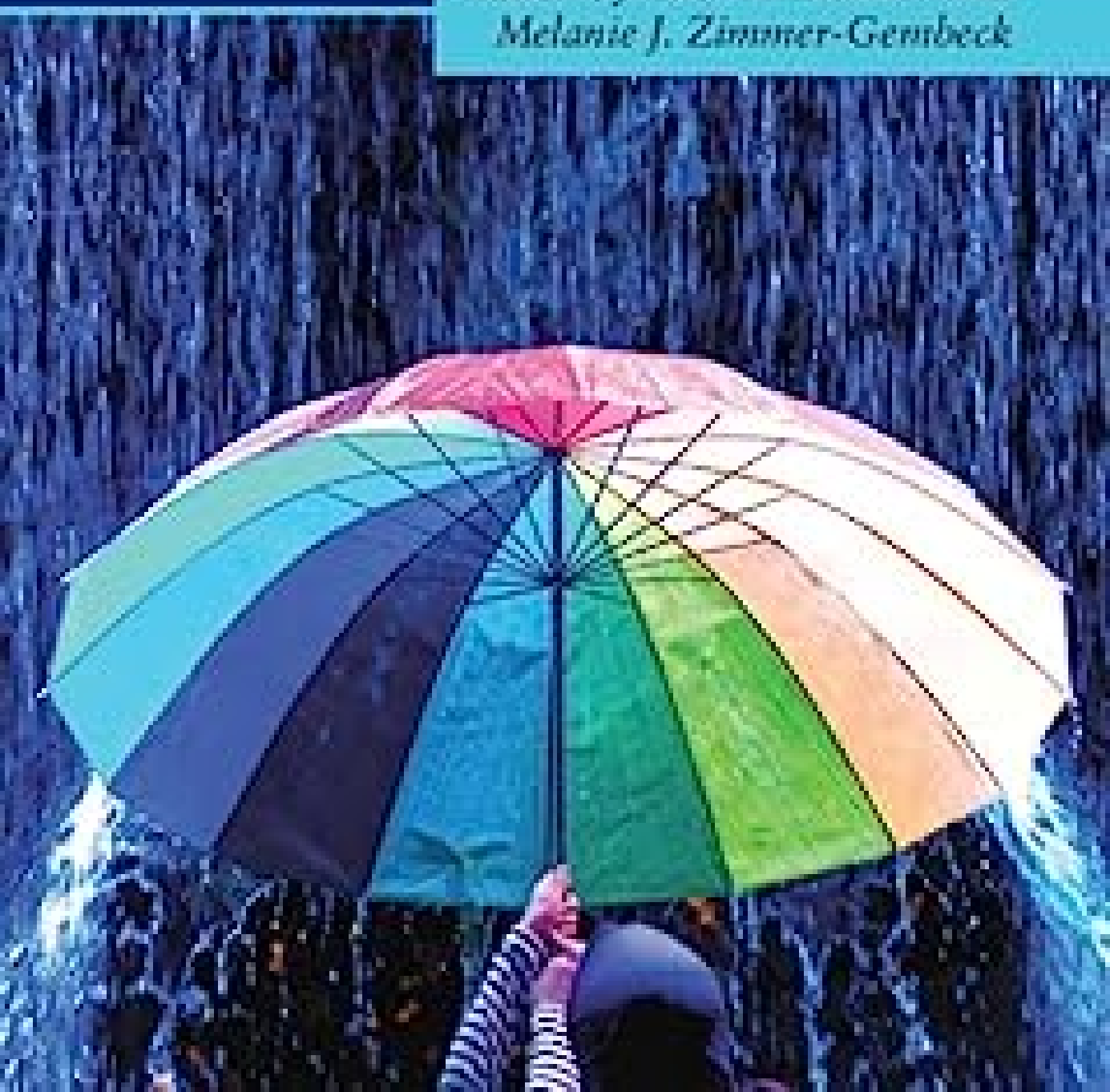
THE CAMBRIDGE HANDBOOK OF THE DEVELOPMENT OF COPING

Edited by Ellen A. Skinner and Melanie J. Zimmer-Gembeck



Contents

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NANCY EISENBERG, *Arizona State University*

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Preface

Working on this Handbook has been like taking a master class in the development of coping, a master class taught by experts all across the fields of stress neurophysiology, regulation, coping, interpersonal relationships, and resilience. Our goal for the Handbook is field building – we want to bring together theory and research from across the spectrum of psychological and developmental sciences that can inform our understanding of how coping develops across childhood, adolescence, and early adulthood. Stress and coping cut across many subareas within psychology and related areas of science, and so this Handbook draws upon and should be of interest to a broad swath of psychologists (including those focusing on clinical, counseling, developmental, educational, personality, social, and neurophysiological psychology), as well as clinicians, public health experts, sociologists, and neuroscientists. In fact, research on "coping" represents one of the most popular topics in psychology over the last 50 years and one that is still of major interest today – not only in other areas of science but also to the media and general public.

An important segment of work on stress and coping focuses on children, adolescents, and young adults. Issues involved in their coping also touch many areas of applied social science, including prevention and intervention science, and are relevant to practitioners interested in parenting, education, clinical practice, social work, and teaching. Despite broad interest in coping among children and young people, and despite broad consensus that developmental level shapes everything about how they are able to cope with stress, this is the first Handbook to focus in depth on theories and research on the development of coping. This Handbook explores the interface between coping and the many content areas related to it, ranging from brain development to social relationships to overarching community structures.

In our own efforts in this area (e.g., Skinner & Zimmer-Gembeck, 2007, 2016), we have been struck by how much relevant and fascinating work is happening *outside* research on coping proper. This work illuminates key facets of the coping process, its underlying constituents, and its social contexts. In each of these areas are strands of work that focus on development. Hence, the Handbook includes chapters not only from researchers whose substantive areas of expertise sit squarely within the territory circumscribed by coping but also from experts in areas that do not even use the term "coping" but whose concerns nevertheless overlap with issues relevant to coping and its development. So, for example, the Handbook includes chapters from researchers who do not consider their work to focus primarily on coping itself. These authors address the question, "What would you like colleagues interested in the development of coping to know about research in your area?" Other authors, clearly experts in coping, do not consider their work to focus primarily on its development; they

answer the question, "What would you like colleagues interested in development to know about your research on coping?"

We owe an enormous debt to all the authors in this Handbook and especially to those who were writing outside their comfort zones. In each chapter you will see thoughtful and generative contributions to theory and research relevant to the development of coping. Authors were eager to learn more about mainstream coping research and generous in their thinking about its development. In fact, as the chapters came in, we were so impressed by their ideas and insights that we started asking authors to include a table of "take-home messages" for researchers interested in the development of coping. We felt that they, like us, would continue to use this Handbook as a reference for future research in the area. In this way, we hope the Handbook can build conceptual and empirical bridges between coping and the many other areas of psychology it touches, including most especially work on the development of regulation and resilience.

Organization of *The Cambridge Handbook of the Development of Coping*

This Handbook is organized around a developmental systems view of coping as an integrated multi-level system that operates on the level of action, but draws on underlying processes from neurophysiological and psychological levels; and is embedded in higher-level social, interpersonal and societal contexts that shape its functioning and development. We organized the Handbook and recruited authors according to that multi-level systems model, with a special focus on researchers studying regulation, resilience, and social relationships.

Connections to Regulation

Developmental models often define coping simply as "action regulation under stress" (Compas et al., 1999; Eisenberg et al., 2009; Skinner & Zimmer-Gembeck, 2007). Because stress activates multiple subsystems, including attention, emotion, behavior, motivation, volition, and cognition, developmentalists argue that coping is both less and more than regulation (Compas et al., 2014). On the one hand, it is less than regulation because it only examines the subset of regulatory activities taking place under stressful conditions. On the other hand, it is more than any one kind of regulation (e.g., attention regulation or emotion regulation), because it involves the coordination of all of these kinds of stress reactions.

Dual process models of regulation can help parse coping into (1) stress reactivity (or action readiness) and (2) action regulation, in which "action" refers to the amalgam of goal-directed emotion-infused attention and behavior that appear on the ground during transactions with stressful events. That emergent action, or coping, reflects the balance between stress reactivity and regulation, with adaptive strategies the result of low reactivity and/or strong regulatory capacities, and maladaptive (or stress-affected) coping the product of high reactivity and/or immature or disabled regulatory capacities. Hence, central to the study of coping are theories

and research on stress reactivity and regulation of all kinds. Of special interest to developmentalists is work that focuses on how and why such reactive and regulatory processes develop or show age-graded qualitative shifts.

Connections to Resilience

Coping can be considered an adaptive process that contributes to how adversity shapes the development of children and youth. Specifically, coping encompasses a set of processes children and young people can deploy when dealing with the proximal stressors created by adversity. Under stressful conditions, coping can make a material difference, sometimes warding off or protecting youth from negative outcomes and building coping resources for dealing with future events. Hence, episodes of coping can contribute to the development of resilience, and programs designed to promote resilience can consider coping as a potential intervention lever to boost adaptation under stressful conditions. As a result, frameworks designed to capture resilience, and especially multi-level developmental systems frameworks (e.g., Masten et al., 2021), provide a natural home for the study of coping. Of special interest to developmentalists are ways in which age-graded changes in coping capacities contribute to resilience during different developmental periods.

Coping as a Site of Development

Coping itself, operating on the plane of action, is also a location where development takes place – where regulatory capacities can be practiced and consolidated, and from which resilience resources emerge. The coping system comprises a set of adaptive processes designed to detect and respond to challenges and threats, which can be broken into multiple tasks, including (1) *radar*, or detection and appraisal of challenges and threats; (2) *reactivity and readiness*, or preparation and coordination of responses to threat or challenge; (3) *regulation*, or sequential adaptation of the complex actions urged by reactivity and readiness to changes in ongoing conditions during interactions with stressful events; (4) *recovery*, or deactivation and resetting of stress responses and rejuvenation of coping resources; and (5) *re-evaluation*, or processes through which coping episodes are debriefed and lessons are learned for future encounters. Each of these steps show development (e.g., radar comes to anticipate threats and not just to react to those that arrive) and all of their development is shaped by ongoing coping interactions.

Social Contexts and Development

Since coping entails the arc of transactions between individuals' actions and stressors over time, it carries with it the seeds of development on many fronts. It is observable and salient to other people in the lives of children and youth, and it is also influenced by the social context, including interpersonal resources and supports, relationships, and the participation of other people. Hence, social partners, settings, and higher-order contexts (e.g., poverty and racism) can be considered parts of the larger coping system.

Of special interest to developmentalists are the ways in which children learn to cope by coping, and in which the contributions of social contexts to coping may also show age-graded changes and shifts. In the grand scheme of things, we hope to begin creating a framework that bridges areas that study developmental changes in how children and adolescents deal with adversity, contributing to the area of resilience and linking it all the way down to research on the many kinds of regulation.

Overview of the Sections and Chapters in this Handbook

The Handbook contains 28 chapters, beginning with an introductory chapter (Skinner & Zimmer-Gembeck; Chapter 1) designed to provide some context for the chapters that follow. Our chapter starts with a historical accounting of stress and coping theory and research, especially the transactional theory of stress and coping, which has dominated the field for at least the past 40 years (Folkman & Moskowitz, 2004; Lazarus, 2000; Lazarus & Folkman, 1984, 1987). We show how developmental systems conceptualizations of coping, which incorporate and expand on transactional perspectives, can scaffold our understanding of the development of coping (Skinner & Zimmer-Gembeck, 2007, 2016; Zimmer-Gembeck, 2021). We lay out five big ideas of a developmental systems view and show how they open pathways for examining age-graded transformations in coping. We then explain how together these ideas suggest that the human coping system undergoes successive reorganizations as the *means* of coping – the coping equipment available to individuals – changes from birth to late adolescence. We end with an overview of the implications of a developmental systems approach for prevention and remediation efforts, highlighting especially the role of coping transactions themselves as sites for the development of robust stress neurophysiology, regulatory resources, stress resistance, and resilience.

The 27 chapters that follow have been organized into six sections, or parts. The first part includes four chapters on *Theoretical Perspectives on the Development of Coping*. Following on, we include two chapters on *Methods for Studying the Development of Coping* and then the content shifts to specific topics, presented in 17 chapters, that cut across three areas: *Neuropsychological* research on the developing human stress system, characteristics at the *Psychological* level that are interwoven into stress and coping processes and development, and *Social Contexts*, including interpersonal relationships and higher-order societal forces, that shape coping and development across the lifespan. We end with a section on *Application and the Development of Coping*, which includes four chapters addressing the interface of stress and coping with social media, clinical treatments, education, and programs for positive youth development.

Theoretical Perspectives on the Development of Coping

In the first section on theoretical perspectives, we encounter complex ideas about how coping develops throughout childhood, adolescence, and adulthood. Each chapter in this section makes its contribution by applying a distinct theoretical lens

to describe and explain coping and its development – including lifespan developmental theory, attachment theory, self-determination theory, and theories of control. In the first of these chapters, Aldwin et al. (Chapter 2) provide a comprehensive developmental introduction to our topic by drawing together coping research conducted within many specific age groups and articulating a general lifespan (meta) theory of coping development. This chapter also highlights key complexities of coping, such as raising the possibility that the development of coping is nonlinear, describing how coping is embedded within many layers of social context, and arguing that coping is rarely an individual endeavor but depends on coping partners (e.g., dyadic coping).

Following this chapter by Aldwin et al., three chapters introduce us to widely influential theories of social and behavioral development that can be used to frame the developmental study of coping. Taken together, these chapters draw from hundreds of theoretically-derived studies of development to summarize what this research reveals about the interface of stress and coping development with parent–child attachment (Magro et al.), psychological needs and social contexts (Raftery-Helmer & Grolnick), and perceptions of control (Baratta & Maier). Magro et al. (Chapter 3) illustrate how themes of stress and coping are interwoven throughout attachment theory and research (Ainsworth et al., 1978/2015; Bowlby, 1982). Thus, this chapter is unequivocal in arguing that the development of coping is a product of social relationships, especially relationships with caregivers alongside experiences of early-life stress. Moreover, they also provide a comprehensive empirical case as well, by reporting the results of a systematic review of the associations of coping with observational, representational, and self-report measures of attachment.

Raftery-Helmer and Grolnick (Chapter 4) rely on self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2017) to guide their consideration of the role of social contexts in children's stress appraisals and coping responses. They focus specifically on the roles of parents and teachers in meeting children's needs for autonomy, relatedness, and competence. Drawing on research on parenting, teacher–student relationships, and stress and coping, they then unpack how elements of the social context (i.e., parent and teacher behaviors) that meet or thwart children's needs can contribute to children's primary stress appraisals of threat versus challenge, and their coping responses. Finally, in this section, Baratta and Maier (Chapter 5) take us on a deep dive into animal studies of controllability to consider processes that contribute to stress resistance (higher threshold of reactivity) and resilience (quicker recovery) to adverse events. After introducing the study of control in animal research, they address many important questions regarding how stressful experiences have differential impacts on neurobiology and behavior depending on their controllability. This is methodical research, which they then apply to human stress and coping, showing why efforts to exert control, as seen in coping and emotion regulation, may buffer against stressor impact and help protect individuals against harmful long-term effects of stress exposure.

Overall, the authors of the chapters in this first part identify commonalities in conceptualizations and operationalizations between the ideas at the heart of each

theory and issues central to coping in childhood, adolescence, and adulthood. The broad scope of this research, with methods ranging from observational studies to survey research to controlled animal studies, was surprising in its coherence – drawing similar conclusions about how coping is shaped by social and physical contexts and often mediated by neurophysiological responses and (in human studies) by individual appraisals, expectations, values, and beliefs. The chapters in this section remind us how much we can learn about the development of coping if we pay close attention to these theories and the empirical research testing them. They also reveal many new possibilities for future study of the development of coping that can be generated from existing developmental theories.

Methods for Studying the Development of Coping

The second section turns to methodology, with two chapters touching on substantive questions about stress and coping, while also raising ideas for new research designs and ways to answer important empirical questions about stress, emotion, coping, adaptation, and development. In this part, authors of the first chapter (Modecki et al.; Chapter 6) cover the many methodological and design challenges (and opportunities) facing researchers who want to study the development of coping. This chapter directs our attention to the advantages and accompanying challenges of attempting to study coping as an unfolding developmental process, highlighting intensive approaches to data collection and the growing use of passive data collection from smartphones and other devices to operationalize concepts related to stress and coping.

The core methods chapter by Modecki et al. is followed by a chapter from experts on resilience (Tyrell & Masten; Chapter 7). They draw upon their expertise in these expansive domains to propose ways that this research could be productively integrated with theories and research on stress and coping. The authors argue that bidirectional scientific communication could enhance the research of those interested in resilience and those interested in stress and coping. This chapter is particularly helpful for considering how to use designs common in studies of resilience to address important questions about coping and its development. The authors do this while also raising important issues such as discrimination and dynamics at many levels. Overall, the two chapters in this section move us closer to addressing some of the big developmental questions of how to best describe and explain diverse pathways of adaptation and maladaptation, keeping in the mind the ultimate purpose of optimizing developmental trajectories across the lifespan.

Multiple Levels of the Development of Coping: Neurophysiological, Psychological, Interpersonal, and Societal Foundations

Parts III, IV, and V include 17 comprehensive and thought-provoking chapters, which start with a focus on the role of human neurophysiology in the development of

coping and move outward to incorporate the roles of psychological processes, and then social environments, both micro (e.g., family, peers, schools) and macro (neighborhood, community). Part III covers *Neurophysiological and Experiential Bases of the Development of Coping* with four chapters (Chapters 8–11). Part IV covers *Psychological Foundations of the Development of Coping* with five chapters (Chapters 12–16). Part V covers *Social Contexts and the Development of Coping* with eight chapters (Chapters 17–24). Each chapter includes an in-depth consideration of its topics and we were inspired by how these chapters not only bring together core findings, but also build on them to propose many new ideas for integrative theories and future research. Thus, the chapters, as a whole, are more than the sum of their parts. We are especially enthusiastic about the chapters' complementarity: Chapters from one area can be used to expand on topics raised only briefly in chapters from another area, while individual chapters can be used to answer important questions that arise from discussions in other chapters.

Neurophysiological and Experiential Bases of the Development of Coping: Within Part III, the four chapters consider neurobiological systems involved in stress responding and regulation within the body *and* the importance of experiences taking place outside the body in shaping the development of coping and adaption more generally. Cohodes et al. (Chapter 8) and Sigrist et al. (Chapter 9) focus most on development within the body by describing the details of neurobiological developments related to the human stress system (Cohodes et al.) and the dynamical biological systems framework of human adaptation (Sigrist et al.). They explain how bodily systems are involved in stress reactivity and regulatory responses (coping), describing development of the hypothalamic-pituitary-adrenal axis, the autonomic nervous system, the central nervous system, and integrated neurovisceral systems. Yet, each chapter also acknowledges the central importance of social experience early in life, by showing how human biological systems and their development are shaped by experiences of caregiving, deprivation, and other resources and adversities.

Such programming via early experience is thoroughly explored in the next chapter by Cicchetti and Bendezú (Chapter 10). They address how and why child maltreatment is so detrimental to human development, concentrating on its impact on the stress system. They carefully lay out these complex literatures, and then thoughtfully present essential details and make important connections to the development of stress reactivity and coping. The last chapter in this section, by Rudolph et al. (Chapter 11), considers the physiological and psychological changes of adolescence, but also pays close attention to changing social experiences and contexts and their roles in adolescents' coping with stress (and other stress responses). This chapter draws on the substantial research base focusing on this period of life as a time of reorganization and change in stress appraisals, regulation, and coping. The authors summarize the many physiological changes that have been documented in the stress system over the pubertal transition and beyond, which are so important to later life pathways. They also emphasize the importance of social contexts and interactions,

given the many experiences of new stressors and shifts in regulation and coping abilities that are features of adolescents' lives. Overall, each chapter in this section pays explicit attention to important ideas about developmental timing as crucial to a complete mapping of the development of coping and related patterns of adaptation or maladaptation.

Psychological Foundations of the Development of Coping: For the five chapters in Part IV, we asked authors to summarize and then apply their expertise on important psychological foundations of development that we argue are closely connected to the development of coping (see Skinner & Zimmer-Gembeck, 2016). Thus, five chapters in this section review person-level psychological factors and highlight their importance for understanding coping, proposing a range of new research ideas along the way. These chapters carefully detail relevant theory and research on attention (Hoyo et al.; Chapter 12), emotion regulation (Cole et al.; Chapter 13), executive functioning (Obradović et al.; Chapter 14), accommodative coping (Greve & Kappes; Chapter 15), and personality (Shiner et al.; Chapter 16).

Social Contexts and the Development of Coping: Eight chapters make up Part V, with all authors asked to apply their expertise on social contextual influences to the development of coping. The chapters in this part are organized to address microsocial system influences first. Bai and Repetti (Chapter 17) start off this part with a very developmental chapter that gives us one of the most comprehensive summaries available on how the social context can influence stress, physiological responses to stress, and coping processes. They also address theory, methodology (especially ecological momentary assessment and observations), research, and applied interventions. The next four chapters focus on the important social contexts of parenting and family. Each enriches our understanding of the development of coping by integrating research on emotion socialization (Spinrad et al.; Chapter 18), child temperament (Lengua et al.; Chapter 19), interparental conflict (O'Hara et al.; Chapter 20), and autonomy in adolescents (Van Petegem et al. ; Chapter 21). Next, a chapter appears on the interface of peer stress and peer relationships with the development of emotion and coping (Zimmer-Gembeck et al.; Chapter 22).

Although many of these first six chapters in Part V also simultaneously consider higher-level societal contexts that have an impact on parenting, families, and peer relationships (e.g., culture, gender socialization, and work), the last two chapters explicitly direct their attention to macrosocial system influences. These chapters address income inequality and poverty (Wadsworth et al.; Chapter 23) and culture and diversity (Nichols Lodato et al.; Chapter 24), thoroughly considering how community and societal conditions can amplify the influence of stress and coping or change how stressful experiences occur and unfold. Of course, focusing only on person-level factors or only on social contexts (or only on *one* social context) in any single chapter turned out to be impossible, so each chapter in Part V (as well as the chapters in Part IV) gifts us with many innovative ideas for how to conceptualize and investigate multiple levels of influence that can help describe and explain the development of coping.

Application and the Development of Coping

Finally, Part VI is the icing on the multi-level cake of the development of coping, with each of the four chapters addressing *Application and the Development of Coping*. Given that most of the researchers who work in the areas addressed in this Handbook are all essentially concerned with improving the development of children and youth, we wanted to end the Handbook by coming back to why the study of the development of coping is so important. Thus, each chapter in this part considers what is known about stress and coping in specific applied areas of research. The aim here was to reveal possibilities for how we can support healthy developmental pathways through research on how children and adolescents cope and expand their coping skills in multiple venues: through resources and interactions available online (Brimmel et al.; Chapter 25) or through clinical interventions (Kangas & Rapee; Chapter 26), experiences in educational settings (Skinner et al.; Chapter 27), and youth development programs (Simmons et al.; Chapter 28). The authors consider these issues by addressing how empirical studies directed at improving children's and adolescents' lives often target coping and, thus, can be informative about how coping develops. Across the whole of Part VI, we were encouraged to see how research on stress and coping can be applied to improve multiple outcomes (e.g., social support, well-being, mental health, or academic success) in multiple settings, including mental health interventions, schools, and programs that support children and youth.

Conclusion

In sum, we view each chapter in this volume as indispensable for any researcher, practitioner, educator, or student who wants an updated account of cutting-edge research on the development of coping broadly construed – the unfolding of children's and adolescents' experiences as they attend to, react to, manage, regulate, think about, come to understand, and learn from their responses in the face of stress. These chapters also provide all of us with a map to follow in conducting future research – in many directions – that identifies and addresses the unknowns that still remain about coping as a developmental process of adaptation and change, and how to turn the experience of stress and coping away from risks for mental and physical health problems and toward supporting learning and growth along constructive pathways of development.

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1 A Systems Perspective on the Development of Coping

"We're Going to Need a Bigger Boat"

Ellen A. Skinner and Melanie J. Zimmer-Gembeck

This is the first Handbook dedicated to the development of coping. That situation represents something of a paradox, given two historical facts. First, there has been overwhelming scientific interest in the topic of stress and coping for almost 100 years and, second, an important branch of this work has always focused on children and youth (Frydenberg, 2014). Coping is of fundamental importance because it marks an adaptive process people use to deal with the challenges and problems they encounter in their everyday lives. It can protect individuals from the ravages of stress, contribute to resilience, and build resources for dealing with future challenges. It represents a topic of enduring empirical study, examined across the biological, psychological, and social sciences, accounting for thousands of investigations each year, starting even before it first appeared as a term in *Psychological Abstracts* in 1967.

A branch of this work focuses on coping in children and youth. Inspired by long-standing interest in the effects of stress on children, researchers have examined the impact of major life events, like maternal deprivation and exposure to wartime conditions, on children's development since the early 1900s. Seminal publications mapping this domain include the longitudinal studies undertaken by Lois Murphy and colleagues at the Menninger Clinic in the 1950s focused on vulnerability, coping, and growth from infancy to adolescence (Murphy, 1957, 1974; Murphy & Moriarity, 1976); the volume *Stress, Coping, and Development* edited by Norman Garmezy and Michael Rutter (1983); the *Psychological Bulletin* paper by Bruce Compas, entitled "Coping with Stress during Childhood and Adolescence" (1987); the book by Carolyn Aldwin on *Stress, Coping, and Development* (2007); and our own annual review chapter, the first on the development of coping, and the book that followed (Skinner & Zimmer-Gembeck, 2007, 2016).

There is great interest in the coping of children and youth, stemming both from basic questions (such as its connection to psychopathology; Compas et al., 2017; Zimmer-Gembeck & Skinner, 2016) and from the realization that interventions to support coping can be a lever to help young people (Wolchik & Sandler, 1997). Moreover, there is complete consensus that development shapes every aspect of how people cope. The tools that infants, toddlers, children, adolescents, and adults have at their disposal to deal with stressful transactions – from appraisals to strategies to recovery from stress – differ fundamentally. A comparison between the neurophysiological reactivity of the infant and the metacognition of the emerging adult seems to reveal the operation of coping on different planets.

And yet, there is no thriving area of research on how coping develops. In this chapter and volume, we address the paradox intimated by this Handbook: How can there be immense interest in the coping of children and youth along with universal acknowledgment that development shapes every aspect of coping,

and, still, so little research examines the development of coping that this Handbook is the first to focus on the topic? We answer this paradox with a paradox of our own. We argue that there are two barriers to the realization of this rich and programmatic area of study.

The first barrier can be found in the conceptualizations of coping that dominate the field today. As explained later in more detail, these conceptualizations view coping as a transactional process (e.g., Lazarus & Folkman, 1984); they direct researchers' attention to the different ways people can cope (e.g., via problem-solving or escape) and their antecedents (e.g., social support, pessimism) and consequences (psychological functioning, distress). Such conceptualizations, focused on individual differences in how adults deal with stressful life events, were never intended as vehicles for understanding how children and youth learn to deal with everyday stressors in the contexts of daily life. The study of adults involves the deployment of responses from an existing repertoire of coping actions; the study of infants, children, and youth also involves the *construction* of a *new* repertoire of coping *capacities*. Transactional theories alone are not equipped to explain how children and youth get better (or worse) at coping as they traverse successive developmental tasks and stages.

We believe that "developmentally friendly" conceptualizations of coping are needed (Skinner & Zimmer-Gembeck, 2007) and the first goal of this chapter is to explain what such conceptualizations entail. At the most general level, they go back to definitions of coping as an adaptive process (e.g., White, 1974) and make clear that it is inherently intertwined with development. At its core, coping depicts how people detect, appraise, deal with, and learn from actual and anticipated stressful encounters. The processes used to accomplish these tasks arise from many levels, and so coping is an organizational construct that includes a tightly integrated bio-psycho-social-cultural system incorporating neurophysiological, attentional, emotional, motivational, behavioral, cognitive, social, interpersonal, and cultural processes. From this perspective, it becomes clear that – paraphrasing the police chief's reaction the first time he saw the great white shark in the film *Jaws* – "We are going to need a bigger boat." In other words, we argue for a developmental systems view of coping that organizes this fundamental adaptive process according to multiple levels that are integrated to serve the functions of coping during transactions involving stressful events. From this vantage point, the successive age-graded reorganizations of this larger system start to become visible.

The second barrier to the developmental study of coping turns out to be the term "coping" itself. As we discovered while working on our book on this topic (Skinner & Zimmer-Gembeck, 2016), once a developmental systems perspective is adopted, it becomes clear that a wide range of developmental phenomena are directly relevant to this system, few of which are actually labeled "coping." So, for example, multiple neurophysiological systems subserve stress reactivity and regulation. All of them show age-graded changes and shifts (Engel & Gunnar, 2020; Lupien et al., 2009), and their developmental trajectories differ depending on the temperamental characteristics (Rueda & Rothbart, 2009) and interpersonal contexts in which they operate (Gunnar & Hostinar, 2015). These neurophysiological processes directly impact the functioning and development of the coping system; however, they are rarely referred to as "coping." A developmental systems view releases theorists from the constraints of research on coping proper, while also providing a clear map of the range of topic areas relevant to the organization and functioning of the coping system. Most importantly, it directs researchers to the

(sometimes thin) strands of work in each of these areas that look at their normative and differential development. These threads hold the keys to the development of coping.

Hence, the second goal of this chapter is to show how a developmental systems perspective on coping can provide a guidebook to identify work directly relevant to the development of coping that has not always been explicitly connected to its study (e.g., Compas, 1987; Skinner & Zimmer-Gembeck, 2016). We provide an overview of the primary areas we see as relevant to the development of the coping system, covering work from neurophysiology (Engel & Gunnar, 2020) and regulation (Compas et al., 2014, 2017; Eisenberg et al., 1997) to higher-order social contexts (e.g., Wadsworth, 2015; Wadsworth et al., 2020). This was the map we used to identify and invite authors for this volume, and we hope it can help answer the paradox of the missing research on the development of coping. There is no burgeoning literature called "research on the development of coping," but there *is* a burgeoning research literature on the development of coping. It has been there all along, but we need a broader more integrative developmental systems perspective to recognize the many rich and complex areas of study that can inform our understanding of coping and its development.

A Bigger Boat: Developmental Systems Conceptualizations of Coping

Because coping represents a fundamental adaptive process, designed to protect people from danger and help them engage effectively with demands and challenges, it is not surprising that it has been considered from a variety of perspectives, often reflecting the established paradigms of the day. From each of these iterations, the field has accumulated insights that inform the way we view coping today. For example, coping can trace its roots to psychoanalytic work on defenses (Freud, 1949). This perspective influenced several generations of ego psychologists (Haan, 1977; Valliant, 1986; see Cramer, 1998), who conceptualized coping as an outcome of personality processes ordered along a hierarchy of ego maturity. Lasting legacies of this approach include the notions that coping involves reactions, not only to external stressors but also to intrapsychic pressures, that some modes of coping are not conscious, and that the ego (or self) and its regulatory functions are key to how coping unfolds.

A second strand of theorizing about coping can be traced back to the biomedical research on stress, starting in the early 1930s. Parallel to the idea that exposure to toxins does not lead in any direct fashion to specific health outcomes, this branch gave us the idea of coping as a form of "host resistance" to stress. It also highlighted the notion of the active individual and the importance of examining specific stressors or demands when trying to make sense of coping. Over its history, coping has also been defined as a specific person-context transaction, an indicator of competence, personality in action under stress, a repertoire of strategies, fewer symptoms of mental or physical health problems, a function of emotion, an outcome of temperament, an expression of stress physiology, a quality of action regulation, and resilience. (For historical overviews, see Aldwin, 2007; Frydenberg, 2014; Lazarus, 1993; Lazarus & Folkman, 1984; Murphy, 1974; Parker & Endler, 1996; Snyder, 1999.)

Transactional Models of Coping

Today the field of stress and coping is dominated by transactional models (Aldwin, 2007). This perspective defines coping as "constantly changing cognitive and behavioral efforts to

manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 141). Transactional approaches insist that individuals' responses can only be understood by considering the actual stressors they face as well as the social and personal resources available in the situation at the time (Folkman & Lazarus, 1985). One of their biggest contributions has been to underscore coping as a cyclical recursive process that unfolds over time, involving stressors, appraisals, coping responses, and outcomes. Central to this process are individuals' ever-changing appraisals of the significance and meaning of stressful encounters.

As depicted in Figure 1.1, transactional models hold that coping is initiated by psychological stress, defined as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984, p. 19). Based on the significance of the outcome and the resources available, individuals can appraise (an actual or anticipated) stressful encounter as, for example, a challenge, threat, harm, or loss. These appraisals, along with personal and social resources, influence the kinds of coping that will be employed, which in turn affects the outcome, for better or for worse. An individual's coping can resolve or exacerbate the stressful situation and calm or heighten psychological distress. These outcomes then feed into the next iteration. Such cyclical transactions continue until the stressor is resolved or the individual accepts the situation, escapes, or gives up. The arc of these transactional processes describes a coping episode.

Research on Coping during Childhood and Adolescence

Over the last 50 years, this framework has guided most of the research on coping across the lifespan. The field is anchored by "ways of coping," or the actual actions individuals show on the ground when dealing with stressors. A range of responses have been considered, such as problem-solving, escape, support-seeking, and distraction, and have been assessed using a variety of methodologies. For older children, adolescents, and adults, self-report questionnaires are most often employed, and young children's coping has

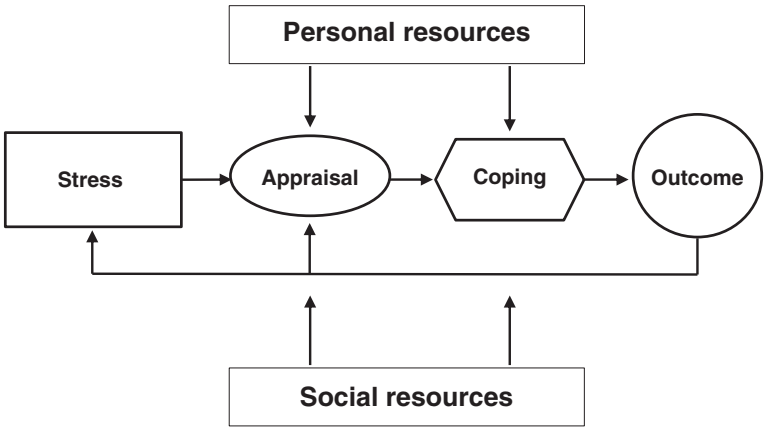

Figure 1.1 Coping depicted as a *transactional process* of appraising and dealing with demands.

been captured using direct observation and reports from parents and teachers. The bulk of this research targets individual differences in the links between steps in the transactional process. For example, to establish their valence and importance, studies examine the connections between different ways of coping and a range of indicators of functioning in children and youth, such as psychological adjustment, well-being, academic performance, peer relationships, internalizing and externalizing behaviors, and distress.

Over many years, these studies have identified ways of coping that seem to be productive in that they relate to positive functioning and well-being; these include effort exertion, problem-solving, negotiation, focus on the positive, and emotion approach coping. A second set of responses seem to be unproductive in that they are linked with psychological distress, disorder, and poorer functioning; they include escape, avoidance, helplessness, rumination, and opposition. A third set, which includes some relatively common ways of responding to stress, are inconsistent in their links to potential outcomes; they include help-seeking, support-seeking, and emotion-focused coping. These responses may be omnibus coping strategies that can be deployed in adaptive or maladaptive ways (e.g., seeking support to rejuvenate versus to co-ruminate) or they may be double-edged swords, in that they are used when distress is high (so are sometimes positively correlated with ill-being) but are also helpful in dealing with distress (and so are sometimes also linked with better outcomes).

Based on the idea that productive coping can protect children and youth from the otherwise negative effects of stressful events, researchers have also conducted studies to investigate interindividual differences in the resources that make adaptive coping more likely. Such studies have uncovered a range of coping resources, both personal (e.g., perceived control, intelligence, optimism, sociability) and interpersonal (e.g., warmth, provision of instrumental aid or emotional comfort from parents, siblings, teachers, and peers). The malleability and importance of coping have been demonstrated in programs designed to support, coach, or teach children and youth to cope more constructively. The study of such programs provides evidence that coping can be changed for the better and that such changes often result in improvements in well-being and functioning (e.g., Sandler et al., 1997; Wadsworth et al., 2020).

Much has been learned from these decades of research on individual differences in ways of coping. However, little of it directly pertains to coping's development. The study of individual differences can provide information about the current functioning of coping on the ground, but not about the developmental history that gave rise to it, nor about how the functioning of that system is enabled and constrained by the current developmental organization of the organism expressing it, nor about how coping transactions themselves may contribute to future development. For this, a developmentally friendly conceptualization is needed. To fill this gap, we favor a developmental systems approach.

Five Ideas from a Developmental Systems Conceptualization of Coping

An interesting feature of developmental systems perspectives is that they lead to a response of "yes and" to most views of coping. Systems approaches view different conceptualizations of coping the same way that the parable of the five blind men and the elephant views their different perspectives on the elephant – a leg as a tree trunk, a tusk as a spear, an ear as a fan, a side as a wall, the trunk as a snake. Different theories all perceive

important facets of the phenomenon, but there are two problems: Each perspective is incomplete, and no one recognizes the whole of the elephant. The construction of a developmental systems conceptualization of coping is organized around a simple question with a complex answer. The question is: "What is the elephant (i.e., the coping system)?." And the complex answer? "All those subsystems that make it up (the parts) and how they are organized (structured) and work together (operate) to serve their adaptive functions (the whole)."

So just as the elephant is not a tree trunk plus a spear, a fan, a wall, and a snake, coping is more than a list of appraisals, emotional reactions, and things people do in times of trouble. It is more than the sum of its parts. The coping described in transactional approaches is just the tip of the developmental system's iceberg. A developmental systems conceptualization can be explained in five big ideas, summarized in Table 1.1. We provide an overview of each of these ideas and show how, by contributing to a developmentally friendly view of coping, they identify other areas of research integral to coping and its development. We end by examining the implications of these big ideas for age-graded shifts in the organization and functioning of the whole coping system and for interventions designed to foster its development at different ages.

Idea 1. Coping as Action Regulation under Stress

The first idea is based on the recognition that coping is a fundamental adaptive process (White, 1974) designed to scaffold both defense and constructive engagement with challenging demands. From this perspective, coping is not just a series of things we do. It is part of an evolutionarily conserved process that allows us to guide and direct our actions so they will be more effective in keeping us alive while allowing us to learn from encounters with challenging and threatening events. What are we doing during these encounters that allows us to "deal with" or "manage" transactions that hold the potential for harm and loss, but also for learning and growth? Developmentalists have converged on one answer: We are regulating our actions. Our actions in all their multiplicity (e.g., fight, run, freeze, push, seek comfort, strategize, get help, work together) are the tools humans employ to fend off danger and build capacities for more effective action in the future. Adaptation under stressful conditions calls for the skillful deployment of actions, guided by goals, coordinated with others, exquisitely tuned to conditions in the organism and on the ground at the moment, and constantly changing as those conditions change. No one can do this at birth, yet most people have gotten much better at it by the time they reach adulthood.

Hence, to describe the full scope of how people manage or deal with stressful person-context transactions, developmentalists define coping as "action regulation under stress" (Compas, 1987, 2009; Compas et al., 2001; Eisenberg et al., 1997; Sandler et al., 1997; Skinner & Wellborn, 1994; Skinner & Zimmer-Gembeck, 2007, 2009). From this perspective, coping depicts how individuals initiate, mobilize, energize, channel, guide, coordinate, organize, modulate, dampen, and direct their actions (or how they fail to do so) under stressful conditions. Dual process models of regulation suggest two components – one depicting the target to be regulated, such as an emotion or impulse, and the other describing the set of processes that regulate it. In work on emotion, these are referred to as "emotion" and "emotion regulation" (Cole et al., 2004); in work on temperament, "reactivity" and "regulation" (Rothbart et al., 1994); in work on willpower, the "hot" emotional and the "cool" cognitive systems

Table 1.1 *Five big ideas in a developmental systems conceptualization of coping*

1. ***Coping as a balance between reactivity and regulation***. Coping can be defined as action regulation under stress.
   - Coping entails stress reactivity (or action tendencies) and action regulation.
   - Constructive versus unproductive (stress-affected) coping reflects the (im)balance between reactivity and regulation.
   - Both impulsigenic (reactivity) and regulatory processes develop.
     - A crucial function of coping is to contribute to the development of constructive action tendencies, regulatory capacities, and everyday resilience.
2. ***Tasks of an adaptive process***. To protect individuals from threats and dangers while allowing them to interact constructively with challenges and demands, the coping system accomplishes five basic tasks.
   - These are (1) *radar* or threat detection and appraisal; (2) *readiness* or coordination of responses to threat or challenge; (3) *regulation* or adapting responses to changes in ongoing conditions; (4) *recovery* or re-setting and revitalizing coping resources; and (5) *re-evaluation* or learning from encounters with stress.
   - Each of these tasks can be accomplished with whatever equipment the infant, child, or adolescent has available to them at their particular developmental stage and current state.
3. ***Place and purpose of the study of coping***. The study of coping is located between regulation and resilience.
   - Coping as an *episodic process* corresponds to transactional models of stress, appraisal, coping, and outcomes. These depend on situational personal and interpersonal resources as well as previous coping episodes. Short-term, episodes produce coping assets and liabilities.
   - Coping as an *interactional process* overlaps with work on regulation, where coping can be a coordinating construct that provides an integrative platform for the operation of multiple impulsigenic and regulatory processes under "hot" stressful conditions.
   - Coping as an *adaptive process* overlaps with work on resilience, where coping can be a protective factor, explanatory mechanism, intervention lever, resource for everyday resilience, and site for building stress resistance and resilience.
4. ***Hierarchical structure of coping***. Coping can be organized as families of action types that serve adaptive functions within which are nested multiple ways of coping (as seen in subscales in coping measures), within which are nested a virtually infinite number of instances of coping.
   - Higher-order categories represent an action typology that classifies the tools individuals can use to coordinate their actions with environmental affordances during stressful transactions, according to their effectiveness, individuals' goals, and personal and social resources available.
   - Core categories of coping are a taxonomy of multi-functional regulatory packages.
   - Each of these families includes ways of coping that are graded by age. Infants, children, and youth have the means to express the coping functions depicted in each of these families, but the specific ways and instances of coping depend on age.
5. ***Coping emerges from an integrated multi-level system that is developing.*** Coping is a bio-psycho-social-cultural process, visible on the level of individual action, but the product of an integrated multi-level system that includes the neurophysiological and psychological subsystems that give rise to it and the interpersonal and societal contexts in which it is embedded. It can be organized in five levels.
   - *Level of action*. Coping unfolds on the plane of action as an episodic process that involves appraisals, reactivity (action tendencies), action regulation, coping outcomes, recovery, and learning under stressful conditions.

Table 1.1 (*cont.*)

- *Underlying processes*. Coping is shaped by underlying neurophysiology and psychological subsystems.
- *Overarching processes*. Coping is deeply social and contextual.
- *Processes at all these levels are developing*. Their development is reciprocally related to the development of coping.

(Metcalfe & Mischel, 1999); in work on motivation, "intrinsic" and "extrinsic" motivation (Deci & Ryan, 1985).

Action Tendencies and Action Regulation

In coping, these dual processes can be labeled "stress reactivity" (or more generally "action tendencies") and "action regulation." Both are adaptive. Stress reactivity is the product of a fast, emotionally driven, impulsive "hot" system that appraises and reacts to external stimuli or situations relatively automatically and with little conscious control. This hot system has strong temperamental, motivational, and emotional bases; however, it also incorporates experiences through conditioning and learning. Although reactivity or impulses are often portrayed as problematic, they serve an important adaptive function – to quickly bring the organism into a state of readiness to act. This hot system is adaptive in two ways: (1) it is more flexible and differentiated than reflexes, and yet (2) it triggers environmentally tuned actions faster than a more cognitively mediated system.

The second component comprises regulatory processes, which work with the hot system to channel, coordinate, and sequence the actions it urges. Regulation is sometimes considered the product of a "cool" system because some of the most effective regulatory strategies are cognitive and deliberate. However, this system has a range of processes at its disposal, including neurophysiological, habitual, attentional, and social processes, that operate already in neonates and infants (e.g., Kopp, 1989). Regulatory processes are also adaptive: (1) by allowing actions to be more informed, deliberate, and flexible, they provide more options than externally triggered reactivity, and (2) they benefit from intentionality and so can be more attuned to individuals' higher-order principles and long-term priorities, goals, and values.

As in other areas, there is active discussion about how reactivity and regulation work together during coping. Researchers generally agree that they mutually influence each other over time (Compas et al., 2001; Eisenberg et al., 1997; Skinner, 1999). For example, an extreme reaction to stress elicits many coping responses. Or, conversely, proactive coping allows a person to avoid situations in which they would be overwhelmed (Aspinwall & Taylor, 1997). Some researchers suggest that any given response reflects a balance between the two subsystems (Metcalfe & Mischel, 1999). In terms of coping, this implies that maladaptive (or our preferred term "stress-affected," Wadsworth, 2015) coping is the product of a strong stress reaction and/or a weak (immature or disabled) regulatory system, whereas productive coping is the result of a mild stress response and/or a strong action regulation system. The effects of stress on the functioning of regulatory subsystems are studied widely (e.g., in work on hot executive functions; Zelazo & Carlson, 2012). Although high levels of stress may disrupt or overwhelm regulatory processes, moderate levels seem to create a zone of heightened regulation, during which subsystems become more

cooperative and regulatory capacities can be practiced and consolidated (e.g., Jamieson et al., 2018; Kopp, 1989; Repetti & Robles, 2016; Sapolsky, 2015).

Developmental Connections

Conceptualizations of coping as action readiness and regulation under stress are developmentally friendly because they build bridges to the rich developmental literatures on reactivity and regulation, including their temperamental and neurophysiological bases and the social forces that shape them. Most importantly, they connect coping to research on age-graded pathways and reorganizations of stress reactivity and regulation across successive developmental levels (Cole et al., 2019; Holodynski & Friedlmeier, 2006; Kopp, 1989; Nigg, 2017; Thompson, 2015). These theories and bodies of research lay out guideposts to chart the development of coping.

Idea 2. Coping Operates between Regulation and Resilience

The second big idea of a systems perspective is that any given system, like the coping system, can operate on multiple levels and over multiple timescales. Such a perspective allows coping to be integrated with the larger landscape of research focused on stress and the development of children and youth. As pictured in Figure 1.2, coping operates on three levels, each with its own timescale. At the middle level, coping functions as an episodic process. This is the level with which coping researchers are most familiar because it depicts the kinds of transactional models prevalent today (e.g., Figure 1.1), and connects them up with antecedents – previous coping episodes – and consequences, namely, resources and liabilities for coping with future stressful encounters.

Coping also operates at a lower-order level in real time, and so overlaps with work on *regulation*; and at a higher level over developmental time, and so overlaps with work on *resilience* (Chapter 7, this volume). The study of coping is located in between these streams of research. Coping is essential to a full understanding of the effects of stress on children and adolescents because it not only depicts the individual's active role in the transactional process of dealing with the demands that adversity brings into a child's life, but also has the potential to consider how these episodes unfold and accumulate across time, and so shape development. Such an analysis makes clear how coping fits with work on regulation and resilience: where they overlap with coping, how research on coping can contribute to them, and how the study of coping can be informed by them.

Coping and Regulation

As can be seen in Figure 1.2, episodes of coping (shown in the middle level) contain coping as an interactional process (shown in the lowest level). Here, coping depicts the actions of infants, children, and youth as they deal with specific demands (e.g., novelty, restraint, delay, noncontingency) during moment-to-moment exchanges on the ground in real time; this process overlaps with the primary concerns of research on regulation (Compas et al., 2014, 2017; Eisenberg et al., 1997; McClelland et al., 2015; Thompson, 2015). However, coping differs from specific kinds of regulation in three ways. First, it considers regulation only under a subset of conditions, namely, during stressful transactions. So, coping overlaps completely with that portion of regulation that is hot (e.g., hot executive processes), but also includes cool regulatory processes when they are deployed under stress.

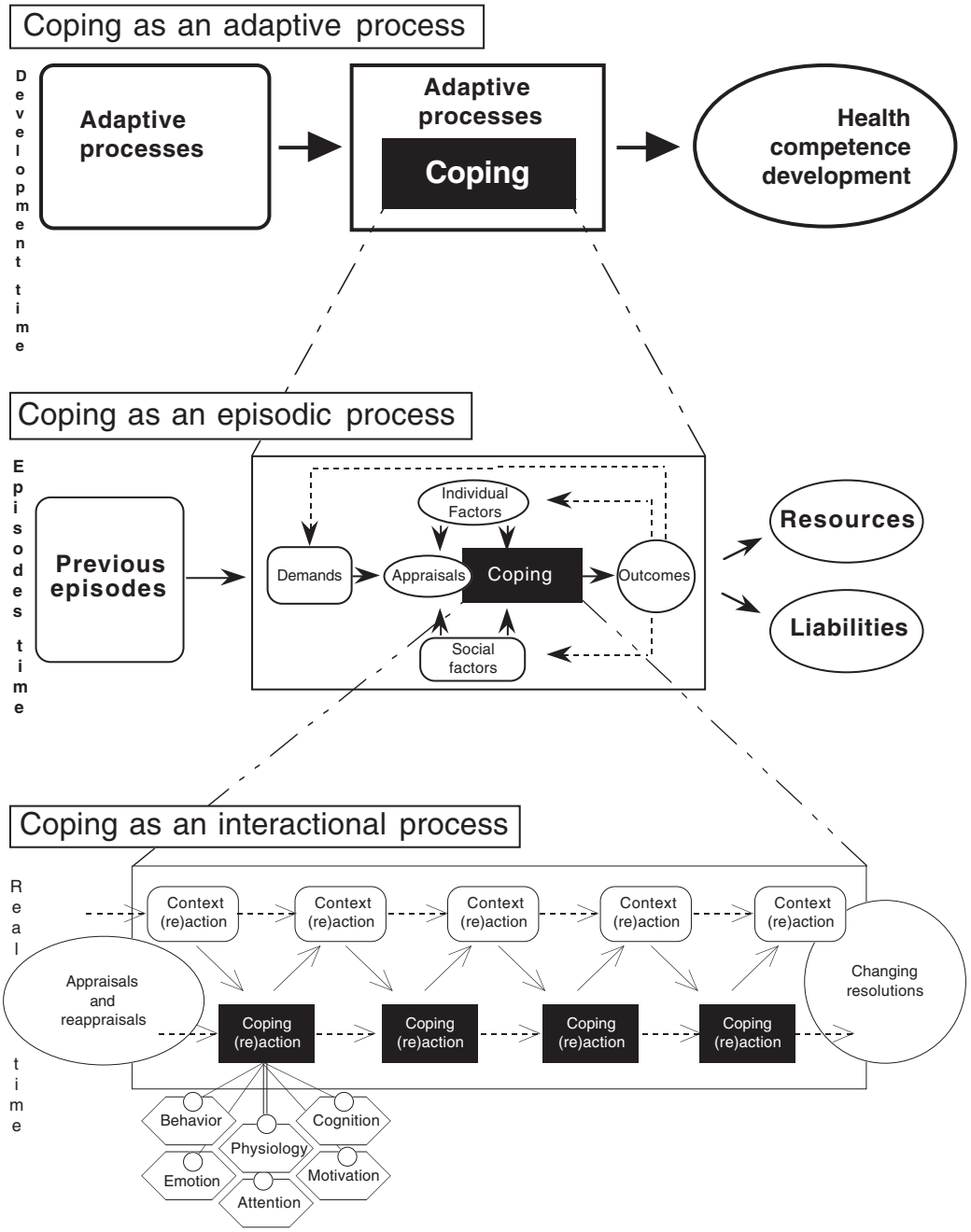

Figure 1.2 Multi-level conceptualization of coping as a *developmental* process, an *episodic* process, and an *interactional* process.

Integrated Models of Regulation: The second way coping differs from work on regulation is based on the targets of regulatory efforts. Researchers have made connections from coping to many kinds of regulation, including emotion regulation (Compas et al., 2014; Eisenberg et al., 1997; Kopp, 1989), behavioral self-regulation (e.g., Metcalfe & Mischel, 1999), attention deployment (e.g., Wilson & Gottman, 1996), ego control and resiliency (Block & Block, 1980), and self-regulation more generally (Aspinwall & Taylor, 1997). In research on regulation, these specific forms are typically studied separately. However, because stress can activate a variety of responses – physiological, emotional, attentional, behavioral, cognitive, and so on – coping includes efforts to coordinate and manage all of them. Hence, during stressful encounters, all these forms of regulation can be considered subsystems that work together to shape the actions described by coping (Compas et al., 1997; Holodynski & Friedlmeier 2006; Skinner, 1999). During coping, their combined regulatory effects can be positively synergistic (e.g., when planning calms emotion or comfort-seeking refreshes resources for problem-solving) or they can work at cross-purposes and show antagonistic effects (e.g., when motivational urges are so strong they derail cognitive processes or when actions are forced before emotions are consulted) or block each other (e.g., when strong approach and avoidance tendencies bring action to a standstill).

Hence, of greatest interest to coping researchers are integrative models that consider how multiple kinds of regulation work together. Until recently, such information was hard to come by because it was dispersed across a wide range of relatively siloed areas of study, each one focusing on a different target of regulation (e.g., emotion, attention, behavior) or different regulatory process (e.g., executive functions, delay of gratification, effortful control). Only recently have researchers begun to propose syntheses that integrate these overlapping areas of study (e.g., Cole et al., 2019; Gagne, 2017; McClelland et al., 2015). Although most have focused on early development, some have also extended their conceptualizations to middle childhood (Nigg, 2017) and adolescence (Casey, 2015; Compas et al., 2017; Steinberg et al., 2018). These emerging perspectives are of great interest to coping researchers, especially because several of them are explicitly developmental (e.g., Cole et al., 2019; Nigg, 2017).

Impulsigenic Processes: Third, coping differs from typical work on regulation because it is focused not only on the development of regulatory processes, but also on the development of so-called impulsigenic processes (e.g., Duckworth & Steinberg, 2015); these are the processes that lead to action readiness and reactivity. As can be inferred from its name, most research on regulation focuses on regulatory processes. From this perspective, conceptualizations of impulses (see Sharma et al., 2014 for a review) typically consider them to be problematic because they interfere with self-control and socially appropriate behavior. Coping researchers, however, are very interested in subsystems that generate the *targets* of regulation, such as impulses or emotional reactions. They argue that anything that makes action tendencies more constructive also makes coping easier (e.g., Compas et al., 1999; Skinner & Wellborn, 1994). Hence, work on processes that affect stress reactivity and action readiness, like emotions, intrinsic motivation, impulsivity, and temperamental dimensions (like reactivity, exuberance, and sociability), are highly relevant to the development of coping.

Coping and Resilience

As shown in the top panel of Figure 1.2, the territory of coping also extends upward where

it functions as an adaptive process operating across developmental time; here it overlaps with work on *risk and resilience*, which trace the effects of adversity on the development of competence and psychopathology (Denckla et al., 2020; Masten et al., 2021; Chapter 7, this volume). Coping fits under the larger umbrella of resilience because it can help buffer the development of children and youth from the otherwise deleterious effects of stress, risk, and adversity. Coping depicts that slice of "big R" resilience that examines how adversity brings a range of actual stressful experiences into the daily lives of individuals, and how through their own actions and reactions, children and youth attempt to deal with them (i.e., everyday resilience; DiCorcia & Tronick, 2011; Spencer, 2006). At this level, the construct of coping serves many purposes for resilience (Zimmer-Gembeck & Skinner, 2016). It can be considered a protective factor itself, an explanatory mechanism (in that other protective factors may exert their positive effects by boosting adaptive coping), an intervention lever, a resource for everyday resilience, and a site where stress resistance and resilience are built. Hence, coping researchers look to work on resilience to bridge to the higher-order contexts of adversity (e.g., poverty, racism) and frame the long-term developmental outcomes and pathways that are at stake.

Developmental Connections

The view that coping operates on three levels (Figure 1.2) contributes to developmentally friendly conceptualizations of coping because it builds out from transactional views of coping as an episodic process to span the conceptual space from coping as an interactional process operating in real time, accumulating all the way up to coping as an adaptive process operating across developmental time. Systems perspectives identify the place and purpose of research on coping: It operates between and overlaps with regulatory processes below and resilience processes above. Both areas are inherently developmental and so they can inform coping theorists about how to construct developmental systems conceptualizations. The most important steps are listed in Table 1.2 (for more details, see Skinner & Zimmer-Gembeck, 2016, pp. 8–11). Coping, in turn, can provide important connections down to research on regulation and carry them all the way up to processes of resilience and development.

Idea 3. The Coping System Accomplishes Five Basic Tasks

The third big idea of a systems perspective is that by returning to a consideration of coping as a basic adaptive process, it is possible to see that the steps described in transactional models – including cognitive appraisals and intentional actions – are just examples of how the basic tasks of coping can be carried out during particular age periods (in the case of transactional models, the age period of adulthood). At its heart, the coping system comprises a set of adaptive processes designed to detect and respond to challenges and threats, which can be broken into a series of tasks. As superimposed on the transactional model in Figure 1.3, these include: (1) *radar*, or detection and appraisal of challenges and threats; (2) *reactivity and readiness*, or preparation and coordination of responses to threat or challenge; (3) *regulation*, or sequential adaptation of the complex actions urged by reactivity and readiness to changes in ongoing conditions during interactions with stressful events; (4) *recovery*, or deactivation and resetting of stress responses and replenishment of coping resources; and (5) *re-evaluation*, or processes through which coping episodes are debriefed and lessons are learned for future encounters.

Table 1.2 *Desiderata for developmental systems conceptualizations of coping*

1. Coping is an **episodic** (cumulative) process that:
   - gives traction with respect to the ways in which social contexts, settings, partners, and individual characteristics shape how it unfolds;
   - has a place to carry forward previous coping episodes; and
   - shows how short-term coping resources and vulnerabilities (both individual and social) accumulate over time.
2. Coping is an **interactive** (coordinating) process that:
   - is built on what we know about temperament and neurophysiology – particularly from a developmental perspective;
   - has a place for neurophysiology, behavior, emotion, attention, cognition, and motivation; and
   - explains how they are organized and change in response to changing demands, appraisals, and resolutions.
3. Coping is an **adaptive** (proximal) process that:
   - specifies its function in adaptation under stress and its role in the development of mental and physical health, problems, and disorder;
   - can be part of an iterative process of change in response to environmental and intrapsychic demands, including individual and social interactional processes; and
   - functions as a mediating process between adversity and resilience or vulnerability.
4. Coping is a **systemic, integrated, cumulative, coordinating, proximal developmental** process that:
   - applies across the lifespan but looks different at different ages;
   - provides an avenue for determining how coping is shaped by normative and differential developmental changes; and
   - operates as a mechanism of the development of coping capacities.

As can be seen in Figure 1.3, each of these functions is located on an arrow connecting two elements in the transactional model of coping. *Radar* (i.e., detection) comprises the connection between outside stressors and appraisals, depicting processes through which external events enter the coping system as interpretations of the meaning of stressful encounters. *Reactivity/readiness* comprises the link between appraisals and action tendencies, depicting processes through which these interpretations initiate preparation for managing upcoming encounters with stress. *Regulation* sits on the arrow between actions and their consequences, depicting how actions are repeatedly modified based on their effects in ongoing transactions with stressful events. *Recovery* depicts the connection between resolutions of stressful interactions and local conditions, including processes of downregulation, healing, and repair. Finally, *re-evaluation* comprises the link between resolutions and the future, as lessons are learned about the entire episode. These lessons can inform any subsequent step in the coping process, including stress generation, appraisals, readiness, or recovery. Such feedforward effects constitute one form of growth in the face of adversity and demonstrate that some of the most important transactions influencing the development of coping are produced by the coping system itself.

Developmental Connections

Breaking coping down into these basic tasks opens the door to the possibility that each task can be carried out at every age, as explained by

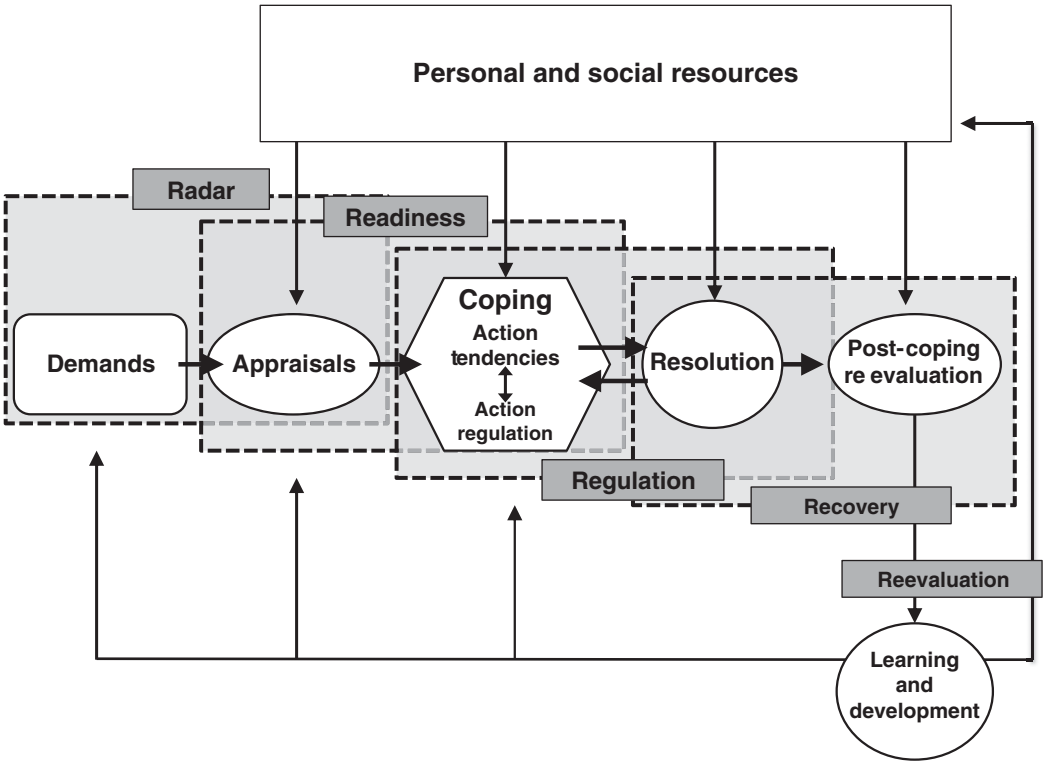

Figure 1.3 The coping system as a set of adaptive processes designed to detect and respond to challenges and threats, comprising five functions: (1) *radar* or threat detection and appraisal; (2) *readiness* or coordination of responses to threat or challenge; (3) *regulation* or adapting responses to changes in ongoing conditions; (4) *recovery* or deactivation and resetting of stress responses, repair, and revitalization of coping resources; and (5) *re-evaluation* or learning from encounters with stress.

Lois Murphy, the researcher who guided the first great longitudinal study of coping in children and youth, "with whatever equipment [the child] ha[s] at his developmental stage" (1974, p. 71). This big idea allows researchers to select a task, such as detecting threats or evaluating lessons learned, and to consider the attentional, motivational, emotional, cognitive, and/or metacognitive "equipment" that can be used to carry it out at different ages. For example, the "radar equipment" of neonates may involve the activation of sensory and attention systems in response to threats and distress, whereas by the end of the first year, radar may come to involve social referencing. In the same vein, appraisal processes likely emerge as implicit expectancies over the first months of life, and only later are carried out by representational systems – still many years away from the full-blown conscious reflective appraisals familiar to coping researchers. These same considerations can be applied to the other tasks carried out by the coping system, leading to the realization, for example, that action readiness can be carried out by the emotion system during toddlerhood or by executive functions during early childhood. Regulation can be a cognitive activity during middle childhood or a metacognitive activity during adolescence. Recovery can be

falling asleep during infancy or losing oneself in songwriting during adolescence. Revaluation can be a conversation with Dad during early childhood or a diary entry during emerging adulthood. Adults have available to them the full range of tools they need to accomplish these tasks – as seen, for example, in their capacity to appraise the likelihood of future threats and to take preemptive coping action (Aspinwall & Taylor, 1997). Infants, children, and adolescents do not. They are discovering and building the tools they will need for these tasks as they grow.

Hence, each task shows normative age-graded developments (e.g., radar, instead of just reacting, begins to anticipate incoming stressors). Such an analysis may open connections between precursor or rudimentary coping capacities and multiple subsystems that show qualitative shifts with age. As summarized in Table 1.3, surfacing these tasks can contribute to developmentally friendly conceptualizations of coping because they can be used to sketch the developmental potentials of a coping system.

These developmental potentials depict a system that can increasingly monitor and appropriately appraise more (current and future) demands using its own and other's "radar"; maintain composure under higher levels of appraised threat with more capacity to withstand multiple demands and better "fallbacks"; respond increasingly in measured socially competent ways that reflect integration of ongoing emotional, attentional, and motivational reactions; more flexibly adjust actions to meet changing environmental demands without losing sight of genuine priorities; recover more quickly from setbacks; and at the same time take more away from stressful encounters, learning how to prevent and deal with future challenges and how to deploy coping in line with future goals (Skinner & Zimmer-Gembeck, 2007, p. 136).

Idea 4. Ways of Coping as Families in an Action Typology

The fourth insight from a developmental systems perspective focuses on "ways of coping" – the building blocks of the coping area. Conceptualizations of coping (and of regulation, which is basically plowing the same field) have found it challenging to translate the

Table 1.3 *Developmental potentials of the coping system*

Coping system that can:

1. increasingly monitor and appropriately appraise more (current and future) demands using its own and other's "radar";
2. maintain composure under higher levels of appraised threat with more capacity to withstand multiple demands and better "fallbacks";
3. respond increasingly in measured socially competent ways that reflect integration of ongoing emotional, attentional, and motivational reactions;
4. more flexibly adjust actions to meet changing environmental demands without losing sight of genuine priorities;
5. recover more quickly from setbacks; and
6. take more away from stressful encounters, learning how to prevent and deal with future challenges and how to deploy coping in line with future goals.

Source: Skinner and Zimmer-Gembeck (2007), p. 136.

"bewildering richness of behavior relevant to it" (Pearlin & Schooler, 1978, p. 4) into a set of core categories. As befits a fundamental adaptive process, literally hundreds of ways of coping have been identified and assessed, creating a thicket of partially overlapping category systems and measures. To bring some order to this confusion, researchers have suggested multiple higher-order categories that could be used to classify lower-order ways of coping based on single *functions* (e.g., problem- vs. emotion-focused coping), *orientations* (approach vs. avoidance), or *topological features* (e.g., cognitive vs. behavioral modes).

Taxonomies of coping, like all taxonomies, should contain categories that are mutually exclusive, functionally homogeneous, functionally distinct from other categories, and exhaustive. Hence, each of the distinctions suggested is problematic as a higher-order category of coping, but for different reasons: (1) categories created by single functions are not mutually exclusive, because all ways of coping serve multiple functions (e.g., problem-solving can also calm emotions); (2) categories like avoidance are functionally heterogeneous (e.g., one can move away from a stressor via terrified escape or via intentional distraction with a pleasurable activity); and (3) categories based on modes are not functionally distinct because all ways of coping can be enacted in multiple modes (e.g., one can seek comfort via behavioral responses, such as by going to find someone, or via cognitive ones, such as through prayer).

Families of Coping

Developmentalists, though conceptual and empirical means, have identified about a dozen core categories of coping that reflect its operation as a basic process of adaptation (Connor-Smith et al., 2000; Skinner et al., 2003; Walker et al., 1997). From this perspective, higher-order categories represent a taxonomy that classifies the tools individuals can use to coordinate their actions with environmental demands during stressful transactions. For example, problem-solving is an adaptive strategy because it allows people to find or create actions that are effective in the environments where stressful transactions are taking place. It is this *coordination* – in this case between actions and environmental contingencies – that is the hallmark of adaptation (White, 1974).

Core categories can be viewed as higher-order *families* of coping that sit at the top of a hierarchical structure (Skinner et al., 2003). Each family contains many members or *ways* of coping (as seen, for example, in subscales of coping measures). In fact, each family includes all the ways of coping that serve those same functions. So, for example, members of the *Problem-Solving* family include not only its corresponding lower-order way of coping (i.e., strategizing) but also other ways that serve to coordinate actions and contingencies, such as effort exertion, instrumental action, mastery coping, cognitive decision-making, positive self-instruction, primary control engagement, task orientation and preparation, task management, planning, and repair. For each coping family member, there are innumerable possible lower-order *instances* of how these ways of coping can be enacted in different circumstances by different people of different ages.

Coping families can be viewed as multifunctional categories of regulatory packages. They include ways of coping that have been commonly studied, like Problem-Solving, Information- and Comfort-Seeking, and Escape. They also hold places for other kinds of coordinating actions that have not always been included in measures of coping, like Accommodation, Negotiation, Helplessness, and Social Isolation. Each of these families is

both problem- and emotion-focused; is oriented toward either approach or avoidance; and can be enacted in a range of modes. Most importantly, these 12 families are relatively comprehensive, in that they can accommodate the vast majority of the over 400 different individual ways of coping included in measures of coping during childhood, adolescence, and adulthood (Skinner et al., 2003). As depicted in Table 1.4, Core categories represent an action typology that categorizes how individuals coordinate actions and affordances, according to (1) their effectiveness, (2) their goals, and (3) their personal and social resources (Skinner et al., 2003).

Coordinating Actions and Contingencies: As can be seen in Table 1.4, the first four coping families are organized around the adaptive process of coordinating actions with contingencies, and so regulate engagement and disengagement in the face of stress. Besides *Problem-Solving*, described previously, productive families include *Information-Seeking*, where an individual pauses in their efforts to deal with a stressor in order to obtain "fresh intelligence," that is, to secure instrumental information about current contingencies and new actions that could potentially be effective. The families organized around this adaptive function – focused on how to deploy one's actions to be efficacious in a given environment – have a long history of study in research on mastery, perceived control, self-efficacy, and learned helplessness (e.g., Dweck, 1999; Folkman, 1984; Maier & Seligman, 2016; Skinner, 1995, 1996; Thompson et al., 1993). Problem-Solving and Information-Seeking are both scaffolded by perceptions of control and competence; individuals who hold these beliefs are more likely to problem-solve and seek information about existing contingencies and how to operate them more effectively (e.g., Raftery & Grolnick, 2015).

Developmental conceptualizations focus on coping transactions as sites for learning and growth, and so tend to highlight constructive coping families. But if stress reactivity is too high or regulatory systems are overwhelmed, individuals show stress-affected ways of coping. When it comes to the coordination of actions and contingencies, two families signal that a coping system is overtaxed: one oriented to avoidance and one to approach. The avoidance family is *Escape*, which includes multiple family members, both behavioral (e.g., leaving) and cognitive (e.g., denial). These responses serve to remove the individual from the stressful encounter, but they do so in ways (e.g., through panic or fear) that heighten distress and undermine subsequent engagement. The approach family is *Helplessness*, and it includes continued engagement with the threatening stressor even though the regulatory system is no longer functioning effectively. These forms of engagement – like confusion and mental exhaustion – are not productive. They amplify the feeling of powerlessness and magnify distress. Ways of coping from both these families are made more likely by histories of experience with objective noncontingency and subjective beliefs that events are out of one's control. Escape under a variety of different names (see Table 1.4) is one of the most common subscales on measures of coping; and helplessness has its own productive area of study active over the last 50 years (Maier & Seligman, 2016).

Coordinating Reliance and Social Resources: The next four coping families depicted in Table 1.4 are organized around the adaptive function of coordinating reliance on others with the social resources available, and so regulate cooperation and self-reliance during stressful transactions. The key constructive family here involves *Support-Seeking* and its family members, all of which serve to bring individuals into contact with trusted others in times of danger (for examples, see Table 1.4).

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Table 1.4 *Core categories of coping as families of action types that serve adaptive functions*

Adaptive process	Family function in adaptive process	Family of coping	Definition of coping family	Ways of coping that are family members
Coordinate repertoire of actions with contingencies in the environment	Adjust actions to be effective	1. ***Problem-Solving***	Attempts to figure out what to do to solve problems, repair mistakes, or prevent them in the future	Strategizing, approach, instrumental action, effort exertion, mastery, planning, repair
	Find additional strategies or contingencies	2. ***Information-Seeking***	Collecting instrumental information about what is happening and how to deal with it more effectively	Social referencing, help-seeking, study, observation, consulting, instrumental aid, reading, internet search
	Find limits of action	3. ***Helplessness***	Stress reaction in which thoughts or next steps become unclear or disorganized	Confusion, flailing, cognitive interference, cognitive exhaustion, resignation
	Evade noncontingent environment	4. ***Escape***	Attempts to avoid or remove oneself from difficulties or undesired outcomes	Flight, mental avoidance, physical avoidance, denial, wishful thinking, disengagement
Coordinate reliance on others with social resources available	Find own strengths Protect social resources	5. ***Self-Reliance***	Attempts to regulate one's flagging emotions and behaviors by bolstering confidence and optimism	Self-encouragement, emotion regulation, behavioral regulation, emotional expression, emotional approach
	Use available social resources and replenish own resources	6. ***Support-Seeking***	Turning to others for emotional reassurance, consolation, encouragement, or cheer	Contact-seeking, comfort-seeking, spiritual support, social emotional support

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	Find limits of resources	7. ***Delegation***	Attempts to get other people to do the work, solve the problem, or take the consequences	Executive help-seeking, self-pity, dependency, complaining, whining, entitlement
	Withdraw from unsupportive contexts	8. ***Isolation***	Attempts to avoid others or prevent them from finding out about the occurrence of negative events	Freeze, concealment, social withdrawal, avoiding others, abandonment, loneliness
Coordinate hierarchy of preferences with available options	Choose to adjust preferences to options	9. ***Accommodation***	Attempts to authentically appreciate and fit one's goals and preferences into existing conditions	Acceptance, distraction, cognitive restructuring, focus on the positive, concession, self-encouragement, endorsement
	Find and create new options	10. ***Negotiation***	Attempts to work cooperatively with current power structure to create better choices	Bargaining, standing up, persuasion, cooperation, priority setting, compromise
	Give up preferences	11. ***Submission***	Preoccupation or capitulation to negative features of a stressful situation	Rumination, self-blame, rigid perseveration, intrusive thoughts, anxiety, amplification
	Remove constraints	12. ***Opposition***	Blaming other people for the negative outcome	Fight, blame others, projection, aggression, venting, explosion, revenge

Notes: Adaptive processes in light gray are considered "stress-affected" in that they are more likely under conditions of threat, whereas adaptive processes in white are more likely under conditions appraised as challenges.

This family is one of the most common subscales in measures of coping, the focus of research on social support (e.g., Taylor, 2011; Taylor & Stanton, 2007), and a core construct in attachment theory under the label "proximity seeking" (Bowlby, 1969/1973). Support-seeking is a productive way of coordinating reliance with social resources because it provides respite, recovery, and an opportunity to build resources for re-entering the fray (e.g., experiences of comfort and encouragement can bolster emotion and motivation).

The second productive family serving these adaptive functions involves *Self-Reliance*, or individuals' attempts to regulate their own behaviors (e.g., via self-encouragement), emotions (e.g., via self-soothing), or motivation (e.g., via determination). This process is adaptive because it allows people to discover their own strengths, protect others, and conserve social resources. Such a functional analysis is consistent with research on the role of perceived social support (e.g., when individuals know that supports are available but do not call on them) as well as with research on attachment showing that a secure base scaffolds both proximity seeking and greater exploration and self-reliance in children (Ainsworth, 1979; Bowlby, 1969/1973).

Stress-affected families organized around reliance on others include an avoidance and an approach version. When the coping system is overwhelmed, it can lead to avoidance via *Social Isolation*, in which individuals attempt to protect themselves by withdrawing socially and preventing others from finding out about the stressful situation. Members of this family, like concealment and social withdrawal, are unproductive because they both prevent the individual from accessing needed resources and can escalate feelings of loneliness and abandonment (Gardner & Zimmer-Gembeck, 2018; Zimmer-Gembeck et al., 2016). The core category involving approach is *Delegation*, in which individuals try to offload the job of dealing with stressors onto other people. Members of this family, like dependency, entitlement, or executive help-seeking, are unproductive because they not only prevent individuals from building their own coping capacities but also amplify feelings of victimhood and self-pity; they can also exhaust social resources and alienate potential supporters.

Coordinating Preferences and Options: The final four coping families depicted in Table 1.4 are organized around the adaptive processes involved in coordinating one's genuine preferences with the options available in the environment, and so regulate concession and defense. The prototypical family here is *Accommodation*, in which individuals attempt to flexibly adjust their preferences to fit into current situational constraints (Chapter 15, this volume). This coping family has been discussed under many names (e.g., Morling & Evered, 2006), and its members include ways like acceptance and focus on the positive (see Table 1.4). This family is adaptive because it allows people to "get into it if you can't get out of it," maintain integrity despite losses or constraints, and focus on the positive features of stressful situations (Brandtstädter, 2009; Brandtstädter & Renner, 1990). These strategies are complemented by the family *Negotiation*, in which people attempt to create new options through bargaining, persuasion, and selection of goals to prioritize (Chapter 21, this volume). These ways of coping are constructive because they can uncover new possibilities on the ground, and help people act in ways that defend their high-priority goals (Baltes & Baltes, 1990).

Central to these families are autonomy and self-determination. These psychological resources allow people to take ownership for their coping and to act in ways that are consistent with their true preferences and priorities (Ntoumanis et al., 2009; Skinner & Edge, 2002; Van Petegem et al., 2017, 2019). The

hallmarks of the constructive coping families of Accommodation and Negotiation are flexibility, authenticity, and choice. Unlike perceived control and support-seeking, which represent well-established pillars in coping research, discussions of ownership and self-determination in coping have not been as well developed, and have even sometimes been labeled "secondary control," which makes no sense because accommodative processes are not secondary, and they are not control (Skinner, 2007).

When coping systems are overrun, the two unproductive coping families organized around concession and defense involve the nonautonomous responses of Submission and Opposition (Chapter 21, this volume). Ways of coping in the *Submission* family, like capitulation, resignation, and rumination, are not autonomous because they are not willingly endorsed and so amplify internal pressure (e.g., through negative emotions like anxiety, self-blame, or guilt); they can also interfere with effective action and undercut social support. *Opposition*, which can involve aggression, blaming others, or revenge, is also nonautonomous because its goals are determined by outside forces; actions are recruited to oppose the agenda of others – without guidance from internal preferences and priorities. It is not adaptive because it tends to amplify anger, undermine coping from more constructive families, and repel other people (Carver & Harmon-Jones, 2009).

Developmental Connections

The identification of a dozen hierarchically organized families of coping forges connections to development in at least three ways. First, it creates bridges to other action-oriented topics, like perceived control, helplessness, attachment, and self-determination, that have long been implicated in children's coping (Compas, 1987; Zimmer-Gembeck et al., 2015) because they focus on how individuals and their social partners face important classes of stressors (such as noncontingency, separation, or coercion). These theories are near-neighbors that help elaborate the substance of coping: They explain how cognition, emotion, and motivation are organized (or disorganized) under stress, and how they are coordinated in the service of action at different ages. They also explain how specific belief systems, like perceived control, internal working models, and autonomy orientations, develop and can shape coping appraisals and action; and why certain social resources, like responsiveness, scaffolding, and autonomy support, should make a difference to how children and youth experience and learn to cope with challenges and threats.

Second, a hierarchical structure of coping connects ways of coping to the development of both regulation and resilience. At the bottom of the hierarchy are instances of coping; these overlap completely with instances of regulatory efforts that take place under stressful conditions. In fact, regulation researchers have always borrowed heavily from the catalogue of coping categories to classify regulatory attempts (e.g., Compas et al., 2014; Eisenberg et al., 1997; Gross & Thompson, 2007). At the top of the hierarchy, core coping categories are connected to basic adaptive processes – those that coordinate actions and environmental affordances, social resources, and personal values and goals. This connection helps to highlight the functional significance of coping and link it to the development of resilience and vulnerability. In some fundamental sense, the coping system has the potential to both preserve the organism and shepherd its development during stressful encounters – to bring it to safety, to extract an outcome from the environment, to connect with others, to reach its goals. And in the

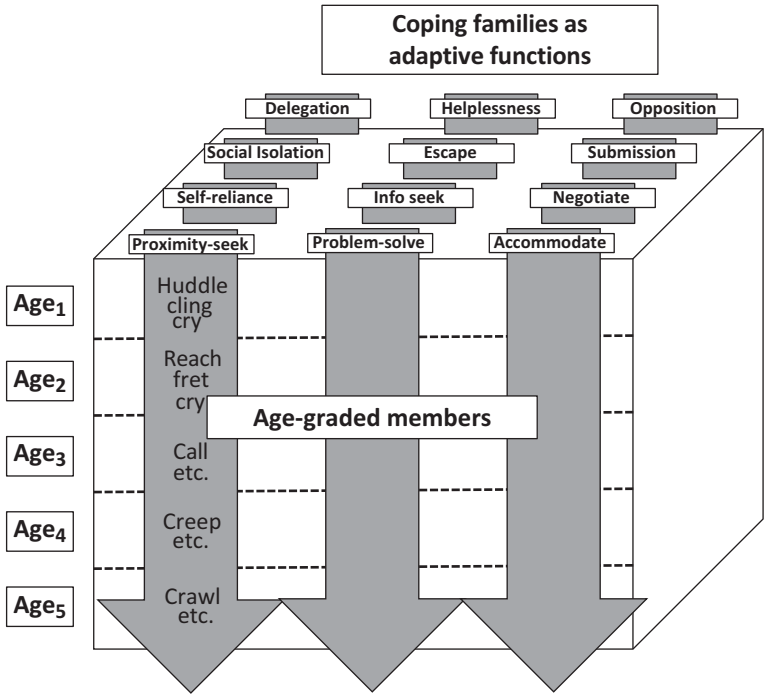

Figure 1.4 A view of families of coping as adaptive functions that allows researchers to identify developmentally graded ways of coping within a family by mapping how those same functions can be achieved through different means at different ages.

process, coping creates learning in its broadest sense, about the qualities and actions of the organism, its genuine priorities, the trustworthiness of social partners, and opportunities in the context.

Developmentally Graded Family Members: Third, this idea – that coping categories are a taxonomy of action types that serve multiple functions in dealing with stress – allows researchers to identify age-graded ways of coping. Functional analyses of each coping family can be used to identify how those combinations of functions can be achieved through different ways of coping based on the equipment available to individuals at different developmental levels, as depicted in Figure 1.4. For example, before the prototypical actions of problem-solving emerge during early childhood, infants can be seen trying to coordinate their actions with the physical contingencies in the environment (e.g., Watson, 1966; Watson & Ramey, 1972). At even younger ages, infants begin to coordinate their actions with social contingencies. Initial expressions of distress turn into communications, when neonates start to intentionally direct their signals to caregivers, waiting after a bid to see whether a response is forthcoming before they signal again (e.g., Paavola et al., 2005). Since these actions are used when the infant is distressed, they can be considered early members of the Problem-Solving family of coping. In fact, they are integral to the problem-solving and instrumental actions of "external coping" provided by caregivers in response to infants' signals (Skinner & Zimmer-Gembeck, 2016).

Support-seeking provides another clear example of developmental progression. Its prototypical family member proximity seeking has been used as an organizing construct in work on attachment to provide an umbrella for the myriad ways that infants and young children can get to caregivers when they are distressed (Chapter 3, this volume). The means that infants use to accomplish this function change with age. They start with cries, signals, and reaching – which bring caregivers to them – and later develop more active means like crawling and walking – which bring them closer to the caregiver. Family members extend all the way up the age range, for example, as an adolescent phones home or a young adult comforts themselves with thoughts of their late grandmother. The identification of age-graded members of coping families paves the way for the documentation of developmental trajectories and transformations in coping from birth to emerging adulthood – as new equipment comes online that creates new ways to carry out each set of functions (Skinner & Zimmer-Gembeck, 2016).

Idea 5. Coping Emerges from an Integrated Multi-level System

The fifth and final big idea of a systems perspective is, of course, about the complexity of the system itself. The key idea is that coping, although manifest at the level of individual action, is the product of a multi-level system, including the neurophysiological and psychological subsystems that give rise to it, and the interpersonal and societal contexts in which it is embedded. As depicted in Figure 1.5, this perspective anchors coping to the level of action, where it is visible in the episodic processes depicted by transactional models. Definitions of coping as action regulation under stress differentiate the intertwined processes of stress reactivity, action tendencies, and regulation that emerge on that level. The repeated operation of this system results in the accumulation of episodes involving both adaptive and maladaptive responses, and so creates a developmental signature of coping, as depicted in Figure 1.5 by a trail of slices of coping.

Underlying Neurophysiological and Psychological Processes

A focus on reactivity and regulation on the plane of action dictates the *psychological* processes underlying coping; these include the attentional, emotional, motivational, behavioral, cognitive, and metacognitive subsystems that jointly generate action tendencies and regulate them under stress. At the *neurophysiological level* are the biological subsystems used to detect and react to stress, to regulate stress reactivity, and to recover and learn from stressful transactions. Most centrally, these involve the sympathetic-adrenal medullary axis (SAM), the parasympathetic nervous system, the hypothalamic-pituitary-adrenocortical (HPA) axis, the amygdala, the hippocampus, and the prefrontal cortex (PFC), especially the anterior cingulate cortex because it subserves both cognitive and emotional processing (Compas, 2006).

Developmental Connections: A multi-level conceptualization of coping is developmentally friendly in that it pinpoints many neurophysiological and psychological subsystems that change and develop, both normatively and differentially, all of which can influence the development of coping on the level of action. At the neurophysiological level, all these subsystems show age-graded changes that can impact how the coping system is organized and functions (e.g., Engel & Gunnar, 2020; Lupien et al., 2018; Mulkey & du Plessis, 2019; Porges, 2018). For example, a history of caring and responsive interactions

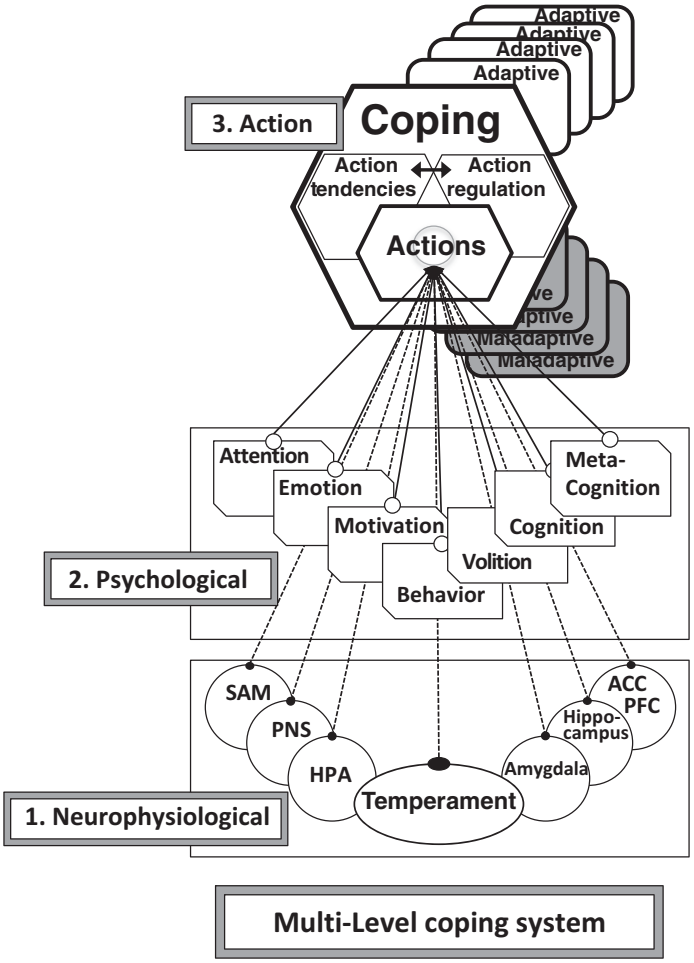

Figure 1.5 An integrative multi-level conceptualization of coping as a biopsychosocial process that includes: (1) the *neurophysiological level*, including psychobiological subsystems used to detect and react to stress and to regulate stress reactivity, most centrally, the sympathetic-adrenal medullary (SAM) axis, the parasympathetic nervous system (PNS); the hypothalamic-pituitary axis (HPA), the amygdala, the hippocampus, and the prefrontal cortex (PFC), especially the anterior cingulate cortex (ACC); (2) the *psychological level*, including the attentional, emotional, and motivational subsystems involved in stress reactivity and regulation; and (3) the *level of action*, including the behavioral, cognitive, and metacognitive subsystems that jointly generate action tendencies and that integrate and regulate them.

with caregivers typically opens the neonate's stress neurophysiology to comfort from social others and normatively leads many of these systems to go into a period of hyporesponsivity by about the age of 3 months (Gunnar & Hostinar, 2015). This shift establishes the neurobiological foundations for support-seeking as an omnibus coping category; it also reduces stress reactivity, improves stress recovery, and supports more constructive engagement and coping with all manner of demands and challenges. The same principle holds for

the development of coping-relevant processes at the psychological level. For example, the development of cognitive processes opens the way for appraisals to move from implicit to explicit expectations, and eventually to emerge as fully reflective and metacognitive processes.

Not all normative developmental changes signal progress, however. At the neurophysiological level, early life stress can produce changes that exacerbate stress reactivity and undermine regulation (e.g., Engel & Gunnar, 2020; Lupien et al., 2009) in ways that make stress-affected coping more likely at subsequent stages. Or at the psychological level, age-graded changes in motivation, such as those found in the academic domain, typically comprise declines in many features (e.g., intrinsic motivation, self-efficacy, engagement) as students negotiate school transitions (Wigfield et al., 2015). These motivational losses correspond to age-graded changes in the deployment of academic coping over the same developmental periods (e.g., Skinner & Saxton, 2020; Chapter 27, this volume). At every age, coping on the level of action emerges from the integration and balance among the developmental forces acting on it, some of which reflect advances (e.g., in coping capacities) and some of which reflect constraints (e.g., in performance factors that influence its deployment).

Overarching Social Forces

As depicted in Figure 1.6, coping and the reactivity and regulation it entails are deeply social phenomena, and so are decisively shaped by *interpersonal relationships* and other social forces (Compas, 1987; Garmezy & Rutter, 1983; Skinner & Zimmer-Gembeck, 2016; Chapters 3 and 17, this volume). As the steps in coping episodes unfold, other people (especially caregivers, but also extended family, friends and other peers, teachers, mentors, and so on) can participate directly in these transactions (Chapters 3, 18, 19, 20, and 22, this volume). Social partners can reduce or amplify demands, corroborate or question appraisals, suggest or prevent ways of coping, offer interpretations of coping transactions that consolidate learning or escalate distress, and create or prevent short- and long-term consequences. Some of these interpersonal processes can even be called co-coping or co-regulation, as for example in co-problem-solving or co-rumination (Waller et al., 2014; Chapters 17 and 22, this volume). At the same time, interpersonal relationships and interactions scaffold individuals' coping, as depicted in processes of parenting, emotion and coping coaching, and socialization (Bradley, 2007; Eisenberg, 2020; Howe & Zimmer-Gembeck, 2022; Kliewer et al., 1994; Power, 2004; Zimmer-Gembeck & Locke, 2007; Chapter 18, this volume). At its most general, this level includes the relationships, social interactions, and local contexts that create the interpersonal matrix within which the structure and functioning of coping's many neurophysiological, psychological, reactive, and regulatory subsystems develop.

Finally, a systems perspective highlights the role of higher-order factors at the *cultural* and *societal level* that shape processes of coping in multiple ways (e.g., Chun et al., 2006; Clauss-Ehlers, 2008; Kuo, 2011; Chapter 23, this volume). Such forces operate directly, by driving differential risks and resources into the niches occupied by children and youth from subgroups who sit on different rungs in the ladder of society's status hierarchy (Spencer, 2006; Chapter 24, this volume). Societal factors influence the stressors that are allowed to make their way into the lives of children and youth, and the resources they can access to deal with them. These forces also impact coping indirectly by shaping the societal stressors and resources that influence their

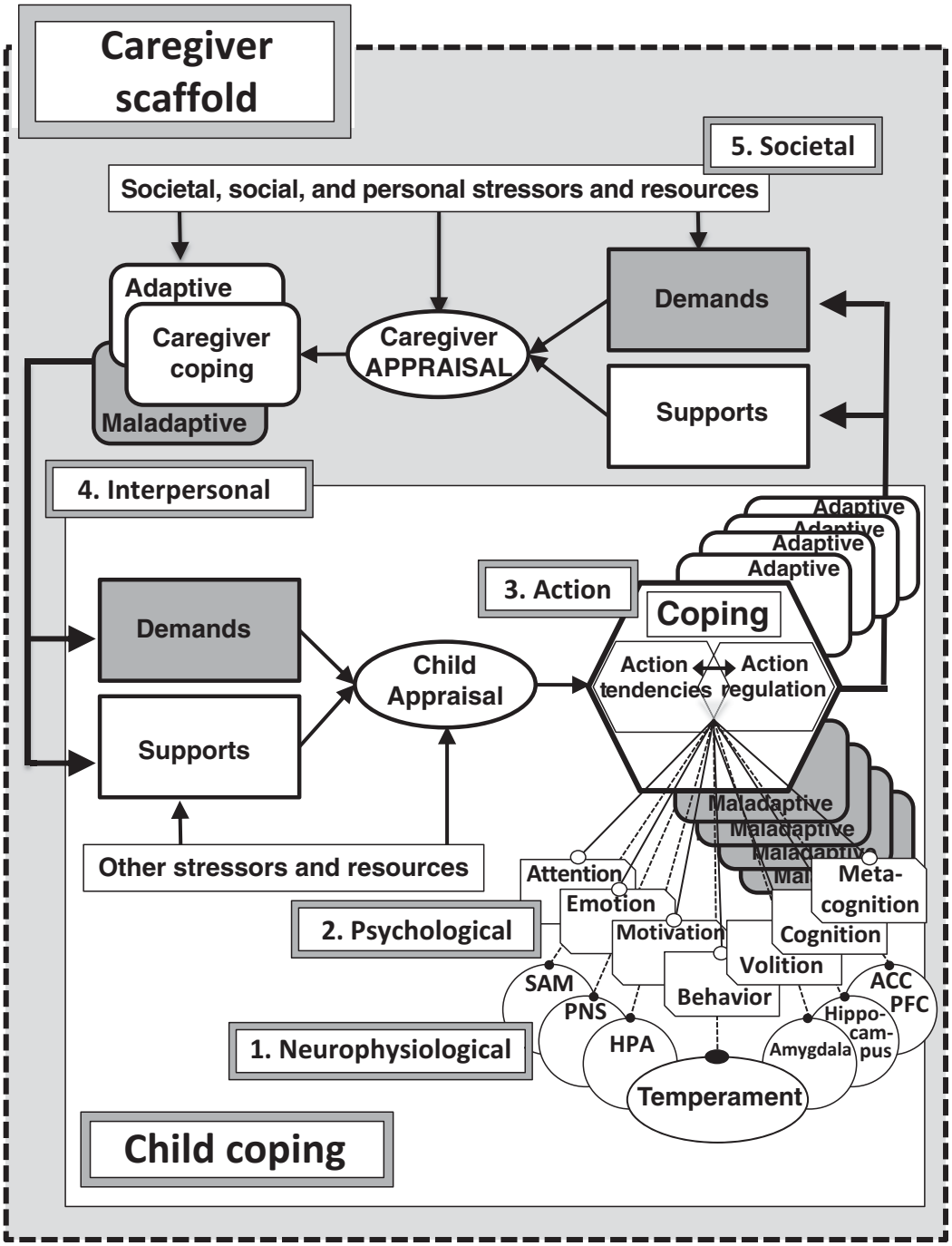

Figure 1.6 An integrative multi-level conceptualization of coping as a biopsychosocial process that adds: (4) the *interpersonal level*, including participation in coping by social partners as well as interpersonal relationships (such as with caregivers, extended family, friends, peers, and teachers) that create the interpersonal matrix within which the structure and functioning of coping's many subsystems develop; and (5) the *societal level*, including the demands that specific niches within society allow to impinge on children and adolescents as they develop and the supports that are available to them, as well as the societal stressors and resources that influence their social partners and contexts, like neighborhoods, homes, and schools.

social partners and contexts, like neighborhoods, homes, and schools (Tolan & Grant, 2009; Wadsworth et al., 2018). Moreover, the cultural communities in which children and adolescents are embedded also offer higher-order collective coping strategies, focused, for example, on mutual support, cooperation, collective efficacy, spirituality, sense of purpose, strong positive cultural/racial/ethnic identities, and fighting for social justice (e.g., Hope & Spencer, 2017; Kuo, 2013; McNamara et al., 2013; Spencer et al., 2003; Wadsworth et al., 2018).

Integrated System

A multi-level perspective lays out the complex system that comprises the coping of infants, children, and youth, and shows the many constructs and areas of research that need to fit inside this "bigger boat." At the same time, it highlights the *integration* of all these processes in service of the functions of coping. So, for example, the neurophysiological subsystems that underlie threat detection, stress reactivity, regulation, and recovery can be thought of as a single multi-level integrated neurovisceral "super-system" (Koenig, 2020; Smith et al., 2017; Thayer & Lane, 2009; Chapter 9, this volume) that, when working optimally, supports flexible functioning that is well-calibrated to internal and external conditions. When stress is low, it supports constructive goal-directed engagement with social and physical environments. If uncertainty or novelty appear, it instigates an observant and cautious readiness for action. In the face of challenge, it can marshal short-term energetic resources and enhanced regulation. If transactions become threatening, it can trigger automatic stress reactions that activate fight or flight behaviors; if these fail, it can initiate the shutdown of a "freeze" response (i.e., immobilization). When danger has passed, it can rapidly switch off resource-expensive reactions and then more slowly reset the entire system to homeostatic functioning, allowing a return to productive social and physical interactions or, if needed, a pause for rest and recovery.

In the same vein, the psychological processes that underlie stress reactivity and action regulation, including emotional, attentional, behavioral, motivational, volitional, and cognitive subsystems, can be thought of as an integrated "super-system" that subserves adaptations to environmental challenges, threats, and dangers (e.g., Cole et al., 2019; Nigg, 2017). In other words, action readiness and regulation – coping – comprises a unitary holistic system that is hierarchical, dynamic, and flexible, with first lines of defense and fallbacks. This system is adaptive because it continuously attunes itself to changing neuropsychological, social, and external affordances and demands (Lupien et al., 2018; Smith et al., 2017; Thayer & Lane, 2009), allowing up- and downregulation of attentional and energetic resources needed to deal effectively with goal-directed action under stress.

All the processes studied as parts of stress reactivity, action readiness, and regulation (e.g., executive function, cognitive control, attention regulation, emotion regulation) can be considered parts of a biopsychosocial system that can be (re)assembled into a wide variety of functional units in response to patterns of internal and external demands. Paraphrasing Joëls and Baram's (2009) apt description of stress, all of these "coping instruments" can be considered parts of the "biopsychobehavioral symphony of coping." By focusing on the ways that coping systems can be organized and function, it may be possible to glimpse the development of this system as the sequential emergence of these levels and their successive integration (e.g., Loman & Gunnar, 2010; McEwen et al., 2016; Porges, 2018; Skinner & Zimmer-Gembeck, 2016).

Such analyses may begin to explain how coping systems show qualitative age-graded shifts as infants, children, and adolescents develop.

How Does the Coping System Develop?

A systems perspective specifies two ways in which coping develops: (1) it develops according to parts, that is, the system changes as each part develops; and (2) it develops according to wholes, as the organization and functioning of the entire system undergo qualitative shifts. In previous sections, we provided a few examples of the development of the coping system's parts by following the five big ideas and examining how they create entryways into age-graded changes in coping. Each idea forges theoretical links to developing subsystems, thus guiding investigation of how the development of component processes underlying coping combine to influence the emergence of new coping abilities at successive ages. In this section, we focus on reorganizations of the whole. We consider the development of coping to be a lifelong process (Aldwin, 2007), beginning at or before birth, that proceeds through multiple qualitative reorganizations, and is influenced at every step by the participation of social partners, interactions, relationships, and contexts (Skinner & Zimmer-Gembeck, 2007, 2016). In fact, it can be argued that the roles played by social partners also show qualitative shifts in organization as infants, children, and adolescents develop.

Perhaps the easiest way of understanding the organization of each of these developmental periods is that the *means* of coping – the coping equipment available to individuals – changes with age. For example, the emergence of language brings new means of appraising stressful situations and of seeking help. Qualitative shifts in the coping system coalesce to produce new kinds of appraisal and action tools that can, with scaffolded practice, be successively applied to deal with stressful transactions. From this perspective, general appraisal and action mechanisms of coping accumulate developmentally, starting with stress responses guided by reflexes that fuse "coping" actions to the sensory system during the neonatal period; and adding implicit appraisals and regulation via action schemes during infancy; supplemented by explicit appraisals and voluntary coping through direct action during preschool age; coping appraisals and actions using reflective cognitive means during middle childhood; and metacognitive means during adolescence. At every age, these shifts allow coping appraisals and actions to become more effectively calibrated to internal capacities and external affordances, better coordinated with other people, and guided by increasingly autonomous values and goals. So far, evidence suggests that new means do not *replace* old means, they *augment* them, creating a broader and more differentiated repertoire of coping tools as children develop (Rochat, 2015), such that individuals can always use earlier means of coping (e.g., interpersonal instead of individual coping or behavioral instead of cognitive coping) as back-ups if stress is high or capacities are diminished (Zimmer-Gembeck & Skinner, 2011).

Qualitative Reorganizations in the Coping System from Birth to Emerging Adulthood

Given definitions of coping as reactivity and action regulation under stress, its development closely follows the development of stress reactivity and regulation (Engel & Gunnar, 2020) and of integrated executive regulatory processes (Cole et al., 2019; Nigg, 2017). Like

all regulation, the coping system develops from external modes of coping, carried out largely by caregivers during the first year of life, to increasingly internal and autonomous forms as children and adolescents develop (e.g., Ryan & Deci, 2017; Sameroff, 2010). These normative developments unfold in coping systems that differ even before birth in their neurophysiological and temperamental underpinnings, and in the interpersonal contexts provided by caregivers and other social partners. From birth, infants are also active participants in coping processes, communicating their emotional reactions and preferences, expressed initially through undifferentiated behaviors, and then communicated and acted on intentionally as development continues. All of coping's subsystems are also shaped by objective stressors, that is, the actual challenges, adversities, threats, and losses children and their families encounter daily. We offer our current working model of the development of coping, comprising six age-graded reorganizations. These six periods are outlined in Table 1.5, along with the changing role of social partners. Each is described here only briefly to provide a sense of how the coping system undergoes qualitative changes over development (for details, see Skinner & Zimmer-Gembeck, 2016).

Neonatal Period: Stress Reactivity and "External Coping" via the Caregiver

The development of coping starts before birth, as underlying neurophysiological and temperamental foundations are laid down that will eventually make the tasks of coping easier or harder to accomplish (Engel & Gunnar, 2020). The first coping system, like all subsequent systems, is both neurophysiological (rooted in temperament; Derryberry et al., 2003) and social (based on attachment; Sroufe, 1996). At birth, neonates' coping equipment starts as reflexive reactions fused to a vigilant and reactive sensory and neurophysiological system. This system produces a diffuse set of undirected emotional expressions, to which caregivers respond, using increasingly more effective strategies for repair and comfort (Sroufe, 1996). Adult actions can be viewed as "external coping," because they fulfill all the functions of a coping system, such as monitoring and detecting threats, protecting, removing stressors, soothing, comforting, and learning how to deal with stress more effectively (Engel & Gunnar, 2020; Holodynski & Friedlmeier, 2006).

Two major reorganizations take place in the coping system during the first 3 months of life – one neurophysiological and one social. The first starts at birth. Until then the neurophysiological systems subserving coping are accustomed to operating *inside* the mother's body so, following birth, a qualitative reorganization is needed so these systems can develop the capacity to establish stable homeostatic functioning outside such a protective environment (Lupien et al., 2018). In the context of a secure attachment relationship, the neurophysiological systems subserving stress reactivity (e.g., the HPA axis) go into a period of hyporesponsivity (Gunnar & Hostinar, 2015). This shift reduces stress reactivity and frees resources for practicing the up- and down-regulation needed to move the neonate from homeostatic functioning (e.g., digestion and sleep) to constructive engagement (i.e., alert participation) to coping with stress (i.e., regulation), and back again (i.e., recovery; Engel & Gunnar, 2020).

The second reorganization during this period involves a shift from strictly neurophysiological reactivity, regulation, and recovery to the beginnings of interpersonal regulation of these systems by caregivers. Based on a history of caring and responsive interactions, infants' neurobiological systems

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Table 1.5 *Broad outlines of possible developmental shifts in the means of coping from birth through adolescence*

Developmental period	Approximate ages	Nature of coping appraisals	Nature of coping actions	Role of social partners	Nature of regulation
1. Neonate	Birth to 3 months	Sensory systems	Reflexes; stress reactivity	Carry out coping actions based on neonate's emotional expressions	External regulation
2. Infancy	First year	Implicit appraisals	Coordinated action schema	Carry out coping actions based on infant's intentional communications Social buffering	Interpersonal co-regulation
3. Toddlerhood	Second year	Explicit appraisals	Emotional action regulation	Participate in demands and coping responses Social buffering	Cooperative self-regulation
4. Early childhood	Ages 2–5	Inferential appraisals	Coping using voluntary direct actions	Available for direct help and participation Peers added	Intrapersonal self-regulation
5. Middle childhood	Ages 6–8	Cognitive reappraisals	Coping using cognitive means	Cooperate with and support child's coping efforts Friends added	Coordinated self-regulation
6. Adolescence					
Early	Ages 10–12	Reflective reappraisals	Reactivity increases Coping using metacognitive means	Reminder coping Social buffering decreases	Proactive self-regulation
Middle	Ages 14–16		Coping based on personal values	Back-up coping	Identified self-regulation
Late	Ages 18–22		Coping based on long-term goals; Emotion- and problem-focused coping integrated	Monitoring coping	Integrated self-regulation

develop the capacity to be up-regulated (i.e., engaged) and down-regulated (i.e., comforted) by caregivers, thus opening them to regulation from social partners (Feldman, 2017) and creating a sheltered venue for neonates to practice their own burgeoning regulatory capacities. This development also paves the way for the introduction of a crucial omnibus coping strategy, namely, proximity seeking (Bowlby, 1969/1973), upon which future coping will be built. This coping family is well-integrated with neonates' actual emotions, motivations, and neurophysiological states because responsive caregiving is based on infants' genuine preferences as they are expressed in real time (Sroufe, 1996).

Hence, by about 3 months of age, infant coping has become an integrated stress reactivity and regulatory system that is tuned to safety and thus hyporesponsive – capable of both supporting homeostatic functions and dispatching energetic resources for responding to external demands. As part of the developmental tasks of this period, dyads build out from newborns' stress neurophysiology to create a stable biobehavioral platform for infants on the level of reactivity and regulation that will support the subsequent development of coping systems that children can (eventually) operate for themselves.

Infancy: Implicit Appraisals, Intentional Action Regulation, and Co-regulatory Coping

The fundamentals of regulatory coping processes, such as attention and working memory, are present in newborns but undergo qualitative transformations as infants develop (Kopp, 1989; Posner et al., 2014). The healthy progress of these biobehavioral subsystems, such as the emergence of executive attention and the expansion of working memory capacity, is dependent on safe and rich social and physical worlds, including dependable care, secure attachments, and opportunities for stimulating interactions (Pallini et al., 2018). Three developments, important to reorganizations in the coping system during the first year, involve advances in coping appraisals, coping actions, and the capacity to coordinate coping with social partners.

First, stress reactivity and regulation are lifted off relatively automatic neurophysiological subsystems and come to be triggered and guided by infants' implicit appraisals of challenging and stressful encounters; as studied, for example, in research on internal working models (Bretherton, 1996; Sherman et al., 2015) and generalized expectations of contingency (Watson, 1966). Implicit appraisals are constructed from the running total of infants' cumulative experiences in interactions with the interpersonal and physical environments, so they are tightly integrated with transactions on the ground. Such appraisals likely work outside of conscious awareness to identify and decipher the meaning of challenging and threating transactions, and so open the door for the practice of intrinsic coping responses based on fundamental emotional and motivational processes (Barrett & Campos, 1991).

The second major development of this period involves infants' coping actions. They become more robust and goal-directed as sensorimotor intentionality emerges and is consolidated (Zeedyk, 1996), thus readying intrinsic action systems for authentic expression, exploration, interaction, and tenacity. These advances systematically convert preferences to purposes, and so are utilized to guide goal-directed actions and communications aimed at dealing with and overcoming challenges and problems. The onset of locomotion brings a range of new means of coping (Campos et al., 2000).

Third, the interpersonal nature of the coping system is transformed, moving away from

largely external coping carried out by caregivers (under the supervision of infant preferences) and toward a co-regulatory system created by both caregiver and baby where infants learn to help negotiate stressful transactions (Evans & Porter, 2009; Gianino & Tronick, 1988). Within this dyadic system, infants' newly constructed appreciations and goal-directed actions increasingly participate in "coping packages" that are co-generated and co-enacted by caregiver and infant and stored as action schema for use in future stressful encounters (Holodynski & Friedlmeier, 2006). Together, these social relationships and coping capacities (and their feedback in reprogramming developing stress neurophysiology toward higher tipping points and faster recovery) may lead to improved biobehavioral stress resistance and stress resilience by the end of the first year (DiCorcia & Tronick, 2011).

Toddlerhood: Explicit Appraisals, Emotional Action Regulation, and Cooperative Coping

Three important developments underlie age-graded shifts in coping during the second year of life. As during previous age periods, these involve transformations in the tools used for coping appraisals and actions as well as the reorganization of the interpersonal system. First, representational capacities emerge (e.g., as seen in language). This transforms the "radar" of coping so that implicit appraisals become explicit belief systems that interpret the experience of potentially stressful interactions and shape subsequent reactivity and readiness for action. This emerging appraisal system, because it is still tied to actual transactions on the ground, continues to provide a stream of realistic information to the coping system. At the same time, the experiences of most toddlers are taking place in the protected environment of a secure attachment relationship, so these beliefs are positively biased, creating a psychological buffer that positively colors explicit interpretations of challenging and threatening experiences.

Second, the development of emotion and self-systems, as seen in burgeoning self- and emotional awareness, understanding, and regulation (Thompson, 2015), integrates intrinsic motivational and goal-directed action systems with emotion, and converts "emotional action regulation" to coping efforts guided by an increasingly agentic self. This transformation generates more durable intentions and coping actions. It also creates new sources of potential stress (e.g., experiences of self-conscious emotions like guilt and shame; interpersonal goal conflicts) that produce new venues where coping can be practiced.

Third, when the capacity for shared intentionality emerges (Tomasello & Carpenter, 2007), this advance transforms the nature of the interpersonal coping system, which up until now was co-regulatory. It increasingly becomes a cooperative "triadic" system; in addition to the toddler and caregiver, it now includes the problems faced by the child as an object of their joint attention, which they can face as a united front (Tomasello, 2007). In this emerging system, children's stressors and problems, as well as their coping appraisals and actions, can now become topics of joint conversation. As children learn to "use their words" to express desires and feelings, they can discuss and reflect on these motivational and emotional states, consider alternative goals suggested by others, and employ words to take on those goals and to encourage themselves to focus on and enact these new behaviors.

Crucial to the development of this cooperative coping system is the caregiver's continued support for genuine communication and productive regulation of emotions and emotionally inspired actions, sometimes called emotion or coping coaching (Gus et al., 2015;

Morris et al., 2017) or socialization (Eisenberg, 2020; Zimmer-Gembeck & Locke, 2007; Zimmer-Gembeck et al., 2022). Although these transformations can be somewhat "bumpy" (Brownell & Kopp, 2007; Lewis et al., 2004), toddlers begin to become reciprocally concerned about the emotions and problems of their caregivers, forming a relationship characterized by a mutually responsive orientation (An et al., 2021; Kochanska et al., 2008). Just as a secure attachment opened neonates' stress neurophysiology to the regulation of caregivers during the first months of life, a secure attachment during toddlerhood opens the child's volition to the regulation of caregivers, promoting young children's willingness to cooperate with the caregiver in dealing with conflicts and problems.

Early Childhood: Inferential Appraisals, Voluntary Action Regulation, and Individual Coping

Three crucial developments contribute to qualitative shifts in coping during early childhood, when coping undergoes the transformation from an *inter*personal to an *intra*personal process. First, regulation evinces perhaps its most important qualitative shift – it becomes truly voluntary. For researchers who define coping as entailing voluntary efforts (e.g., Compas et al., 1999), this transition marks the beginning of coping proper. The emergence of voluntary coping, like all other developments in the coping system, is a biopsychosocial process. Neurocognitive executive capacities, like attention, working memory, and inhibitory control, improve but also become more differentiated and better coordinated during early childhood (Nigg, 2017), shaped by the quality of home and preschool contexts. Young children exercise regulatory capacities when they have structured opportunities to follow routines and rules, respond to adults' requests for appropriate behavior, and constructively negotiate interpersonal interactions with peers (Laursen et al., 2001; McClelland et al., 2015). The transactions most relevant to coping are those, like emotion regulation, that take place in hot situations, involving young children's desires and goals (e.g., Thompson, 2015). Increased integration among regulatory subsystems enables a range of new coping responses, such as the intentional generation of alternative action options (Keen, 2011).

Second, advances in theories of mind and affect allow young children to appraise conflicts and difficulties using increasingly more complex mental models that, through the incorporation of inferential concepts, begin to grant others a range of understandings, emotions, and desires that differ from oneself and from reality. Especially important to coping are conversations with social partners about everyday problems and dilemmas – discussions that take others' perspectives and consider alternative causal interpretations and possible actions in the face of stressful events. Interestingly, at this same age, relationships with friends and other peers supplement those with adult attachment figures and begin to take on the role of buffering children's neurophysiology from the effects of stressful transactions (Engel & Gunnar, 2020).

Third, the emergence of a moral compass, as depicted in research on the development of conscience (Kochanska et al., 2010), offers young children a set of tools to coordinate the goals and actions of the self with those of others using increasingly internalized moral values and principles. As capacities for voluntary self-regulation develop, social partners (e.g., family members and preschool teachers) create "problems" for young children by demanding increasingly more mature and socially appropriate rule-governed behavior. Such problems occasion episodes of coping

where children must coordinate their actions and emotions according to these demands.

The emergence of voluntary coping actions can be considered a shift from self-control or compliance based on co-regulation with adults to genuine self-regulation, initiated by an increasingly mastery-oriented self. Throughout this period, involvement of caregivers is essential, but they must figure out how to scaffold young children as they test-drive their own self-regulated coping systems. This inevitably involves the construction of "redemption routines" and debriefing conversations following coping fails. Together, these developments again shift the coping system's center of gravity to an increasingly more autonomous self, as young children can appraise and deal with problems and stressors using their own interpretations and actions as a first line of defense, with direct participation of caregivers now relegated to a second-line back-up.

Middle Childhood: Cognitive Reappraisal, Mental Modes of Coping, and Coordination with Demands

The "five-to-seven-year shift" (Sameroff & Haith, 1996) marks the beginning of a new developmental period for the coping system. Although children's regulatory capacities have undergone multiple reorganizations by this age, they are still relatively basic (McClelland et al., 2015). Important advances are occasioned by the "cognitive revolution" (Case & Griffin, 1990; Case et al., 1988), when self-regulatory strategies that were previously expressed as actions on the ground increasingly become "cognitivized," that is, reconstructed as a psychological inventory of action options (Holodynski & Friedlmeier, 2006). Three key changes underlie reorganizations of the coping system during this age period, involving appraisals, coping actions, and coordination with others.

First, "cognitivization" results in the emergence and consolidation of new representational capacities that permit children to deliberately reappraise stressful events in ways that influence their emotional responses and coping actions (Davis-Kean et al., 2009). This allows them to integrate their executive processes with motivational and emotional impulses (now also stored as cognitive reflections), enabling regulation to become more autonomous and so require fewer resources to enact. These developments also give children the capacity to intentionally track their own emotional and motivational states and begin to modulate them through coping strategies like cognitive reframing and positive self-talk (Band & Weisz, 1990; Davis et al., 2010).

Second, regulatory capacities are exercised, strengthened, and consolidated into more advanced executive processes like goal-directed problem-solving. Studies of the development of regulation reveal a hierarchy of such processes that continue to grow throughout this period (Nigg, 2017), becoming more differentiated, context independent, and complex. These new mental means are incorporated in problem-solving and emotion regulation, contributing to the emergence of more complex executive processes, like strategizing, sequencing, and planning. This leads to improvements in children's abilities to identify, negotiate, and enact constructive solutions, even under demanding conditions, such as interpersonal conflict. Across this age range, children are increasingly able to differentiate and deploy a wider range of coping options. During early childhood, coping shows little differentiation: young children primarily seek support from caregivers, intervene directly in stressful situations, withdraw, or use behavioral activities to distract themselves. During middle childhood, however, all these strategies become more differentiated as a host of mental means are added. For example, problem-

solving and distraction become more diverse and flexible as children increasingly draw upon both behavioral and cognitive tactics.

Third, as executive functions continue to grow, children can more intentionally and appropriately coordinate ways of coping with changing internal and external affordances and constraints. For example, children not only rely on additional sources of support (such as teachers, peers, and extended family members), but also become more selective and attuned to stressor- and context-specific information when seeking advice, help, or comfort. Together, these emerging capacities allow children to employ a wider range of behavioral and cognitive coping tools for productively dealing with stressors from both the instrumental (e.g., academic; Skinner & Saxton, 2020) and interpersonal (e.g., peer conflict; Seiffge-Krenke & Pakalniskiene, 2011) domains, while at the same time becoming better able to tune into internal emotional and motivational states and intentionally work to restore well-being, recover, and learn from stressful encounters.

Such coping transactions, when supported by caring social partners (both peers and adults), contribute to the continued development of pragmatic and constructive self-systems during middle childhood (as seen, for example, in increasing feelings of coping efficacy, sense of belonging, and autonomous orientations) that will anchor children's subsequent efforts to manage the challenges and stressors they encounter. During middle childhood, these developments collectively produce a system that seems to be particularly sturdy and resilient. At this age, children have a wider range of flexible appraisal and action tools than at younger ages, but do not yet have to deal with the increasing stress reactivity and social sensitivity that will challenge the coping systems of early adolescents.

Adolescence: Heightened Reactivity, Proactive Regulation, and Increased Coping Flexibility

The development of coping during adolescence covers many years and seems to be even more extended today with longer periods between puberty and becoming established in work, forming long-term relationships, or having children. Thus, this topic could fill its own chapter (Skinner & Zimmer-Gembeck, 2016) and even its own book (Frydenberg, 2018: Seiffge-Krenke, 2013). The shift to adolescence begins around ages 10–12, with the onset of puberty and other neurophysiological developments, which are accompanied by changing patterns of thinking and feeling about the self, relationships, and society (Spear, 2000). In addition, the social worlds of youth expand, bringing a greater range of potential social supports and stressful experiences. Three important developments underlie transformations in the coping system during this age period, including notable changes in stress reactivity systems, richer tools for social and emotional understanding, and advances in metacognitive processes.

First, neurophysiological stress reactivity systems generally come out of their period of hyporesponsivity during adolescence, just as encounters with actual stressful events are normatively on the rise and the power of attachment figures to physiologically buffer stress appears to be waning (Engel & Gunnar, 2020). The onset of puberty seems to bring with it greater motivational and emotional sensitivity to some hot events, especially threats, rewards, and interpersonal interactions. Such reactivity may outstrip the developing capacities of the regulatory system, producing what appear to be setbacks in regulatory functioning despite normative advances in executive processes (e.g., Casey, 2015; Steinberg et al., 2018; Chapter 11, this volume). Some researchers suggest that such

elevated stress reactivity creates repeated opportunities for youth to practice and grow their developing regulatory and coping "muscles" in these emotionally and motivationally hot situations (Casey, 2015; Skinner & Zimmer-Gembeck, 2016). In fact, researchers even hypothesize that the reopening of the neurophysiology subserving stress reactivity and regulation that accompanies puberty allows for a recalibration of those systems, including reorganization and repair following early life stress (DePasquale et al., 2019).

Second, adolescents' tools for appraisal are enriched by normative advances in empathy, understanding of emotions, and affective theory of mind, allowing youth to generate richer and more accurate depictions of the complex factors in play during stressful transactions. The continued development of self-system processes during this period also influences adolescents' appraisals and reevaluations of distressing experiences. For example, important transitions may take place between ages 14 and 16, when autonomy and identity become increasingly salient (Côté, 1996; Van Petegem et al., 2018; Zimmer-Gembeck & Skinner, 2010; Zimmer-Gembeck et al., 2018).

Third, beginning in adolescence, metacognitive capacities emerge, allowing more sophisticated future-oriented executive processes that can proactively anticipate problems, and consider both long-term goals and effects on others (Case et al., 1988; Davis et al., 2010). These burgeoning capabilities enable youth to more intentionally and flexibly use executive processes to coordinate their actions with changing internal and external conditions, such as the demands and resources available in specific situations. Normative improvements in the flexibility of regulatory systems can result in some unreliability in actions on the ground, but they also foster the capacity to better align (and realign) coping strategies with specific stressors as these encounters unfold.

Toward the middle and end of adolescence, this emerging complex of self-regulatory skills allows adolescents to integrate problem-focused and emotion-focused coping, as youth are increasingly able to use the developmentally more demanding skills of hot executive functions to maintain access to their higher-order cognitive capacities under increasingly challenging conditions of risk and reward. Despite overall developmental trends that indicate normative improvements, it is important to underscore that the hot regulatory processes so crucial to coping are harder for children and adolescents to deploy at every age and develop more slowly across the entire age range (Cohen et al., 2016).

Heightened focus on peers and then romantic partners during this period contributes to improved interpersonal coping, and adds supplementary, increasingly important, layers of support and protection for coping. Additional important transformations may take place from middle to late adolescence (about ages 20–22), when significant social transitions motivate better coping, as well as ushering in potentially stressful new experiences, such as leaving home (Arnett, 2000). Neurobiological developments continue, further integrating decision-making (Reyna & Farley, 2006) with the processing of emotions (Spear, 2000). In terms of coping, improvements in metacognitive and emotion regulation capacities enable adolescents to better manage their stress reactions, select and structure their environments, and consider long-term consequences, thereby becoming more able to deal with local stressors without losing sight of future goals and priorities. By the beginning of emerging adulthood, these burgeoning "meta-capacities" enable young adults to construct a reflective representation of the entire coping system. With practice and support, their coping becomes increasingly autonomous and responsible; they get help when needed and learn from their mistakes. In other words, they

increasingly take ownership for the development of their own coping.

Building Up from Neurophysiology and Down from Social Contexts

To end this section, we offer a picture of what we think is developing as the coping system undergoes successive transformations. One way of looking at this process, pictured in Figure 1.7, is that from birth to emerging adulthood, the multi-level coping system pictured in Figure 1.6 is sandwiched between the neurophysiological layer below and the interpersonal and societal layers above. At birth, coping equipment consists only of reflexes at

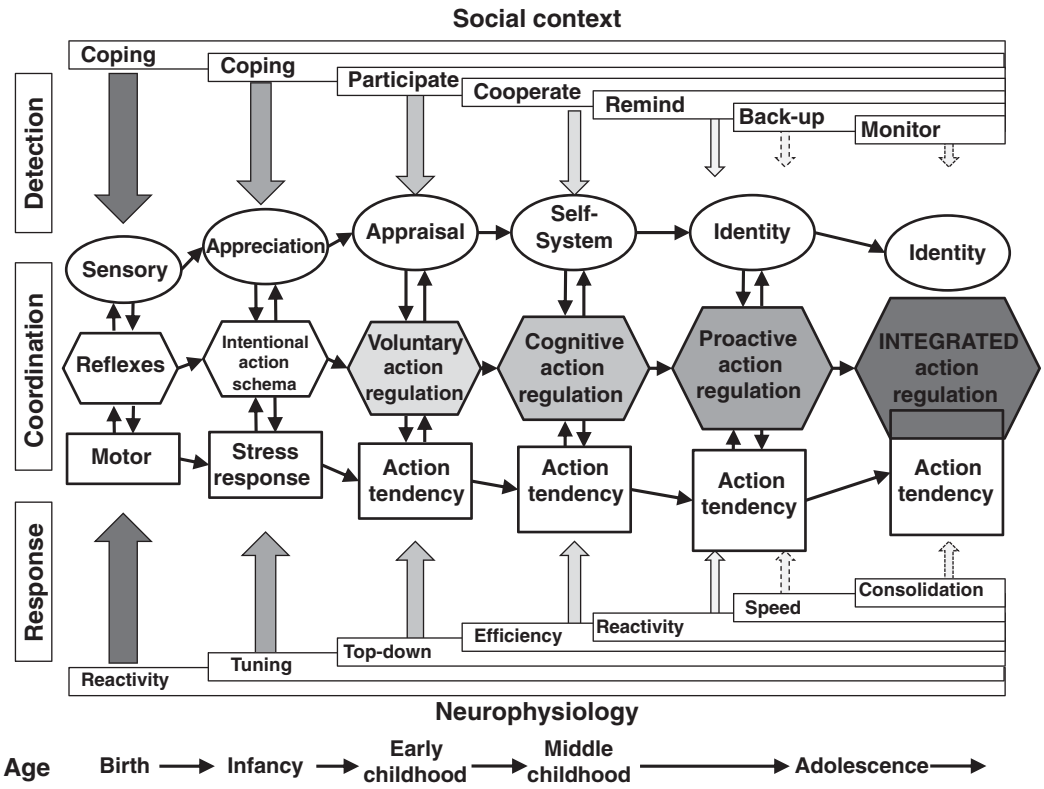

Figure 1.7 Broad developmental phases in the development of coping. Age-graded shifts in the implementation of the basic tasks of coping are scaffolded by (1) the development of neurophysiological subsystems and (2) changes in the demands and supports provided by social partners, and especially caregivers. The balance of influence between biological systems and environmental provisions shifts over time, such that biological tendencies and social forces are more prominent influences on coping in the early years, but the normative development of coping progressively entails a larger and larger role for the active individual in shaping stress responses and regulatory activities with increasing age, as represented by the smaller and smaller arrows that emanate from neurophysiology and the social context as development proceeds. The boxes that contain "coordination" are represented as growing larger and larger as these functions are successively accomplished first by reflexes, then by an intentional infant, an agentic toddler, and finally by a deliberate young child capable of volitional self-regulation, who becomes more reflective and proactive over middle childhood and all during adolescence.

the level of action and fused sensory, attention, emotion, and motivation systems at the psychological level. The task of the caregiver and the neonate is to begin building out an increasingly more complex and effective appraisal and action system, slowly creating a larger and larger role for the active individual in carrying out the tasks of radar, readiness, regulation, recovery, and re-evaluation. These new coping tools will function more effectively to the extent that they are tightly coordinated with neurophysiological layers below and social layers above. Close cooperation with neurophysiological subsystems allows coping to be continually updated with accurate information about the organism's genuine states, emotions, goals, and preferences. Close coordination with social partners allows these systems to co-regulate, cooperate, and work together to carry out coping tasks.

As shown in Figure 1.7, in many ways the development of the coping system is the progressive expansion of the appraisal and action systems as infants, children, and adolescents grow and change. The role for the active individual in shaping stress responses and regulatory activities expands with increasing age. These transformations are represented by the boxes that contain "coordination": They grow larger and larger as these functions are carried out first by reflexes, then successively accomplished by an intentional infant, an agentic toddler, and finally by a deliberate young child capable of volitional self-regulation, who becomes more reflective and proactive over middle childhood and all during adolescence. The balance of influence between biology and environmental provisions shifts over time, such that biological tendencies and social forces are more prominent influences on coping in the early years, but their influences become less central as they are successively incorporated into developing psychological and action subsystems with increasing age. These changes are represented by the smaller and smaller arrows that emanate from neurophysiology and the social context as development proceeds. This pattern is the same one described by many developmentalists for age-graded changes in regulatory processes (e.g., Sameroff, 2010).

Translation to Practice: Supporting and Repairing the Development of Coping

We end with a few thoughts about the important work of practitioners, clinical researchers, and prevention scientists in supporting the development of coping, as they use foundational research to design prevention and intervention programs to improve the way that children and youth react to and deal with stress, either directly or via those who support them (e.g., Compas et al., 2010; Lewis & Frydenberg, 2002; Pincus & Friedman, 2004; Sandler et al., 1997; Wadsworth et al., 2018; Chapters 26 and 28, this volume). While examining the effects of such programmatic efforts, some researchers have been moved to ask whether interventions really change anything (e.g., Seiffge-Krenke, 2004). We think that a developmental systems perspective has the potential to help explain why coping can be resistant to change, why it is such an important target for intervention, and where some effective levers for fostering its development may lie.

Why the Coping System Is Challenging to Change

A developmental systems approach may help explain why it can be difficult to change the ways that children and youth cope (e.g., Seiffge-Krenke, 2004). Such difficulty makes more sense if coping is not seen primarily as a "strategy" to be taught, but instead as a mode of adaptation that reflects a history of thousands upon

thousands of transactions that have created an individually and developmentally organized system. To paraphrase Ross Thompson's (1991) apt description of the development of emotion regulation: "Psychologically, [coping] is a painstaking developmental process because it requires intervening into phylogenetically deeply-rooted [stress reactivity] systems with psychologically complex control mechanisms" (p. 271).

The same can be said of coping interventions. From a developmental systems perspective, coping actions are not just things that children and adolescents happen to do. They emerge from an "apparent reality" (Fridja, 1988) created by a history of actual transactions with demands and stressors. This system also acts as a set of reality-generating processes through its effects on seeking out or avoiding challenge, making stressful situations better or worse, and deciding what such transactions reveal about the self and the world (Conway et al., 2012; Liu, 2013). The longer these processes have been operating, the more consolidated the system becomes. A developmental systems perspective (see Figure 1.6) makes visible the complex, integrated, self-sustaining system that interventionists are up against, and highlights the challenges inherent in making qualitative shifts to improve or repair its functioning.

Moreover, because of the cognitive demands involved in learning new strategies, most programs to improve coping target older children, in late middle childhood or adolescence (i.e., about 10 years old or older; e.g., Cunningham et al., 2002; Frydenberg et al., 2004). On the one hand, as can be inferred from the discussion of age-graded reorganizations of the coping system, the focus on this age makes sense. The cognitive means that can be used for appraisal and coping actions at this age create a pathway for children to benefit from direct instruction. On the other hand, however, middle childhood and early adolescence are very late in the developmental game. Just as the building blocks of coping emerge and develop, starting even before birth, interventions to support the healthy development of coping can also be initiated prenatally and continue across the lifespan (Lupien et al., 2009, 2018). A developmental systems perspective suggests two approaches – one focused on parts and one on wholes – to help identify the levers that can orchestrate transformations in coping systems, both of which suggest age-graded strategies for intervention.

Where the Levers to the Development of Coping Lie: Parts

A systems perspective identifies an almost infinite number of pathways through which practitioners and interventionists can reach the coping system. Figure 1.6, which outlines many of the essential parts of this system, can be used as a menu: Interventionists can walk up its levels for program ideas, starting with support for stress neurophysiology (e.g., strengthening the parasympathetic nervous system), psychological processes (e.g., increasing motivation), appraisals (e.g., inducing optimism), reactivity (e.g., downplaying threat), regulatory capacities (e.g., boosting executive attention), or interpersonal relationships (e.g., increasing social skills; e.g., Larose et al., 2019). A developmental view of the coping system sends interventionists back to the previous sections on age-graded reorganizations, so that program designs can be informed by detailed information about when different subsystems successively come online, dictating the periods during which each subsystem shows its most active development, and what each needs to scaffold the healthy negotiation of the tasks central for each age. For example, developmental models, like polyvagal theory or the life-cycle model of stress, can provide blueprints for the timing and

experiences expected by each of the neurobiological systems involved in reactivity and regulation (Engel & Gunnar, 2020; Gee & Casey, 2015; Lupien et al., 2018; Porges, 2018).

Programs can use this information as a guide to suggest the focus of coping interventions at different ages. For example, at birth, programs could help establish the kind of secure attachment that allows the neonate's multi-level stress neurovisceral physiology – like the hippocampus, amygdala, HPA axis, SAM, vagal circuits, or PFC – to sequentially develop along healthy lines (Cooke et al., 2019; Lupien et al., 2009, 2018; Pallini et al., 2018). Or, when language emerges, programs could work with caregivers so they can nurture their toddlers' clear and accurate communication about feelings and desires, and coach their constructive expression and regulation (e.g., England-Mason & Gonzalez, 2020). Or, during early childhood, programs could show parents how to foster authentic and willing self-regulation, even in the face of frustration and setbacks (Boldt et al., 2020; Grolnick et al., 2019). Complementary school-based programs involving socio-emotional learning (Corcoran et al., 2018) or sports (Waters et al., 2022) are also likely to support the development of coping, since they focus on core competencies (i.e., self-awareness, self-management, social awareness, relationship skills, and responsible decision-making) and provide guided practice to help children deal constructively with their own and others' emotions, goals, and conflicts. All approaches have in common that they target the hot reactivity and regulatory capacities so crucial to coping, can focus on children younger than those typically included in coping interventions, and work to change the ways adults in children's lives (primarily caregivers, families, and teachers) socialize and coach reactivity and regulation during demanding episodes.

Each of these age-graded approaches also represents a gift that keeps on giving. For example, the initial focus on establishing a secure attachment not only supports the healthy development of stress neurobiology during infancy, but also allows it to open up so it can subsequently benefit from the co-regulation of caregivers (Gunnar & Hostinar, 2015); the same secure attachment later fosters a mutually responsive orientation that facilitates the socialization of emotion and self-regulation (Kim et al., 2015). In the same vein, early efforts to quiet stress physiology and emotional reactivity make subsequent self-regulation easier; and parent emotion socialization may also reach down and reprogram some of the neural substrates of emotional reactivity and regulation (Tan et al., 2020).

Prevention and Remediation

Practitioners rightly focus on prevention, given that the effects of early life adversity on the development of the neurobiological systems involved in stress reactivity and coping can be epigenetic, structural, and permanent (e.g., Engel & Gunnar, 2020; McEwen et al., 2016). Researchers seeking to discover remediation strategies are guided by the fact that the effects of early life stress follow two principles (Lupien et al., 2018): Effects are cumulative (Sameroff, 2010) and they seem to be concentrated on the neurobiological systems that are developing at the time that adversity is experienced (Gee & Casey, 2015; Lupien et al., 2018; Chapter 10, this volume).

If prevention is not possible, then the ideal scenario is to detect and intervene on a time frame that is very close to the adverse experiences, so that brain systems are still plastic. This insight has led to routine screening for adverse experiences during pediatric visits, followed by two-generation interventions that target both caregiver and infant for services and treatment (Ford et al., 2019). However, once nonnormative structural or functional

changes have taken place, their effects cannot always be reversed, so interventions focus on reprogramming systems that are still open, creating compensatory processes, and focusing on strengthening the next developmental layers that are laid down (Lupien et al., 2018; Maier, 2015). The search for remediation strategies ranges from bottom-up interventions, such as pharmacological regimens, to higher-level top-down programs, such as physical exercise (Boparai et al., 2018; McEwen & Gianaros, 2011). Despite the specificity of problems with stress reactivity and regulation created by early exposure to adversity, however, the strongest counterweight to these early adverse experiences seems to converge on the same antidote: massed experiences in safe and enriched environments, but – perhaps surprisingly– not ones that are stress-free (Crane et al., 2019; Masarik & Conger, 2017; Repetti & Robles, 2016). Instead, growth, recovery, and potential reprogramming are especially likely in high-quality social contexts (homes and schools) that offer active social, cognitive, and physical stimulation, exploration, and manageable challenge.

Where the Levers to the Development of Coping Lie: Wholes

Hence, to the list of programs designed to support the development of coping and all its underlying parts, we would add one more key intervention lever: coping transactions themselves. If a developmental history of experiences with stress created the coping system, it is a new history of experiences with stress that will transform it. A wholistic view of the coping system highlights multiple crucial points of entry for interventions, focused on coping actions themselves, but also on the neurobiology, appraisal processes, and social contexts that shape them. This perspective reinforces lessons learned from coping interventions, that improving coping not only requires new coping actions that solve problems and support emotional expression and regulation, but also necessitates changes in both individuals' ways of viewing themselves and the world and in the social context itself – including the stressful demands and interpersonal supports involved in children's coping (e.g., Compas et al., 2010; Kovacs & Lopez-Duran, 2012; Spencer et al., 2003).

As befits a systems approach, all these features – neurophysiological reactions, coping appraisals, coping actions, and social contexts – will have to be shifted simultaneously to transform the system. Each level of this system is important, but as children develop, the relative emphasis may change, from neurophysiological to social to actions and finally appraisals. In fact, across childhood and adolescence, appraisals take on a bigger role and offer a bigger handle to adults wishing to support and rework coping. To be effective in creating developmental shifts in both coping and emotion regulation, interventions take on ever more hyphenated names, like cognitive-behavioral (Mennin et al., 2013) or contextual emotion-regulation (Kovacs & Lopez-Duran, 2012) therapies, in recognition of the bio-psycho-social-cultural processes inherent in coping appraisals and actions (Compas et al., 2014; Goldin et al., 2013).

Coping Transactions as Important Sites for the Development of Coping

Descriptions of the successive reorganizations of the coping system highlight a crucial developmental process: Infants, children, and adolescents learn to cope by coping. That is, the equipment children and youth need to cope well (i.e., the tools used in radar, readiness, regulation, recovery, and reevaluation) are built, an episode at a time, during encounters with stress. These interactions are the grist from which integrated stress reactivity and

flexible regulatory capacities (and all the other components of the coping system) are made. Coping transactions reprogram stress neurophysiology (Gee & Casey, 2015; Maier & Watkins, 2010; Ortiz & Conrad, 2018), strengthen regulatory muscles, sculpt attachment relationships, build implicit appraisals and action schema used to deal with challenge and threat, contribute to the development of emotion regulation and understanding, and enable the internalization of moral rules used to guide conscience. It is during interactions with demands and difficulties that coping tools are assembled, tools like problem-solving, negotiation, cooperation, self-reliance, concession, and defense. It is clear, for example, that the primary way children learn to problem-solve is by encountering problems.

Coping is a complex, recursive dynamic system in which top-down and bottom-up processes are shaped by their workings together during stressful transactions. Such transactions comprise thousands upon thousands of episodes whose experience, described using the inverted-U function of the stress response, range from understimulated to engaged to challenged to threatened to overwhelmed and back again (Sapolsky, 2015). The entire coping system – its parts and its organizations – are cumulatively shaped by the processes of coping themselves. Hence, constructive coping is an important target of intervention. It not only helps protect children and youth from the harmful effects of daily stressors, but it also promotes their development, strengthening and consolidating processes from stress neurophysiology to reactivity/readiness to regulation to social relationships.

Coping Transactions in the Zone of Just Manageable Challenge

A primary task of adults is to ensure that the stressors children face in the major domains of their lives are tackled in a zone of "just manageable challenge," where events are demanding but within the child's capacity to deal with effectively (e.g., Crane et al., 2019; Jamieson et al., 2018; Masarik & Conger, 2017; Repetti & Robles, 2016; Sapolsky, 2015). These experiences promote stress resistance and resilience, but this zone represents a moving target, requiring continual monitoring and readjustment of both demands and supports. Social contexts face a "Goldilocks" dilemma, balancing between challenge and threat (Dhabhar, 2018; Sapolsky, 2015). Coping capacities need to be exercised and stretched to grow, but if the system is overwhelmed, it shuts down and produces patterns of stress-affected coping.

Development complicates this equation. On the one hand, as infants, children, and youth acquire new competencies, these provide new resources for coping. As a result, individuals are more able to deal effectively with new demands and are more likely to seek out new opportunities to exercise developing capacities. On the other hand, however, developmental advances also provide new avenues for experiencing threat and harm. For example, the emergence of locomotion brings with it a range of new coping tools, but it also increases the probability that an infant will fall down the stairs. This dual developmental progress, of expanding resources *and* risks, continues throughout all the years of childhood and adolescence. For example, during adolescence, close peer relationships become an important source not only of support and satisfaction but also of conflict and heartache (Clarke, 2006). In fact, it might be possible to argue that the emergence of new risks and dangers is as important to the development of the coping system as is the emergence of new competencies since risks provide age-graded opportunities to learn to cope with ever more demanding challenges.

From this analysis, it becomes clear that the roles of social partners and social contexts in the development of coping are as complex as the coping system itself. In fact, as pictured at the top of Figure 1.6, it might even be possible to consider social partners' ways of participating (proactively and reactively) in children's coping as a form of coping with someone else's coping. It seems possible that caregivers (and others responsible for development) use an individual's changing signals of distress versus engagement (made visible on the level of action as coping responses themselves) as information to calibrate the demands made and resources offered in helping them deal with stressful situations.

It is important for those attempting to change the course of coping to keep in mind the many strategies available to them, especially at higher levels of the social context. For example, socio-emotional learning programs can transform classrooms and school contexts and help children develop caring relationships with teachers, peers, friends, and classmates. These relationships and climates support children as they attempt to deal productively with everyday stressors inside and outside school. Or, for children and youth who are confronted every day by stressors stemming from racism, discrimination, and poverty, communal experiences of civic engagement and social action may create a context for collective coping (Rodriguez et al., 2019). Of greatest interest may be multi-level or multi-systemic interventions that address actions, identities, interpersonal, and societal contexts all at the same time (Hope & Spencer, 2017; Wadsworth et al., 2020).

Conclusion

If coping does indeed represent a force in development, then the goal of parents, teachers, and those who work on prevention or intervention is not merely to increase or decrease the use of a given coping strategy. Instead, they are attempting to induce a qualitative shift that transforms the coping system itself. The end game is to create a stable growth dynamic, that is, to adjust the processes of coping so that the entire system continues to create interactions that allow coping capacities to grow. This means attending not just to the surface characteristics of families of coping, such as problem-solving and negotiation, but also understanding their role in guiding development. Problem-solving is not just a "good" way of coping; it allows individuals to bring their actions in line with their own goals and the actualities of the current context for achieving them. Negotiation is not just a "good" idea; it permits individuals to identify their genuine priorities and discover and create options for realizing them.

Supporting "good coping" is like helping children and adolescents build tools they can use to shape their own development. Good coping allows people to seek optimally challenging contexts, to avoid or escape from overwhelming situations, to negotiate unavoidable harms and losses, to foresee stressful events, and to proactively take protective measures. Good coping permits individuals to listen closely to their own genuine desires and emotions, even when distressed, to appraise realistically yet optimistically, and to take the perspectives and wishes of others into consideration when trying to construct a causal account of stressful situations. Good coping enables people to respond autonomously and intentionally – to problem-solve and seek information so actions are more effective; to cooperate and shoulder responsibility so efforts are well coordinated with others; and to negotiate and accede in ways that are true to authentic values and priorities. Good coping deploys actions that are effective now and aligned with long-term goals, incorporates

respite and recovery, and coaxes growth from mistakes, failures, and unbearable losses. That idea – that the tools of coping have the power to influence development (e.g., Brandtstädter, 2009; Skinner & Edge, 1998) – has been an inspiration in our continued interest in unlocking the secrets and understanding the development of coping.

In the original proposal for this Handbook, we had intended to write a concluding chapter, entitled something like "An Emerging Agenda for the Study of the Development of Coping," where we would draw together threads from all the chapters into an organized and enumerated list. However, after the honor of reading all of these inspiring chapters, we have changed our minds. In keeping with the idea of the "bigger boat" called for by a developmental systems view of coping, we now understand that this whole book, embodied in every chapter, is the emerging agenda for the study of the development of coping. Generative and messy and mysterious – the agenda is the whole damn boat.

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Part I
Theoretical Perspectives on the Development of Coping

2 Toward a Lifespan Theory of Coping Development

A Social Ecological Approach

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Introduction

To our knowledge, there is no general theory of how coping develops across the lifespan (Skinner & Zimmer-Gembeck, 2007, 2016). Most of the developmental coping literature, especially longitudinal studies, is focused either early in life (i.e., childhood and adolescence) or in later life (i.e., 65+). Thus, there are good attempts at theory development in both childhood and adolescence (e.g., Compas et al., 2017; Skinner & Saxton, 2019; Skinner & Zimmer-Gembeck, 2007) and in later life (Aldwin & Igarashi, 2016; Brandtstädter et al., 2010; Charles, 2010; Heckhausen et al., 2019, 2021), but none that are lifespan theories. As we shall see, there are themes that emerge at both ends of the lifespan that might provide a scaffolding for a true lifespan theory.

The major takeaway points are indicated in Table 2.1. The first four points address the developmental aspects of coping. First, coping adheres to the general tenets of lifespan developmental theory (Baltes, 1987): that it is plastic, develops across the lifespan, exhibits individual differences in trajectories, and is multidimensional and multidirectional (1 & 2). The next two focus on developmental trajectories in childhood and adulthood (3 & 4). However, the importance of the social context cannot be overemphasized (5). Finally, there are points of similarity in coping theories across the lifespan, involving both greater efficiency and specificity, as well as better use of energy management (6). Thus, the organization of the chapter will follow this outline.

The first two sections of this chapter will first review theories of coping and development across the lifespan, and then review longitudinal studies on changes in coping in childhood, adolescence, and adulthood. As many have noted, coping is embedded in both immediate social contexts (Thoits, 2011) and more distal sociocultural ones (Aldwin & Igarashi, 2015). Thus, social ecological factors should be considered in any lifespan theory of coping development. To illustrate how social factors may influence coping development, we will review the developmental literature from this perspective, with an emphasis on dyadic coping in adulthood. Finally, we will identify key issues that need to be addressed in a theory of the development of coping across the lifespan.

Theories of Coping Development across the Lifespan

Theories of Coping in Early Life

There have been several good reviews of theories of coping in childhood and adolescence (see Compas et al., 2017; Skinner & Saxton, 2019; Skinner & Zimmer-Gembeck, 2007; Zimmer-Gembeck & Skinner, 2011), and, indeed, there are several chapters devoted to this in the current volume. For the purposes of this chapter, we will focus on work that provides the best extensions to connections with

Table 2.1 *Summary of major conclusions*

1. Coping is plastic and develops across the lifespan. Developmental trajectories can vary by type of coping strategy, and individual differences in trajectories may also occur.
2. The development of coping strategies is not necessarily linear. During some types of transitions and/or particularly difficult circumstances, individuals may revert to earlier modes of coping.
3. In childhood, the developmental course is fairly easy to depict. Very young children typically engage in behavioral emotion-focused coping (e.g., crying), and problem-focused coping may not emerge until ages 6–8. Cognitive emotion-focused coping also starts emerging around age 8. Adolescents begin tailoring their coping strategies to the demands of specific situations.
4. In adulthood, change in coping strategies is characterized by a decrease in maladaptive emotion-focused strategies, a greater use of proactive coping to decrease and/or mitigate the occurrence of stressors, better emotion regulation, and, in general, a decrease in coping effort, perhaps signifying more efficacious coping.
5. Coping development occurs in a social context. In childhood, it is scaffolded by caregivers and teachers. In adolescence, peer relations become important, although adults are still relied upon, especially for difficult problems. In adulthood, dyadic coping may become particularly salient for the development and maintenance of coping efficacy.
6. In general, coping development across the lifespan may be characterized by two dynamics – greater efficiency in coping effort and greater specificity to address particular situational demands, both of which allow for the conservation of energy and resources that may wane with age.

the adult literature. Skinner and Zimmer-Gembeck (2007, 2016) identified different types of coping trajectories in childhood and adolescence, which Zimmer-Gembeck and Skinner (2011) described as reflecting two overarching issues: increases in *coping capacity* and *better deployment* of coping strategies, which is similar to constructs of coping flexibility and efficacy in adulthood (Aldwin & Revenson, 1987).

There is no doubt that there are increases in coping capacity in childhood and adolescence, with a shift from behavior to cognition in both emotion- and problem-focused coping. This means that very young children express emotions behaviorally, and could be argued largely to also have behavioral problem-focused strategies (e.g., banging at puzzle pieces, hoping that they will go together eventually). This shifts to more cognitive strategies around ages 6–8, with increasing sophistication and differentiation through adolescence and early adulthood in understanding how to better fit appropriate coping strategies to contextual demands and opportunities. However, strategies relying on high cognitive function like planning, list making, reflection, commitment, and ambition may not emerge until young adulthood (Skinner & Zimmer-Gembeck, 2007).

Theories of Coping in Adolescence

In adolescence, a curious phenomenon is that there may be a decrease in problem-focused coping and an increase in emotional expression (see Compas, 1987; Skinner & Saxton, 2019), for reasons that are not clear. We hypothesize two possibilities. First, adolescence entails many transitions, including psychological, social, neurobiological, hormonal, and cognitive shifts (see Chapter 8 in this volume). As our literature review indicates, transitions can be very stressful and may be a time when individuals return to earlier forms of coping. A second possibility reflects changes

in dyadic coping. That is, dyadic coping in early childhood primarily occurs between the children and their parents and teachers, who (hopefully) attempt to promote emotion regulation through emotional processing, as well as action regulation through processing stressful transactions (see Chapter 18 in this volume). However, in adolescence, there is a shift from relying on parents for coping to relying more on peers and significant others. Given that the prefrontal cortex is still developing during adolescence, it is not surprising that a return to emotional expression may become dominant in adolescent peer groups, if the stress exceeds an individual's regulatory capacity.

Theories of Coping in Adulthood

The language used to describe coping in later life is a little different from that used in child development (see Aldwin, Lee, Choun, & Kang, 2019 for a primer of general coping terms and models). Briefly, problem-focused coping strategies are behaviors and actions aimed at managing the problem, while emotion-focused coping strategies are directed at the attendant negative emotions. However, in traditional coping scales, most of these involve either emotional expression or suppression, neither of which seem to manage negative affect very well, so Stanton et al. (2000) proposed an emotion-processing measure, which is much more similar to how emotion regulation is perceived in the child development literature (e.g., recognizing, understanding, and managing negative emotions). Other common strategies include seeking social support, religious coping or prayer, and cognitive reappraisal or meaning making, which are attempts to manage the meaning of the situation. Anticipatory and proactive coping strategies are directed at managing either imminent or foreseeable problems, respectively, and may involve efforts to prevent them or to mitigate their adverse effects (Aspinwall & Taylor, 1997).

In adulthood, theories of developmental change in coping strategies have focused on the widely found decrease in the number of coping strategies used. Contrasting theories focus on motivation (or changes in goal management) versus energy/resource management (see Aldwin et al., 2021).

Age-Related Changes in Motivation

We have known for over 50 years that older adults use fewer coping strategies, but the reason for this is a matter of some debate. The earliest interpretation of this was that older adults were simply more passive copers (Gutmann, 1974). In a similar vein, Schulz and Heckhausen (1996) hypothesized that older adults have less control over their environment, so they shift from primary (problem-focused) to secondary (emotion-focused) control coping. In the child developmental literature, however, it is widely acknowledged that control over internal processes is critical to the development of effective environmental regulation (Eisenberg, 2020), which calls into question the primary versus secondary distinction. Further, both types of coping decrease with age (Brennan et al., 2012), and older adults often use problem-focused coping with seemingly uncontrollable stressors, such as managing a chronic illness (Aldwin, 1991). Heckhausen et al. (2010) modified this theory to acknowledge that both primary and secondary control processes are necessary to achieve goals, and the field is shifting toward emphasizing changes in motivation and goals rather than assuming passivity among older adults. Both Heckhausen et al. and Brandtstädter and Rothermund (2002) address *compensatory secondary control*, which entails shifting goals to accommodate decreases in resources seen in later life.

Rothermund and Brandtstädter (2003) proposed a dual-process model, in which assimilative processes (that is, problem-focused strategies) are used for the achievement of personal goals. In later life, however, limited resources may necessitate goal adjustment, which is accomplished using accommodation processes. Using longitudinal data, they showed that individuals who shift from assimilative to accommodation processes in later life have higher levels of life satisfaction (Rothermund & Brandtstädter, 2003). Later versions of this theory proposed that extrinsic-instrumental goals are supplanted in later life by ego-transcendent goals (Brandtstädter et al., 2010).

Increase in Coping Efficiency

An alternative explanation for the decrease in coping effort with age may have more to do with resource/energy management (Hobfoll, 2011). In later life, energy and other resources often begin to wane, and older adults may simply be coping more efficiently. Both the strength and vulnerability integration (SAVI) (Charles, 2010; Charles & Luong, 2013) and the coping, appraisal, and resilience in aging (CARA) models (Aldwin & Igarashi, 2016) have noted these possibilities. The SAVI model is based on socioemotional selectivity theory (Carstensen, 2006), which posits that older adults become more selective in their social relations and activities, with a greater focus on the selection of relationships and activities that have personal meaning. To avoid the increased physiological cost of stressors with age, older adults decrease the likelihood of stressful events through both proactive and anticipatory coping. Older adults may also downregulate distress by making more benign appraisals of stressful events. However, these strategies may not work well with very negative and uncontrollable stressors and may leave older adults vulnerable to adverse physiological effects.

The CARA model (Aldwin & Igarashi, 2016) starts with the premise that older adults recognize their increased physiological vulnerability to stress and focus on not only appraisal processes but also coping efficacy. The broader perspective with age leads older adults to be less likely to appraise situations as problems and to rate problems as less stressful. They have also learned what coping strategies have worked in the past for similar problems, and thus may have become more efficient copers, allowing them to husband their resources. Thus, it is noteworthy that cross-sectional studies find no age differences in coping efficacy, or how well individuals think they handled the problem (Aldwin et al., 1996; Newth & DeLongis, 2004), which has been supported by analyses showing stability in coping efficacy over 20 years (Aldwin, Lee, Choun, & Kang, 2019).

It is possible that the inclusion of resource management into coping theory may tie together theories of coping development in early as well as later life. Infants and toddlers have coping strategies that are not very efficacious on their own and highly costly in terms of energy and resources (i.e., throwing a tantrum). This is gradually supplanted by more efficacious strategies (e.g., cognitive vs. behavioral emotion regulation), analogous to the shift from costly innate to more efficient learned immunity. Thus, coping may become more efficient and autonomous over the lifespan, with notable exceptions, for example during stressful transitions, or a decrease in cognitive resources in later life, which may impair coping.

It must be emphasized that stress and coping processes occur within a social context, which may both greatly affect coping efficacy. For example, Dixon (2011) has shown that older adults perform more competently in dyads, including on cognitive testing, and it would make sense that parents facilitate their

children's coping efficacy as well their developmental coping trajectories. Thus, the next two sections will examine empirical, longitudinal studies of the development of coping strategies across the lifespan, and then explore the influence of dyadic dynamics on the development of coping.

Recent Longitudinal Studies of Change in Coping across the Lifespan

As mentioned earlier, there have been a number of good reviews of coping development, especially in childhood, but many of the studies reviewed were cross-sectional. Therefore, this section will focus on recent longitudinal studies of change in coping across the lifespan. Please note that many different fields study coping, and thus we will be drawing on a far-ranging literature. While the social context plays an extremely important role in the development of coping strategies, much of that research is not longitudinal, and thus will be reviewed in the section on the social ecology of coping development.

Childhood

Not surprisingly, there are fairly well-documented changes in coping strategies in childhood. In the elementary school years, children tend to cope with academic demands by increasing their utilization of problem-focused coping (Skinner & Saxton, 2019). They also solicit social support from various social partners (e.g., parents, teachers, peers) and use various media outlets. From grades three to five, German children exhibited decreases in the use of avoidant and emotional coping strategies involving anger (Eschenbeck et al., 2018). The trend generally holds for young elementary-aged children until the transition toward middle school when coping with academic stress. During this time, children decrease the use of behavioral emotion-focused strategies and increase in both cognitive emotion-focused and problem-focused coping. They also start utilizing more peer-based social support (also see Skinner & Saxton, 2019).

However, transitions may be difficult. Israeli children transitioning between late elementary school and middle school during grades 3–6 increased in projection (i.e., blaming others) as a means of coping and decreased positive coping behaviors for both academics and social stress (Ben-Eliyahu & Kaplan, 2015). There are also individual differences in coping trajectories. While some children during this transition move toward more problem-focused behaviors, others maintain emotion-focused strategies as their primary coping strategies, specifically projection and avoidance.

The context may influence the development of coping strategies in childhood. Children aged 5–9 who were living with acute lymphoblastic leukemia tended to employ fewer coping strategies over time, with the exception of utilizing self-soothing, often through the use of stuffed animals, and were more likely to rely on exercising control where possible as a means of coping (Leibring & Anderzén-Carlsson, 2019). However, if there was little to no control over a circumstance or procedure, there was a tendency to cope by acceptance of the circumstances and recognition of what they could and could not change. These children coped by controlling the situation as best they could while understanding and accepting elements of their illness and treatment that they could not control.

Children coping with the aftermath of a natural disaster displayed a variety of coping outcomes (La Greca et al., 2013). Notably, children who survived Hurricane Andrew fit into several categories: those that were resilient, those that were recovering from the stress, and those that were chronically stressed. Those

who were chronically stressed in the aftermath of a natural disaster were more likely to adopt less adaptive coping behaviors centered around emotion-focused coping. In those who were resilient, there tended to be a transition out of emotion-focused coping behavior and a move toward problem-focused behaviors. Children who were recovering tended to utilize some of both strategies (La Greca et al., 2013).

Thus, there is a consistency in broad developmental coping trajectories from behavioral emotion-focused coping to more cognitive emotion-focused and problem-focused coping, both among ordinary schoolchildren and those undergoing more extreme stress. Transitions and trauma may pose particular difficulties, resulting in a return to earlier coping strategies, and some children are slower to effect this transition than others.

Adolescence/Emerging Adulthood

New research on changes in coping during adolescence is limited and often focused on a narrow age range, from late high school to early college, but there has been some work done at earlier ages. For example, in an interesting study which went beyond the usual problem- versus emotion-focused coping trajectories, Malin et al. (2019) found that a sense of purpose was linked to an increased employment of positive reframing as a means to cope, during the final semester of 8th grade through to the end of 9th grade. In addition, Chow et al. (2016) found reciprocal relationships between attachment style and friendship intimacy in 6th through 12th graders. Those with avoidant attachment styles were more likely to be excluded from friendships, and being excluded from friendships created more attachment anxiety. Nonetheless, the majority of the research we found focused on the transition to university.

During the first year of higher education, around the age of 18, adolescents tend to display varied coping strategies (Heffer & Willoughby, 2017). The use of problem-focused coping behaviors was correlated with academic success and lower perceived stress over time, as compared to peers who employed more emotion-focused and avoidant coping strategies. They tended to adjust better when they employed more positive coping behaviors, with negative coping behaviors correlated with lower emotion regulation skills. Park et al. (2020) focused on the first 2 years of college. Students became more likely to utilize social support in coping with stress, and less likely to utilize emotion-focused strategies such as suppression over time. The progression, however, was not all positive. During this time, students were less likely to use cognitive reappraisals as a means to cope and were more likely to turn to substance use. But among students who were socially engaged and scored high for eudaimonic well-being, there was an increase in use of adaptive coping methods over time, such as positive reframing and emotional social support-seeking.

Conley et al. (2020) also observed that students were less likely to utilize cognitive reappraisals during freshman and sophomore years of college, but this study found declines in social support, in contrast to Park et al. (2020). However, students rebounded to baseline levels over their junior and senior years. Maladaptive and avoidant behaviors such as suppression and substance use increased over the first 2 years of college, and then decreased over the final 2 years, while still remaining higher than baseline levels. One negative coping behavior that tended to increase during this time was substance use and specifically alcohol (Conley et al., 2020; McCarty & Lawrence, 2016), perhaps due to the increased accessibility or attainment of legal age to purchase and consume alcoholic beverages.

It is not only college students who may return to earlier modes of coping during transitions. Younger police recruits displayed decreases in task-oriented coping and outreach strategies over their first year of employment, with noted increases in avoidant coping (McCarty & Lawrence, 2016). However, there were some group differences. Both those with lower education, and married or partnered recruits, were less likely to use task-oriented coping approaches over the first year (McCarty & Lawrence, 2016). In contrast, police recruits in rural agencies exhibited increases in task-oriented approaches and religious coping, compared to their more urban peers. The reasons for this divergent trend are unclear, although perhaps the wide area often covered by rural police officers encouraged more autonomy, necessitating task-oriented approaches. Further, the sample was overwhelmingly male, and it would be interesting to see if similar changes were seen among female recruits.

Summary

Thus, coping trajectories from childhood through early adulthood display many of the basic principles of lifespan developmental theory (Baltes, 1987). In early childhood, developmental trajectories are fairly clear, with a shift from behavioral to cognitive emotion-focused coping and the development of problem-solving skills. There also is a shift in emotion-regulating scaffolding from primary caregivers, to teachers and peers, and a growing shift toward autonomy. Starting in middle childhood, however, both individual differences and plasticity emerge, with school transitions often problematic for some, causing a return to earlier modes of coping. As Baltes noted, culture becomes more important in adult development, especially in later life, and thus such clear trajectories may not emerge.

Mid-Life and Later Adulthood

Whether and how coping trajectories change in mid-life and later adulthood is a matter of some debate. In general, we know that less adaptive forms of coping (e.g., escapism) tend to decline with age, that older adults tend to become more experienced at emotion regulation, especially in interpersonal situations, and that older adults are more likely to use proactive and anticipatory coping behaviors to avoid stress and/or minimize its adverse effects (Aldwin et al., 2021). As mentioned earlier, we also know that the number of coping strategies used, or coping effort, in general declines. The primary issue is whether older adults become more passive copers or increase in coping efficiency. That is, do older adults use fewer strategies because they do not believe they can affect the situation, or is it because they know what works for them and thus become more efficient? For example, Beesley et al. (2018), using a lifespan sample, found that the utilization of positive reframing and taking direct action to cope tended to show a linear increase over a year. During this time, there were noted decreases in some forms of social and emotional coping, and no changes to use of acceptance or denial techniques. Indeed, short-term studies often find relative correlational stability in coping strategies, even after a major medical life event (Aldwin et al., 2021), although coping efficiency increased in patient sample who had had myocardial infarctions (Kristofferzon et al., 2005). Relative stability in aggregate analyses does not address the considerable individual differences in whether and how individuals change, with those who changed their coping strategies after a Parkinson's diagnosis having more optimal outcomes (Frazier, 2002).

Longer-term studies are more likely to find change, but the nature of that change varies as a function of the type of measure and the age of the sample. For example, Hayward and Krause (2016) found that most older adults decreased in negative religious coping (e.g., blaming God) and increased in positive religious coping, but several different types of coping trajectories were identified, demonstrating individual differences in how coping strategies change over time. Over a 20-year period, Brennan et al. (2012) reported modest declines in approach and avoidant methods of coping. Aldwin et al., (2019) also found decreases in overall coping effort across 26 years in older men. Others have found both linear and nonlinear effects. For example, Diehl et al. (2014), using a defense mechanism measure in middle-aged adults, found that the use of suppression strategies and other defense mechanisms decreased linearly over 8 years, but more mature mechanisms increased until the mid-sixties and then leveled off. The increase in mature mechanisms was more likely to be seen in women and higher SES groups. Rothermund and Brandtstädter (2003) found that compensatory coping, roughly equivalent to problem-focused coping, increased until age 70, but then declined. In contrast, Martin-Joy et al. (2017), in a 70-year qualitative study, found that use of mature defense mechanisms increased until very late life. Thus, how coping changes with age may vary as a function of type of coping assessed, the design of the study, and the age group of the sample.

Preliminary analyses by Aldwin et al., (2019) in an older sample revealed that coping efforts decreased from mid-life to the mid-sixties, but then increased in later life. However, different classes of coping trajectories were found, with most showing declines in coping effort, but one class increased after about age 80. Coping efficacy, on the other hand, was largely stable across this age range.

Summary

The lifespan principles of plasticity and individual differences clearly apply to the coping strategies that older adults use. How coping changes across time does not necessarily follow a clear developmental trend, but there is some indication both problem-focused coping and mature defenses increase from mid-life to the mid-sixties. While coping effort decreases, at least until very late life, efficacy remains stable, suggesting that, through long years of experience, older adults have found the coping strategies that work for them (Aldwin & Igarashi, 2016).

The Social Ecology of Coping Development

Just as stress can spill over into families and relationships (Repetti et al., 2009), coping is also likely to be a joint effort. There is ample evidence that coping occurs and develops within close interpersonal relationships (dyads), illustrating a social-ecological influence. Berg and colleagues (2016) argued that dyadic coping likely develops throughout one's lifetime, as "parent-child relationships and early romantic relationships may set the stage for dyadic coping during middle and late life" (p. 268). Therefore, the purpose of this section is to examine whether dyadic coping changes across time for three developmental stages: early childhood, adolescence, and adulthood. The literature on dyadic coping will also be reviewed.

Childhood

Emotion regulation is largely examined during childhood and has substantial overlap with

coping, as the ability to regulate emotions is thought to be foundational for the eventual development of problem-focused coping (Compas et al., 2014). Relationships with parents are extremely important for the development of coping strategies in early life. There are several approaches to studying this. First, much of the research has focused on the impact of attachment styles on coping and suggests that securely attached children have better emotion regulation than avoidant- and ambivalently–attached children (see Cooke et al., 2019; Zimmer-Gembeck et al., 2017). The second focuses on co-regulation, which usually occurs between mother–infant dyads, although this can also occur within the larger family context. According to Paley and Hajal (2022, p. 19), co-regulation refers to the "processes by which caregivers provide external regulation or scaffolding for a child to facilitate the development of emotion regulation over the first several years of life." The third focuses more broadly, on socialization, and argues that children learn coping in three ways, through *coaching*, especially from parents, *modeling*, and the *environmental context*, in which coping behaviors are learned, enacted, and reinforced (or discouraged) (Kliewer et al., 1994, 2006). There is evidence that this social regulation is associated with better cortisol profiles in young children under stress (Gunnar & Donzella, 2002). Thus, children likely learn these skills to process and regulate their emotions through engaging in dyadic coping with parents, other caretakers, and peers (Berg et al., 2016).

Unfortunately, not all parents model supportive or healthy behaviors for their children, which can result in levels of low emotional suppression (Bariola et al., 2012) and high emotional dysregulation (Morelen et al., 2016), similar to that of their mothers. When parents can regulate their emotions and behaviors appropriately, both child and parent have better emotion processing (Lukenheimer et al., 2011; Wilson & Durbin, 2013). This also extends to child–teacher dyads (Silkenbeumer et al., 2018), suggesting co-regulation within these dyads. However, not all studies find associations between this sort of dyadic scaffolding if the parent is not modeling age-appropriate skills. When preschoolers were granted more autonomy during a free-play task, they were less compliant and emotionally regulated during the cleanup task than those children whose mothers were more actively involved in the task (Lincoln et al., 2017).

Socialization is another predictor of later coping and reactions to stress (Kliewer et al., 2006; Skinner & Zimmer-Gembeck, 2007). Modeling these behaviors during early childhood is important as socialization efforts are associated with fewer conduct problems in later childhood (Johnson et al., 2017). For example, emotion-focused socialization from parents at age 3 was associated with more dyadic positive synchrony (similar intensity of positive emotion) that predicted less aggressive behavior when the child was 5 years old (Lukenheimer et al., 2020). Further, children become more active dyadic partners with age, as older children make more attempts to guide parents during various laboratory tasks than younger children (Wilson & Durbin, 2013). As Berg et al. (2016) noted, the emotion regulation developed through parent–child dyads may set the stage for better coping in subsequent years. For example, Perry et al. (2020) demonstrated a link between supportive responses from parents at age 5 with better emotion expression (e.g., less risk-taking and internalizing behaviors) at age 15 through higher emotion regulation at age 10. In general, support-seeking is stable among elementary and middle-schoolers but increases in adolescence (Skinner & Saxton, 2019; Zimmer-Gembeck & Skinner, 2011).

Adolescence

A shift away from parents and adults and toward peers, friends, and romantic partners is observed in adolescence (Berg et al., 2016). This might account for the anomaly noted by Skinner and Saxton (2019), in which teens change their developmental pathway to less adaptive coping. Presumably, this may reflect the tendency to return to earlier modes of coping during transitions mentioned earlier, but also could conceivably reflect peer pressure. However, coping also becomes more self-reliant during this stage of development (Zimmer-Gembeck & Skinner, 2011). Nonetheless, teens continue to seek support from adults, especially for uncontrollable stressors (Zimmer-Gembeck & Skinner, 2011).

Higher parental empathy (as reported by parents) was associated with better emotional regulation among their children (Manczak et al., 2016). Adolescents exhibited fewer externalizing behaviors when mothers engaged in more dyadic coping with the child's father 2 years earlier; this relationship was mediated through material warmth when the child was 14 (Skinner et al., 2021).

Children with serious illnesses such as depression (Rueger et al., 2016), diabetes (Carroll & Marrero, 2006), and cancer (Decker, 2007), have better illness outcomes if they rely on parents for guidance. For example, adolescents with Type 1 diabetes were more efficacious in their coping when more maternal collaborative coping occurred, but only when the stress was perceived as shared (Berg et al., 2009). Decker (2007) found that although support from both friends and parents was important when experiencing cancer diagnosis and treatment, adolescents were more satisfied with support from parents.

Social support also plays a role in the development of romantic relationships. Adolescents who had low friendship quality during the transition to high school engaged in less supportive romantic behaviors (Schachter et al., 2019). Indeed, dyadic studies indicate complex relationships within adolescent dyads. For example, males had higher relationship satisfaction when their girlfriends perceived less stress within the relationship (Breitenstein et al., 2018), and negative romantic feelings were associated with more negative affect (Rogers et al., 2018). Further, higher levels of dyadic coping from one's partner were associated with lower stress within the relationship, especially for those facing additional stress exposures (Breitenstein et al., 2018).

Thus, the dyadic scaffolding of emotion regulation can provide healthier patterns of coping in adolescence. There is an interesting link between better emotion regulation in childhood and the development of friendship networks and romantic relationships in adolescence. Better dyadic coping within relationships may also help adolescents deal more successfully with external stressors.

Adulthood

Social influences continue to be important in how individuals cope in adulthood (Aldwin, 2007). For example, Thoits (2011) has argued that social networks influence both appraisal and coping processes. Individuals provide feedback on whether or not a person should perceive a situation as problematic, and, if so, how stressful it typically is. They can also influence coping in ways similar to that described by Kliewer et al. (2006) in childhood – through modeling, direct instruction, encouragement, and discouragement. However, relatively little empirical evidence exists on precisely how social networks and support influence coping in adulthood, with the exception of dyadic coping.

Definition of Dyadic Coping Dyadic coping is a response to a partner or a couple's stress,

which can be both positive and negative (Bodenmann, 1997, 2005). Positive dyadic coping includes common coping (joint coping and problem-solving) and delegated coping (taking over responsibilities of the other partner to reduce their stress). Negative forms include hostile coping (sarcasm and minimization of the seriousness of problems) and ambivalent coping (unwillingness to support or the perception that support is not needed). Not surprisingly, studies that examine dyadic coping in adulthood have found many benefits for positive dyadic coping in domains of emotional, psychological, and physiological well-being (Berg et al., 2016; Staff et al., 2017), but often more for men than women (Butler & Randall, 2013; Falconier & Kuhn, 2019).

Another approach to dyadic coping, the relationship-focused coping model (DeLongis & O'Brien, 1990), may shed light on how people engage in specific activities to help their partner during times of chronic stress. Relationship-focused coping refers to "cognitive and behavioral efforts to manage and sustain social relationships during stressful episodes" (O'Brien et al., 2009, p. 18), and includes strategies such as empathic responding that reflect attempts to understand one's partner and to respond in a caring, supportive manner.

Benefits of Dyadic Coping There are surprisingly few studies of dyadic coping in later life. Drawing largely upon the developmental literature, Berg and Upchurch's (2007) review suggested that older adults might be more collaborative due to their higher marital satisfaction, lower levels of conflict, and greater emotion regulation abilities. These positive characteristics were largely thought to reflect greater experience over long lifespans or survival of better relationships. These benefits extend to couples across adulthood and varying duration. Both older married couples (Landis et al., 2013) and young adult dating couples (Papp & Witt, 2010) had higher relationship satisfaction when dyadic coping levels were also high, underscoring benefits of dyadic coping throughout adulthood.

In general, empathic responding is associated with reduced marital tension (DeLongis & Zwicker, 2017; O'Brien et al., 2009) and higher marital satisfaction (Stephenson et al., 2013). When couples are coping with cancer, relationship functioning is higher when they engage in dyadic coping (Hagedoorn et al., 2011; Traa et al., 2015).

However, few studies have specifically examined developmental changes in dyadic coping in adulthood. In other words, how do couples in romantic relationships learn to cope more positively and efficiently with stress with their partners? This presumably would result not only in more stable relationships but perhaps in benefits to well-being for both members of the couple.

Age Differences in Dyadic Coping: In general, older adults are less likely to have arguments, largely due to use of avoidant strategies (Charles et al., 2009). This extends to dyads, as studies suggest older couples handle conflict discussions better than younger couples. Older adults used more collective pronouns (e.g., "we") and were more satisfied with conversations with their partners than younger couples (Rohr et al., 2019). They also had lower rates of disagreement during conflict conversations than middle-aged couples (Levenson et al., 1993), even when controlling for marital satisfaction (Carstensen et al., 1995). In a 13-year longitudinal study, negative behaviors decreased, positive behaviors increased during conflict conversation, and marital satisfaction increased across age groups (Verstaen et al., 2020). However, when disagreements did occur, older adults were more physiologically reactive to disagreements than middle-aged adults, including higher systolic blood pressure and blood pressure reactivity (Smith et al., 2009).

Few studies have directly addressed age difference in dyadic coping. Breitenstein et al. (2018) contrasted stress dynamics in adolescent/young adult couples (aged 16–23 years) with their middle-aged parental dyads. While both groups felt more stress when their partner engaged in less dyadic coping, the parents were more sensitive to external stress. Unfortunately, age differences in coping for the entire sample were not examined; however, within age groups, there were no associations between age and coping.

Bodenmann and Widmer (2000) compared dyadic coping among young (<30), middle-aged (31–50), and older adult couples (51–81), and found that older couples by far had the highest level of relationship satisfaction. However, they did not present the raw means for coping strategies by couple but only presented group differences after covarying relationship satisfaction. Thus, their finding that older adults used less positive dyadic coping may be a bit misleading, given the strong relationship between age and relationship satisfaction.

Acquati and Kayser (2019) found younger couples generally had more difficulty with facing cancer when compared with middle-aged couples, despite both groups engaging in dyadic coping. This suggests possible age differences in effectiveness of dyadic coping across stressful events. Alternatively, there may be differences in the types of stressors experienced between young and middle-aged couples, or perhaps the latter may engage in more relationship-focused coping.

Relationship Duration Differences: Along with age, relationship duration also contributes to use of and outcomes of dyadic coping. Staff and colleagues (2017) conducted a narrative analysis review and found that couples with longer relationship durations tend to use dyadic strategies more than those with shorter relationship durations. Berg and colleagues (2016) noted that dyadic coping appears beneficial for intimate couples of varying relationship durations.

However, other studies found mixed results: Relationship duration was either unrelated to marital satisfaction (Fallachai et al., 2019; Hilpert et al., 2016) or was negatively associated with relationship satisfaction under certain circumstances, for example same-sex male couples (Feinstein et al., 2018) or among wives only (Rusu et al., 2019). Johnson et al. (2016) found that supportive dyadic coping declined across a 5-year period, although there was variation in this rate of change. Decline was steeper for those who had higher baseline levels, while their partners experienced more gradual decline. Thus, there are undoubtedly individual differences in the relationship between relationship duration and dyadic coping. Studies are needed that can examine long-term relationships between these factors.

Summary: Dyadic coping could provide an interesting context in which to study how the social context influences the development of coping strategies in adulthood. However, the current studies are limited by a paucity of longitudinal studies and a tendency to ignore the context in which the dyadic coping occurs, as well as individual variation in coping trajectories. In addition, studies tend to condense different coping strategies into a single predictor, even though a factor analysis of the English version of the Dyadic Coping Inventory (Bodenmann, 2008) showed that it was multidimensional (Randall et al., 2016), including both problem- and emotion-focused components, as well as elements of provided and perceived support. Summing different types of dyadic coping into a composite indicator does not allow for an examination of the differential developmental trajectories, or how socialization of coping within dyads might occur. What leads couples to engage in empathic dyadic coping as opposed to the

acrimonious, divorce-prone pattern that Carrère and Gottman (1999) observed? A closer theoretical and empirical linkage between the theories of how coping changes with age, the clinical marital literature, and dyadic coping researchers might prove fruitful.

We suggest that future research focus on three areas. First, more longitudinal studies are needed to examine how and why dyadic coping changes with age, and the factors that influence its development. For example, dyadic support in early childhood is related to better adolescent emotion expression (Perry et al., 2020). Although supportive dyadic coping might decrease across adulthood (Johnson et al., 2016), this might reflect the general decrease in coping effort seen in later life (Aldwin, 2007). Studies examining how couples learn to help, model, socialize, and support each other's self-regulation and become more efficacious problem-solvers would be a welcome addition to the literature.

Second, it would be helpful if the dyadic coping measures more closely reflected individual coping measures to better allow comparison between the two. Anecdotally, parents of infants rapidly learn that their own emotion regulation helps soothe infants. It would also make sense that adults in long-term romantic relationships may help each other develop better regulatory skills, given that Carrère and Gottman (1999) demonstrated that divorce rates were much higher among couples who escalated their disagreements than those who practiced better emotion regulation.

Finally, there is a surprising dearth of dyadic coping studies in diverse samples, including different ethnicities and social classes. While there was a cross-national study showing that the slope between dyadic coping and marital satisfaction appeared shallower in African countries (Hilpert et al., 2016), we identified only a few studies that specifically examined dyadic coping in ethnic minorities (e.g., Mendez-Luck et al., 2019; Mitchell et al., 2015). Thus, further understanding of social class and ethnic differences in dyadic coping would be a much-needed contribution to the literature.

Summary and Integration

It is premature to propose a new theory of coping across the lifespan. However, we feel that similar issues emerge at different points in the lifespan. The first reflects the emphasis on resource/energy management, important in how individuals cope with stress. Across the lifespan, it is important to develop efficacious means of coping with both the adverse situation and the attendant emotional distress through the process of energy management at the biological, psychological, and social levels. As we have seen, infants and young children have very costly and rather ineffective means of coping with stress, such as tantrums or other emotional displays to attract attention, necessitating reliance on others for more effective coping. Emotion regulation shifts from behavioral to more cognitive management strategies, which become more complex and nuanced through young adulthood and may also be more energy efficient. Problem-focused coping emerges more in middle childhood and becomes sophisticated and responsive to situational demands in adolescence and young adulthood. Issues in resource management continue throughout adulthood, but may become particularly salient in later life as older adults may have less energy to cope and need to avoid the health costs of stress reactions. Thus, we argue that, in general, there is an increase in efficacious coping throughout the lifespan, with coping becoming more nuanced and situation-specific, as well as tailored to individual needs and preferences. Issues of increase in the number and flexibility of coping strategies need to addressed, paired with

increases in specificity. It is important to understand the processes through which individuals increase their coping capacity and become more efficient copers, especially in the context of dyadic coping.

Second, the importance of the social context for the development of coping strategies cannot be overemphasized. Parents and teachers socialize children into culturally appropriate emotion-regulation and problem-focused coping strategies, but this is also influenced by peers and later through romantic dyads, as well as by others within one's social contexts. In adulthood, coping clearly keeps developing, and how the social context influences the increases in emotion regulation and coping efficacy is, as yet, unclear. From a life course perspective, which examines how individual lives are embedded within larger social contexts, this suggests that there are probably cohort and period effects in coping strategies, which, to our knowledge, have not yet been explored.

Finally, the lifespan principles of plasticity and individual differences in trajectories also need to be incorporated. The research on transitions reviewed earlier shows that individuals can return to developmentally earlier modes of coping under both transitions and chronic stressors such as major illness and disability. Nonetheless, there are individual differences in how people undergo transitions and in how they cope with stress. Thus, more research on the developmental and contextual factors that influence coping trajectories is needed.

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3 Attachment, Regulation, and the Development of Coping

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Introduction

Attachment theory proposes that one of the most important functions of early relationships is to support a child's use of an adult to appropriately regulate emotions in times of stress (Ainsworth et al., 1978/2015). A child's tendency and ability to use a caregiver as a safe haven when faced with a stressor in order to organize emotions and promote safety is considered to be the key function of the attachment system (Bowlby, 1982; Sroufe, 1996). In this chapter, we (1) summarize claims made by attachment theorists about the importance of attachment quality for predicting an individual's ability to effectively self-regulate; (2) describe different traditions in the measurement of attachment across the lifespan; and (3) introduce some definitional and methodological approaches to the study of emotion regulation and coping. We additionally highlight the conceptual links between attachment, emotion regulation, and coping. Finally, we review literature that has estimated associations between various measures of attachment at different life stages and coping and offer suggestions for future research in this field.

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Attachment Theory: An Overview

Bowlby (1982) argued that emotional bonds are formed between infants and their primary caregivers through the activation of the attachment system. This system, when functioning normatively, promotes the safety of the infant in the vulnerable first few years of life. Under optimal conditions, the infant uses the caregiver as a secure base from which to explore the environment as well as a safe haven to return to when a threat is perceived. More specifically, the quality of an attachment relationship is theorized to depend primarily upon the quality of the caregiving experienced in the first year of life and beyond, including parental sensitivity, availability, and consistency (Bowlby, 1982).

A central tenet of attachment theory is that the quality of these early caregiving relationships continues to have an impact on behaviors through the lifespan. More specifically, experiences with primary caregivers are internalized by the child and take the form of "representational or working models" (Bowlby, 1973, p. 203). These internal working models, in turn, are assumed to shape children's perceptions of, as well as their responses to, environmental cues. These models become generalized over time and are thought to influence relationships with others and responses to challenges over the lifespan (Bowlby, 1973; Bretherton & Munholland, 2016).

Regulation and Coping

Because regulation is a part of normal functioning, the ability to identify and regulate emotions appropriately is a vital aspect of healthy development (Compas et al., 2001). Emotion regulation is defined as the process of modulating, managing, and modifying emotions to achieve a goal and has been discussed as the ability to both control and communicate affect in social situations (Eisenberg & Spinrad, 2004; Thompson & Meyer, 2007). Coping is defined as behavioral and cognitive efforts that manage internal and external demands perceived as threatening or stressful to the individual (Lazarus & Folkman, 1984; VanMeter et al., 2020). Coping is a goal-oriented process in which individuals direct their thoughts and behaviors toward resolving the source of stress and managing reactions to the stressor (Jackson et al., 2017; Lazarus, 1993).

Though typically discussed as distinct constructs, coping and emotion regulation are conceptually linked. Both are processes of regulation and include efforts toward regulation such as attempting to modify a behavior, emotion, thought, or psychological response (Compas et al., 2014, 2017; Skinner & Zimmer-Gembeck, 2007). Further, researchers have included many of the same strategies when studying both constructs, including cognitive reappraisal, avoidance, and emotional expression (Compas et al., 2017).

Where the constructs differ is that coping refers more specifically to a broad regulatory response to *stress*, whereas emotion regulation refers to responses to a much wider range of situations (positive or negative), but more specifically to the regulation of emotion-like behaviors, attention, and motivation (Compas et al., 2001; Eisenberg et al., 2010; Folkman & Moskowitz, 2004; Gross, 2013). These concepts are further differentiated by the fact that coping refers specifically to volitional processes (Compas et al., 2014), whereas emotion regulation includes volitional processes as well as automatic ones (Gross, 2013). Though differences between the two exist, coping and emotion regulation share several key elements. Despite the conceptual overlap of these terms, most researchers do not study them in concert. Instead, two parallel fields have developed that examine the constructs separately (Compas et al., 2014). The current chapter will discuss both regulatory functions, with a focus on the relation between attachment and coping with stress.

Conceptualizations and Measurements of Coping

Lazarus and Folkman's (1984) model of stress and coping has widely dominated the coping literature. Lazarus and Folkman initially posited two overarching dimensions of coping that capture the general characteristics of responses to stress: *problem-focused* coping and *emotion-focused* coping. Problem-focused coping is defined as responses that are directed toward resolving a stressor (Lazarus & Folkman, 1984), such as taking action to alter a stressful situation. Emotion-focused coping, on the other hand, is defined as efforts to alleviate emotions that occur in response to a stressor (Compas et al., 2001; Lazarus & Folkman, 1984), such as expressing emotions or using emotions to seek attention and/or support from others. Since Lazarus and Folkman's (1984) identification of these dimensions of coping, researchers have continued to develop an increasing number of subtypes of coping, such as avoidant, social support, passive, and active coping (Compas et al., 2001; Coyne & Gottlieb, 1996). In fact, Skinner and colleagues (2003) reported that there have been over 400 subtypes of coping conceptualized in published studies.

Not surprisingly, then, a wide variety of coping measures have been developed. Generally, coping measures aim to assess how individuals respond to stressors, whether that be general stress or specific stressors (e.g., interpersonal problems, academic or career stress, or chronic illness). Most studies have relied on self-assessments, such as the Ways of Coping Questionnaire (Folkman & Lazarus, 1985) and the Coping Orientation to Problem Experience Inventory (COPE; Carver et al., 1989), to assess coping. The benefit of self-assessments is that, although coping is volitional, it can be an internal process that might not be observable, as is the case with cognitive reappraisal (i.e., changing the way an individual thinks about the problem to alleviate stress; Lazarus & Alfert, 1964). However, some studies, particularly with infants and young children, rely on observational measures of coping, such as the Coping Strategies Rating Questionnaire (Smith et al., 2006). Although this may allow for a less biased record of behavior, as these measures are less susceptible to self-report biases (von Baeyer et al., 2009), this strategy likely does not fully capture internal coping strategies that may be utilized by an individual.

Attachment and Coping

During infancy, emotion regulation is a dyadic process between the infant and their caregiver (Roque et al., 2013; Thompson, 1994). When distressed, infants' caregivers work to regulate their infants' emotions by holding, talking to, or otherwise distracting the infant (Sroufe, 1996). As children develop, caregivers still play an important role in children's regulation. They assist in the expression of emotion and help children utilize strategies that reduce distress (Roque et al., 2013; Sroufe, 1996). In this sense, caregivers and children participate in *co-regulation*, in which caregivers primarily teach regulatory skills and also assist with regulation itself. Successful co-regulation is essential to the development of children's healthy, independent regulatory abilities (Diamond & Aspinwall, 2003; Fogel, 1993).

Attachment theory is centered around the impact of the parent–child relationship on a range of developmental outcomes (Ainsworth, 1978/2015; Bowlby, 1982). Attachment scholars have claimed that early relationships are uniquely impactful and affect a range of behavioral processes over the lifespan (Carlson & Sroufe, 1995). The attachment relationship is where children begin to develop the ability to recognize and regulate emotions and develop the capacity to cope with stress (Zimmer-Gembeck et al., 2017). It is in this attachment relationship that children are able to use an adult to assist in regulation of stress. The attachment relationship also is informed especially by a caregiver's sensitivity to the child (Ainsworth, 1978/2015; Weinfield et al., 1999). This sensitivity itself can be considered a type of co-regulation, as caregivers must be sensitive to the cues of their children and respond in a timely, appropriate, and ultimately effective manner. Reliably experiencing these reciprocal interactions, reflected in a secure attachment relationship, is what builds regulatory and expressive skills that children can later utilize independently (Sroufe, 1996; Zimmer-Gembeck et al., 2017). Ultimately, attachment bonds develop alongside and together with regulatory skills, including coping with stress.

It is possible that an individual's regulatory abilities are influenced by the quality of the attachment bond through expectations formed early in life about caregivers' behavior and warmth (i.e., internal working models) that then influence their own relational behavior throughout their lives (Bowlby, 1982). Children first learn regulatory abilities such

as requesting support and using distraction to alleviate distress through the aid or modeling of a caregiver (Zimmer-Gembeck et al., 2017). This provides a foundation for the development of patterns of regulation that differ between individuals (Siegel, 2001; Sroufe, 1996; Zimmer-Gembeck et al., 2017). Lazarus and Folkman's (1984) transactional theory of stress and coping posits that individuals are constantly appraising stimuli within their environments, and when stimuli are appraised as threatening, the resulting distress initiates a coping response to attempt to address that threat (Biggs et al., 2017). These appraisals, which are central to the formulation of coping responses, may work in parallel with individuals' expectations of responses that are informed by internal working models. Having a secure, healthy attachment relationship of course does not mean that an individual never experiences negative emotions, but rather that they have the ability to successfully manage stressful, difficult, or threatening situations (Roque et al., 2013), at least in part, because their caregiver assisted with regulation and modeled regulatory skills.

The remainder of this chapter reviews work that has examined the association between the quality of attachments and coping behaviors. Based on what is known about the development of attachment styles and regulation, it would be expected that individuals who experience a secure attachment relationship to a caregiver would have successfully engaged in co-regulation with their caregiver, and would thus be more likely to utilize adaptive coping strategies, such as problem-focused coping, active coping (i.e., actively and flexibly managing the stressor rather than avoiding the stressor; Cassidy, 2008), and more specifically, support-, comfort-, and help-seeking strategies of coping. On the other hand, individuals with an anxious attachment relationship have been predicted to engage in coping strategies that emphasize emotional reactions that aim to elicit attention from others, including aggression, crying, and emotive language (Wei et al., 2005). This strategy might have adaptive functions in infancy, such as gaining the attention of an unavailable parent, but might be maladaptive outside of the attachment relationship (Bowlby, 1973). Conversely, individuals with an avoidant attachment relationship with a caregiver might be expected to engage in avoidant coping strategies. These individuals might have had a withdrawn or rejecting caregiver, and thus may have developed more self-oriented coping strategies and may be less likely to seek support, help, and comfort when faced with stress (Roque et al., 2013; Spangler & Grossmann, 1993). Said another way, the skill of avoiding or distancing the self from stressors was built into the internal working model as a way to adaptively cope with stress. Finally, individuals with a disorganized attachment relationship with a presumably frightening or inconsistent (Baer & Martinez, 2006) caregiver are hypothesized to utilize an inconsistent pattern of coping strategies, switching between adaptive and maladaptive forms of regulation (DeOliveira et al., 2004). Thus, children might develop less adaptive and more maladaptive coping strategies because they experienced inconsistent caregiving.

Studies of Attachment and Coping

Next we review the literature on the association between attachment and coping. Our goal was to represent the range of conceptualizations and measurements of attachment behavior from infancy to adulthood. As such, any study that used a well-validated measure of attachment (see Ravitz et al., 2010) was considered for inclusion. Our definition of coping was more broad, in that studies employing either a measure of coping strategies used generally or in response to a specific stressor (e.g., military

deployment) were considered. The literature is organized by measurement of attachment to facilitate comparison of studies within each subfield.

Observational Measures of Attachment

The earliest studies of attachment and its consequences were conducted with infants and young children. Infant attachment has been traditionally assessed using the Strange Situation procedure developed by Ainsworth and colleagues (1978/2015), wherein an infant undergoes a set of two increasingly stressful separations from a primary caregiver. Infant behavior toward the caregiver during reunion "episodes" (e.g., comfort-seeking, avoidance, anger) is coded in order to classify the infant's attachment style as secure, insecure-anxious, insecure-avoidant, or disorganized (Ainsworth et al., 1978/2015). Subsequently, the Attachment Q-Sort was developed, which allowed for observations of infant–caregiver interactions in home and other ecologically valid settings. Infants are scored on their similarity to the prototypically secure infant (Waters, 1995).

Despite the long-standing tradition of assessing attachment early in life using observational techniques, however, relatively few studies have been conducted that examine the association between infant attachment quality and strategies for coping with stressors (Tables 3.1A and 3.2A). Overall, these studies provide some preliminary evidence that early coping behaviors are associated with infant attachment quality. Of the reported effects, 56.0% were consistent with a positive association between attachment security and adaptive coping, whereas only 1 out of 25 (4.0%) showed a positive, significant association between attachment *in*security and adaptive coping. For example, in their study of 223 urban, low-income infants, Vondra and colleagues (2001) observed that infants rated as secure more often from ages 12 to 24 months were more likely to use assertive, sociable, and competent (though not adaptable) coping skills at age 24 months. No clear pattern emerged that differentiated the avoidant, ambivalent, and disorganized infants from one another, though they were generally less likely to use the various adaptive coping skills that were rated by observers using the Early Coping Inventory (Zeitlin et al., 1988).

In general, the studies conducted in this area are strong in their use of large sample sizes and multiple measurements of early attachment quality. Both Vondra and colleagues (2001) and Howard (2009) assessed attachment behavior over several assessments, which is important given the difficulty of fully capturing a child's attachment quality in one brief assessment (Roisman & Booth-LaForce, 2014). However, this body of work is significantly limited by the lack of well-validated measures of coping in infancy and early childhood. Furthermore, each study used a different design and measure of coping, making it difficult to interpret the consistency of results.

The interpretation of these results is further complicated by the close relation between infant attachment behavior and early regulatory behaviors. As discussed above, the Strange Situation procedure is designed to be stressful. Attachment codes are primarily dependent upon how effectively an infant is able to use a caregiver to recover from the stress of separation. This complication is reflected in studies like those by Spangler and Grossmann (1993), who conceptualized infant coping as "orientation during the Strange Situation," and Braungart and Stifter (1991), who conceptualized infant coping as "regulation of negative affect" during the Strange Situation. Clearly, more studies are needed that assess attachment early in life and follow up participants at later ages,

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Table 3.1 *Description of samples and measures for studies reporting an association between attachment and coping strategies*

Study	N, country, ages	Attachment measure	Coping measure
A: Observational measures of attachment in infancy and childhood			
Fuertes et al. (2009)	48, Portugal, 3m (T1), 12m (T2)	Strange Situation (12m)	Still Face Paradigm (3m)
Howard (2009)	394, USA, 4.5y (T1), 5.5y (T2)	Attachment Q-Sort (4.5, 5.5y)	Early Childhood Coping Puppet Interview (5.5y)
Vondra et al. (2001)	223, USA, 12m (T1), 18m (T2), 24m (T3)	Strange Situation (12, 18, 24m)	Early Coping Inventory (24m)
B: Self-reported parental attachment in childhood			
Abraham and Kerns (2013)	106, USA, 8–12y	Kerns Security Scale	Children's Coping Strategies Checklist
Contreras et al. (2000)	62, USA, 9–11y	Kerns Security Scale	Children's Coping Strategies Checklist
Hébert et al. (2018)	505, Canada, 6–13y	Kerns Security Scale	Self-Report Coping Scale
Jagadeesan (2013)	673, USA, 6–12y	Kerns Security Scale	Coping Strategies Questionnaire
Kerns et al. (2007)	52, USA, 9–11y	Kerns Security Scale	Children's Coping Strategies Checklist
Tur-Porcar et al. (2018)	1,447, Spain, 7–12y	Kerns Questionnaire of Perceived Parental Attachment to the Mother and Father	Coping Assessment Questionnaire for Children
C: The Adult Attachment Interview			
Dawson et al. (2014)	141, USA, 14y (T1), 22y (T2)	Adult Attachment Interview (14y)	COPE Scale (22y)
Scharf et al. (2004)	88, Israel, 17–18y (T1), 18–19y (T2)	Adult Attachment Interview (17–18y)	Ways of Coping Scale (18–19y)
Seiffge-Krenke (2006)	112, Germany, 21y	Adult Attachment Interview	Coping across Situations Questionnaire
Seiffge-Krenke and Beyers (2005)	112, Germany, 14y (T1), 15y (T2), 16y (T3), 17y (T4), 21y (T5)	Adult Attachment Interview (21y)	Coping across Situations Questionnaire (14, 15, 16, 17, 21y)

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D: Attachment prototypes			
Birnbaum et al. (1997)	233, Israel, 20–62y	Hazan and Shaver prototypes	Ways of Coping Checklist
Kemp and Neimeyer (1999)	193, USA, 18y	Bartholomew's Relationship Scales Questionnaire	Ways of Coping Checklist
Mikulincer et al. (1993)	127, Israel, 20–37y	Hazan and Shaver prototypes	Ways of Coping Checklist
Mikulincer and Florian (1995)	92, Israel, 18y	Hazan and Shaver prototypes	Ways of Coping Checklist
Myers and Vetere (2002)	111, England, 18–38y	Hazan and Shaver prototypes	Coping Resources Inventory
Nelson (2004)	138, USA, 22y	Bartholomew's Relationship Questionnaire	Ways of Coping Checklist
E: Continuous scales of attachment anxiety/ambivalence and avoidance			
Alexander et al. (2001)	184, Australia, 30y	Attachment Style Questionnaire	Ways of Coping Checklist
Belizaire and Fuertes (2011)	155, USA, 40y	Experiences in Close Relationships Scale	Brief COPE
Ben-Ari and Hirschberg (2009)	146, Israel, 14–16y	Hazan and Shaver Attachment Scale	Rahim Organizational Conflict Inventory
Berry and Kingswell (2012)	57, England, 19–32y	Experiences in Close Relationships Scale – Revised	COPE Scale
Deniz and Işik (2010)	421, Turkey, 17–32y	Bartholomew's Relationship Scales Questionnaire	Coping with Stress Scale
Fuenfhausen and Cashwell (2013)	191, USA, 22–60y	Experiences in Close Relationships Questionnaire – Revised	Dyadic Coping Inventory
Gatmaitan (2013)	102, USA, 18–68y	Experiences in Close Relationships – Short Form	Problem-Focused Style of Coping Questionnaire
Han (2009)	381, USA, 18–60y	Experiences in Close Relationships Scale	Brief COPE
Holmberg et al. (2011)	75, Canada, 18–50y	Experiences in Close Relationships Inventory – Revised	COPE Scale

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Table 3.1 (*cont.*)

Study	N, country, ages	Attachment measure	Coping measure
Howard and Medway (2004)	75, USA, 14–19y	Adolescent Relationship Scales Questionnaire	Adolescent COPE
Li and Yang (2009)	326, Taiwan, 18–22y	Revised Adult Attachment Scale	Coping Strategy Indicator
Lopez et al. (2001)	55, USA, 22y	Experiences in Close Relationships – Short Form	Problem-Focused Style of Coping Questionnaire
Lussier et al. (1997)	526, Canada, 18–70y	Hazan and Shaver Attachment Scale	Coping Inventory for Stressful Situations
Marques (2006)	146, USA, 18–24y	Bartholomew's Relationship Scales Questionnaire	Ways of Coping Checklist
Ognibene and Collins (1998)	81, USA, not reported (undergraduate college students)	Bartholomew's Relationship Scales Questionnaire	Ways of Coping Checklist; Social and achievement-related stressors vignettes
Perlman et al. (2016)	225, USA, 18–25y	Experiences in Close Relationships – Short Form	Brief COPE
Zheng (2018)	119, USA, 18–43y	Experiences in Close Relationships Scale	Brief COPE

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Table 3.2 *Results from studies reporting an association between attachment and coping strategies*

Study	Attachment subscale	Coping subscale	Result (t, F, r, b, or β)
A: Observational measures of attachment in infancy and childhood			
Fuertes et al. (2009)	Attachment security	Positive other-directed coping	$F(2, 45) = 10.55$, $p < .001$ avoidant < secure; resistant < secure
	Attachment security	Negative other-directed coping	$F(2, 45) = 8.49$, $p < .005$ avoidant < resistant; secure < resistant
	Attachment security	Self-directed coping	$F(2, 45) = 12.10$, $p < .001$ resistant < avoidant; secure < avoidant
Howard (2009)	Attachment security (T1)	Coping adaptiveness	$r = -.055$, $p = .29$
	Attachment security (T2)	Coping adaptiveness	$r = .003$, $p = .956$
Vondra et al. (2001)	Stable avoidant vs. secure vs. ambivalent attachment	Adaptable regulation	$F(2, 70) = 19.88$, $p < .001$ ambivalent < avoidant; ambivalent < secure
	Stable avoidant vs. secure vs. ambivalent attachment	Assertive regulation	ns
	Stable avoidant vs. secure vs. ambivalent attachment	Sociable regulation	$F(2, 67) = 3.61$, $p < .05$ ambivalent < secure
	Stable avoidant vs. secure vs. ambivalent attachment	Competent exploration	$F(2, 69) = 9.46$, $p < .001$ ambivalent < secure
	Frequency avoidant attachment	Adaptable regulation	$r = .21$, $p < .01$
	Frequency avoidant attachment	Assertive regulation	ns
	Frequency avoidant attachment	Sociable regulation	ns
	Frequency avoidant attachment	Competent exploration	ns
	Frequency secure attachment	Adaptable regulation	ns
	Frequency secure attachment	Assertive regulation	$r = .18$, $p < .05$

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Table 3.2 (*cont.*)

Study	Attachment subscale	Coping subscale	Result (t, F, r, b, or β)
	Frequency secure attachment	Sociable regulation	$r = .25$, $p < .001$
	Frequency secure attachment	Competent exploration	$r = .30$, $p < .001$
	Frequency ambivalent attachment	Adaptable regulation	$r = -.39$, $p < .001$
	Frequency ambivalent attachment	Assertive regulation	ns
	Frequency ambivalent attachment	Sociable regulation	$r = -.18$, $p < .05$
	Frequency ambivalent attachment	Competent exploration	$r = -.19$, $p < .05$
	Frequency disorganized attachment	Adaptable regulation	ns
	Frequency disorganized attachment	Assertive regulation	$r = -.24$, $p < .01$
	Frequency disorganized attachment	Sociable regulation	ns
	Frequency disorganized attachment	Competent exploration	$r = -.24$, $p < .01$
B: Self-reported parental attachment in childhood			
Abraham and Kerns (2013)	Attachment security	Social support coping	$r = .33$, $p < .01$
	Attachment security	Problem-solving	$r = .21$, $p < .05$
Contreras et al. (2000)	Attachment security	Constructive coping	$r = .61$, $p < .001$
Hébert et al. (2018)	Attachment security (father)	Avoidance coping	$r = -.10$, ns (boys) $r = -.24$, $p < .001$ (girls)
	Attachment security (father)	Approach coping	$r = .15$, $p < .07$ (boys) $r = .01$, ns (girls)

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	Attachment security (mother)	Avoidance coping	$r = -.15$, $p < .07$ (boys) $r = -.22$, $p < .001$ (girls)
	Attachment security (mother)	Approach coping	$r = .07$, ns (boys) $r = .16$, $p < .05$ (girls)
Jagadeesan (2013)	Attachment security	Avoidant coping	$r = -.44$, $p < .001$
	Attachment security	Preoccupied coping	$r = .21$, $p < .001$
Kerns et al. (2007)	Attachment security	Constructive coping	$r = .26$, $p < .10$
Tur-Porcar et al. (2018)	Attachment (mother)	Functional coping	$r = .292$, $p < .01$
	Attachment (mother)	Dysfunctional coping	$r = .017$, ns
	Abandonment (mother)	Functional coping	$r = -.073$, $p < .01$
	Abandonment (mother)	Dysfunctional coping	$r = .141$, $p < .01$
	Attachment (father)	Functional coping	$r = .237$, $p < .01$
	Attachment (father)	Dysfunctional coping	$r = -.001$, ns
	Abandonment (father)	Functional coping	$r = -.036$, ns
	Abandonment (father)	Dysfunctional coping	$r = .092$, $p < .01$
C: The Adult Attachment Interview			
Dawson et al. (2014)	Preoccupied attachment	Maladaptive coping	$\beta = 0.16$, $p < .05$
	Dismissing attachment	Maladaptive coping	$\beta = 0.22$, $p = .01$
Scharf et al. (2004)	Autonomous vs. dismissing attachment	Emotion-focused coping	$t(78) = 0.11$, ns
	Autonomous vs. dismissing attachment	Problem-focused coping	$t(78) = 2.07$, $p < .05$ autonomous > dismissing
Seiffge-Krenke (2006)	Secure attachment	Active coping	$r = .225$, $p < .05$
	Secure attachment	Internal coping	$r = .182$, $p < .05$
	Secure attachment	Withdrawal	$r = -.174$, $p < .05$
	Dismissing attachment	Active coping	$r = -.260$, $p < .01$
	Dismissing attachment	Internal coping	$r = -.058$, ns
	Dismissing attachment	Withdrawal	$r = -.002$, ns
	Preoccupied attachment	Active coping	$r = .045$, ns
	Preoccupied attachment	Internal coping	$r = -.196$, $p < .05$
	Preoccupied attachment	Withdrawal	$r = .276$, $p < .01$

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Table 3.2 (*cont.*)

Study	Attachment subscale	Coping subscale	Result (t, F, r, b, or β)
Seiffge-Krenke and Beyers (2005)	Secure vs. dismissing vs. preoccupied attachment	Active coping	$F(4, 424) = 8.15$, $p < .001$ dismissing < secure
	Secure vs. dismissing vs. preoccupied attachment	Growth in active coping	$F(8, 424) = 3.02$, $p < .01$ dismissing < secure; preoccupied < secure
	Secure vs. dismissing vs. preoccupied attachment	Internal coping	ns
	Secure vs. dismissing vs. preoccupied attachment	Growth in internal coping	$F(8, 424) = 3.69$, $p < .001$ preoccupied < dismissing; preoccupied < secure
	Secure vs. dismissing vs. preoccupied attachment	Withdrawal	ns
	Secure vs. dismissing vs. preoccupied attachment	Growth in withdrawal	ns
D: Attachment prototypes			
Birnbaum et al. (1997)	Secure vs. ambivalent vs. avoidant attachment	Social withdrawal	$F(2, 230) = 14.23$, $p < .01$ ambivalent > secure; avoidant > secure
	Secure vs. ambivalent vs. avoidant attachment	Wishful thinking	$F(2, 230) = 4.71$, $p < .05$ ambivalent > avoidant; ambivalent > secure
	Secure vs. ambivalent vs. avoidant attachment	Self-defeating thoughts	$F(2, 230) = 9.42$, $p < .01$ ambivalent > secure; avoidant > secure
	Secure vs. ambivalent vs. avoidant attachment	Problem-solving	$F(2, 230) = 2.16$, ns
	Secure vs. ambivalent vs. avoidant attachment	Support-seeking	$F(2, 230) = 0.88$, ns
	Secure vs. ambivalent vs. avoidant attachment	Distancing	$F(2, 230) = 0.60$, ns
Kemp and Neimeyer (1999)	Secure vs. fearful vs. preoccupied vs. dismissing attachment	Social support-seeking	$F(3, 182) = 1.40$, $p < .39$

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	Secure vs. fearful vs. preoccupied vs. dismissing attachment	Distancing	ns
Mikulincer et al. (1993)	Secure vs. ambivalent vs. anxious attachment	Problem-focused coping	ns
	Secure vs. ambivalent vs. anxious attachment	Emotion-focused coping	$F(2, 120) = 4.84$, $p < .01$ ambivalent > avoidant; ambivalent > secure
	Secure vs. ambivalent vs. anxious attachment	Support-seeking	$F(2, 120) = 3.94$, $p < .05$ ambivalent < secure; avoidant < secure
	Secure vs. ambivalent vs. anxious attachment	Distancing	$F(2, 120) = 4.07$, $p < .05$ ambivalent < avoidant; avoidant > secure
Mikulincer and Florian (1995)	Secure vs. ambivalent vs. avoidant attachment	Problem-focused coping	ns
	Secure vs. ambivalent vs. avoidant attachment	Emotion-focused coping	$F(2, 89) = 9.20$, $p < .01$ ambivalent > avoidant; ambivalent > secure
	Secure vs. ambivalent vs. avoidant attachment	Support-seeking	$F(2, 89) = 7.08$, $p < .01$ ambivalent > avoidant; ambivalent < secure
	Secure vs. ambivalent vs. avoidant attachment	Distancing coping	$F(2, 89) = 6.18$, $p < .01$ ambivalent < avoidant; secure < avoidant
Myers and Vetere (2002)	Secure vs. ambivalent vs. avoidant attachment	Coping resources	$F(2, 108) = 7.82$, $p < .0001$ ambivalent < secure; avoidant < secure
Nelson (2004)	Secure vs. fearful vs. preoccupied vs. dismissing attachment	Confrontive coping, distancing, planful problem-solving, positive reappraisal, social support-seeking, and escape-avoidance	ns
E: Continuous scales of attachment anxiety/ambivalence and avoidance			
Alexander et al. (2001)	Anxiety over relationships	Problem-focused coping	$r = -.07$, ns
	Anxiety over relationships	Social support-seeking	$r = .13$, ns
	Anxiety over relationships	Emotion-focused coping	$r = .40$, $p < .001$
	Discomfort with closeness	Problem-focused coping	$r = -.04$, ns

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Table 3.2 (*cont.*)

Study	Attachment subscale	Coping subscale	Result (t, F, r, b, or β)
	Discomfort with closeness	Social support-seeking	$r = .00$, ns
	Discomfort with closeness	Emotion-focused coping	$r = .41$, $p < .001$
Belizaire and Fuertes (2011)	Attachment avoidance	Adaptive coping	$r = -.33$, $p < .001$
	Attachment avoidance	Maladaptive coping	$r = -.08$, ns
	Attachment anxiety	Adaptive coping	$r = .21$, $p < .001$
	Attachment anxiety	Maladaptive coping	$r = .44$, $p < .001$
Ben-Ari and Hirschberg (2009)	Attachment security	Avoiding strategy	$r = -.16$, $p < .05$
	Attachment security	Dominating strategy	$r = .12$, ns
	Attachment security	Obliging strategy	$r = .06$, ns
	Attachment security	Compromising strategy	$r = .30$, $p < .001$
	Attachment security	Integrating strategy	$r = .26$, $p < .001$
	Attachment avoidance	Avoiding strategy	$r = .03$, ns
	Attachment avoidance	Dominating strategy	$r = .26$, $p < .001$
	Attachment avoidance	Obliging strategy	$r = -.16$, $p < .05$
	Attachment avoidance	Compromising strategy	$r = -.22$, $p < .01$
	Attachment avoidance	Integrating strategy	$r = -.18$, $p < .01$
	Attachment anxiety	Avoiding strategy	$r = .35$, $p < .001$
	Attachment anxiety	Dominating strategy	$r = -.02$, ns
	Attachment anxiety	Obliging strategy	$r = .10$, ns
	Attachment anxiety	Compromising strategy	$r = .01$, ns
	Attachment anxiety	Integrating strategy	$r = -.09$, ns
Berry and Kingswell (2012)	Attachment anxiety	Problem-focused coping	$r = -.14$, ns
	Attachment anxiety	Positive emotion-focused coping	$r = .04$, ns
	Attachment anxiety	Dysfunctional coping	$r = .51$, $p < .05$
	Attachment avoidance	Problem-focused coping	$r = -.41$, $p < .05$
	Attachment avoidance	Emotion-focused coping	$r = -.27$, $p < .05$
	Attachment avoidance	Dysfunctional coping	$r = .14$, ns
Deniz and Işik (2010)	Fearful attachment	Social support-seeking	$r = .07$, ns
	Fearful attachment	Problem-focused coping	$r = -.01$, ns
	Fearful attachment	Avoidance	$r = -.14$, $p < .01$
	Dismissing attachment	Social support-seeking	$r = .09$, ns

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	Dismissing attachment	Problem-focused coping	$r = .23$, $p < .001$
	Dismissing attachment	Avoidance	$r = -.11$, $p < .01$
	Secure attachment	Social support-seeking	$r = .05$, ns
	Secure attachment	Problem-focused coping	$r = .15$, $p < .01$
	Secure attachment	Avoidance	$r = .15$, $p < .01$
	Preoccupied attachment	Social support-seeking	$r = .09$, ns
	Preoccupied attachment	Problem-focused coping	$r = -.07$, ns
	Preoccupied attachment	Avoidance	$r = -.01$, ns
Fuenfhausen and Cashwell (2013)	Attachment anxiety	Dyadic coping	$r = -.53$, $p < .05$
	Attachment avoidance	Dyadic coping	$r = -.73$, $p < .05$
Gatmaitan (2013)	Attachment anxiety	Reactive (emotional) coping	$r = .50$, $p < .001$
	Attachment anxiety	Suppressive (avoidant) coping	$r = .46$, $p < .001$
	Attachment avoidance	Reactive (emotional) coping	$r = .42$, $p < .001$
	Attachment avoidance	Suppressive (avoidant) coping	$r = .39$, $p < .001$
Han (2009)	Attachment insecurity (Anxiety and avoidance latent factor)	Maladaptive coping (Active avoidance, non-problem-solving latent factor)	$\beta = 0.83$, $p < .001$
Holmberg et al. (2011)	Attachment anxiety	Social support-seeking (partner)	$\beta = 0.16$, ns
	Attachment anxiety	Social support-seeking (friends/family)	$\beta = 0.12$, ns
	Attachment anxiety	Distancing	$\beta = 0.25$, $p < .05$
	Attachment anxiety	Positive emotion-focused coping	$\beta = 0.29$, $p < .05$
	Attachment anxiety	Problem-focused coping	$\beta = 0.22$, $p < .10$
	Attachment avoidance	Social support-seeking (partner)	$\beta = -0.60$, $p < .001$
	Attachment avoidance	Social support-seeking (friends/family)	$\beta = -0.52$, $p < .001$
	Attachment avoidance	Distancing	$\beta = 0.09$, ns
	Attachment avoidance	Emotion-focused coping	$\beta = -0.26$, $p < .10$
	Attachment avoidance	Problem-focused coping	$\beta = -0.23$, $p < .10$
Howard and Medway (2004)	Secure attachment	Negative avoidance	$r = -.32$, $p < .01$
	Secure attachment	Anger	$r = -.04$, ns
	Secure attachment	Family communication	$r = .35$, $p < .01$

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Table 3.2 (*cont.*)

Study	Attachment subscale	Coping subscale	Result (t, F, r, b, or β)
	Secure attachment	Positive avoidance	$r = .22$, ns
	Fearful attachment	Negative avoidance	$r = .40$, $p < .01$
	Fearful attachment	Anger	$r = .21$, ns
	Fearful attachment	Family communication	$r = -.22$, ns
	Fearful attachment	Positive avoidance	$r = -.28$, $p < .05$
	Dismissing attachment	Negative avoidance	$r = .30$, $p < .01$
	Dismissing attachment	Anger	$r = .01$, ns
	Dismissing attachment	Family communication	$r = -.07$, ns
	Dismissing attachment	Positive avoidance	$r = .02$, ns
	Preoccupied attachment	Negative avoidance	$r = .32$, $p < .01$
	Preoccupied attachment	Anger	$r = .04$, ns
	Preoccupied attachment	Family communication	$r = -.03$, ns
	Preoccupied attachment	Positive avoidance	$r = .10$, ns
Li and Yang (2009)	Attachment security	Problem-solving	$r = .03$, ns
	Attachment security	Social support-seeking	$r = .07$, ns
	Attachment security	Avoidance	$r = -.13$, $p < .05$
Lopez et al. (2001)	Attachment anxiety	Reactive (emotional) coping	$r = -.51$, $p < .01$
	Attachment anxiety	Suppressive (avoidant) coping	$r = -.20$, ns
	Attachment avoidance	Reactive (emotional) coping	$r = -.34$, $p < .05$
	Attachment avoidance	Suppressive (avoidant) coping	$r = -.34$, $p < .05$
Lussier et al. (1997)	Attachment security	Task-oriented coping strategies	$r = .26$, $p < .05$
	Attachment security	Emotion-oriented coping strategies	$r = -.06$, ns
	Attachment security	Avoidance	$r = .02$, ns
	Attachment anxiety/ ambivalence	Task-oriented coping strategies	$r = -.11$, $p < .05$
	Attachment anxiety/ ambivalence	Emotion-oriented coping strategies	$r = .31$, $p < .05$
	Attachment anxiety/ ambivalence	Avoidance	$r = .28$, $p < .05$

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	Attachment avoidance	Task-oriented coping strategies	$r = -.18$, $p < .05$
	Attachment avoidance	Emotion-oriented coping strategies	$r = .31$, $p < .05$
	Attachment avoidance	Avoidance	$r = .10$, $p < .05$
Marques (2006)	Secure attachment	Confrontive coping	$r = -.027$, $p = .747$
	Secure attachment	Distancing	$r = -.136$, $p = .108$
	Secure attachment	Self-controlling	$r = -.112$, $p = .184$
	Secure attachment	Seeking social support	$r = .047$, $p = .581$
	Secure attachment	Accepting responsibility	$r = -.014$, $p = .865$
	Secure attachment	Escape-avoidance	$r = -.161$, $p = .056$
	Secure attachment	Planful problem-solving	$r = .045$, $p = .596$
	Secure attachment	Positive reappraisal	$r = .140$, $p = .097$
	Fearful attachment	Confrontive coping	$r = .034$, $p = .691$
	Fearful attachment	Distancing	$r = .116$, $p = .165$
	Fearful attachment	Self-controlling	$r = .248$, $p = .003$
	Fearful attachment	Seeking social support	$r = -.145$, $p = .083$
	Fearful attachment	Accepting responsibility	$r = .099$, $p = .240$
	Fearful attachment	Escape-avoidance	$r = .234$, $p = .005$
	Fearful attachment	Planful problem-solving	$r = .061$, $p = 464$
	Fearful attachment	Positive reappraisal	$r = .042$, $p = .613$
	Preoccupied attachment	Confrontive coping	$r = .133$, $p = .115$
	Preoccupied attachment	Distancing	$r = -.125$, $p = .135$
	Preoccupied attachment	Self-controlling	$r = .145$, $p = .084$
	Preoccupied attachment	Seeking social support	$r = -.043$, $p = .609$
	Preoccupied attachment	Accepting responsibility	$r = .121$, $p = .150$
	Preoccupied attachment	Escape-avoidance	$r = .200$, $p = .016$
	Preoccupied attachment	Planful problem-solving	$r = -.154$, $p = .065$
	Preoccupied attachment	Positive reappraisal	$r = -.083$, $p = .322$
	Dismissing attachment	Confrontive coping	$r = -.029$, $p = .727$
	Dismissing attachment	Distancing	$r = .266$, $p = .001$
	Dismissing attachment	Self-controlling	$r = .140$, $p = .094$
	Dismissing attachment	Seeking social support	$r = -.099$, $p = .237$

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Table 3.2 (*cont.*)

Study	Attachment subscale	Coping subscale	Result (t, F, r, b, or β)
	Dismissing attachment	Accepting responsibility	$r = .011$, $p = .895$
	Dismissing attachment	Escape-avoidance	$r = .079$, $p - .345$
	Dismissing attachment	Planful problem-solving	$r = .059$, $p = .482$
	Dismissing attachment	Positive reappraisal	$r = .084$, $p = .314$
Ognibene and Collins (1998)	Secure attachment	Social support-seeking	$r = .33$, $p < .01$
	Secure attachment	Confrontive coping	$r = .16$, ns
	Secure attachment	Distancing	$r = -.01$, ns
	Secure attachment	Escape-avoidance	$r = -.10$, ns
	Preoccupied attachment	Social support-seeking	$r = .33$, $p < .01$
	Preoccupied attachment	Confrontive coping	$r = .22$, $p < .05$
	Preoccupied attachment	Distancing	$r = .06$, ns
	Preoccupied attachment	Escape-avoidance	$r = .33$, $p < .01$
	Dismissing attachment	Social support-seeking	$r = -.12$, ns
	Dismissing attachment	Confrontive coping	$r = -.04$, ns
	Dismissing attachment	Distancing	$r = .10$, ns
	Dismissing attachment	Escape-avoidance	$r = -.19$, $p < .10$
	Fearful attachment	Social support-seeking	$r = -.18$, ns
	Fearful attachment	Confrontive coping	$r = -.14$, ns
	Fearful attachment	Distancing	$r = -.20$, $p < .10$
	Fearful attachment	Escape-avoidance	$r = -.19$, $p < .10$
Perlman et al. (2016)	Attachment avoidance	Adaptive coping	$r = -.246$, $p < .01$
	Attachment avoidance	Maladaptive coping	$r = .383$, $p < .01$
	Attachment anxiety	Adaptive coping	$r = .035$, ns
	Attachment anxiety	Maladaptive coping	$r = .440$, $p < .01$
Zheng (2018)	Attachment avoidance	Adaptive coping	$r = -.218$, $p < .05$
	Attachment avoidance	Maladaptive coping	$r = .173$, ns
	Attachment anxiety	Adaptive coping	$r = -.148$, ns
	Attachment anxiety	Maladaptive coping	$r = .260$, $p < .01$

Notes: ns = not significant. All p-values greater than 0.050 were considered nonsignificant.

when the activation of the attachment system can be conceptualized as a precursor of later coping ability, rather than a separate system from the infant coping response. In particular, it will be helpful to compare the predictive significance of infant attachment for clearly attachment-relevant coping behaviors like social support-seeking, versus other adaptive but less-relevant coping strategies, like practical problem-solving.

Self-Reported Attachment in Childhood

Although the majority of research in parent–child attachment has focused on observational work with infants, Bowlby's (1982) theory proposed that attachment relationships are developmentally significant across the lifespan. Methodological challenges related to the development of appropriate measures of attachment quality in middle childhood have slowed work in the middle childhood period; however, in recent years, research on parent–child attachment with older children has become more common (Brumariu et al., 2018). In particular, the Kerns Security Scale (Kerns et al., 1996) has become one of the most frequently used measure of childhood attachment quality. Studies using the Kerns Security Scale to study the association between attachment and coping are summarized in Tables 3.1B and 3.2B.

Similar to those studies using observational measures of parent–child attachment, the majority of reported effects supported a positive association between attachment security and adaptive coping behaviors (60.0%), whereas only one provided evidence of an association between security and maladaptive coping (i.e., preoccupied coping; 5.0%). For example, using the largest sample identified in this domain, Tur-Porcar and colleagues (2018 surveyed 1,447 Spanish youth (ages 7–12 years) regarding their attachment security and abandonment fears toward their mother and father. Children who reported higher levels of attachment to their mother and father were more likely to report using functional coping strategies on the Coping Assessment Questionnaire for Children (Richaud, 2006), whereas those endorsing high levels of abandonment toward mother and father were more likely to endorse dysfunctional coping strategies. Additionally, fear of abandonment by mother was also associated with less use of functional coping strategies.

Overall, it appears that self-reported attachment security to parents in childhood is associated with more adaptive coping, and also in some cases with lower maladaptive coping (i.e., less avoidant coping, less dysfunctional coping). Likewise, there is some evidence that insecure states of mind (i.e., fear of abandonment) are associated with an increased likelihood of using less adaptive coping skills. Conclusions drawn from this body of literature are strengthened by the presence of largely consistent results from several large samples representing different populations (e.g., high- and low-risk caregiving; various countries). However, none of the studies reviewed above were longitudinal, making it difficult to establish the directionality (or, perhaps more likely, transactional nature) of the association between parent–child attachment quality and coping behavior.

The Adult Attachment Interview

Attachment theory has expanded over the last four decades to include the assessment of attachment states of mind in adolescents and adults. In the mid-1980s, Main and her colleagues (George et al., 1996) developed the Adult Attachment Interview (AAI). During the AAI, individuals are asked a

series of questions about their childhood experiences with their primary caregivers. Responses are most typically coded for coherence, or the extent to which an individual tells internally consistent stories about their childhood experiences without becoming emotionally dysregulated (Ravitz et al., 2010; Roisman, 2009). Adults are then inductively sorted into categories that conceptually parallel the original coding of the Strange Situation paradigm: secure/autonomous, dismissing, preoccupied, or unresolved (Main & Goldwyn, 1998).

Few studies have been conducted using the AAI in adolescence or adulthood to study the association between attachment security and coping. In our review, we identified four studies relying on data from three independent samples that reported an association between AAI states of mind and self-reported coping strategy use (Tables 3.1C and 3.2C). Altogether, 12 out of 19 (63.2%) reported effects supported a relation between attachment security and higher rates of adaptive, or lower rates of maladaptive, coping. No studies reported significant effects supporting a negative association between attachment security and adaptive coping. For example, Dawson and colleagues (2014) administered the AAI to 175 US participants at age 14 years. The sample was followed until age 22 years, when participants self-reported on their use of coping strategies using the COPE scale (Carver et al., 1989). Results showed that preoccupied and dismissing states of mind at age 14 predicted greater use of maladaptive coping skills at age 22 (Dawson et al., 2014). Conversely, there is some evidence that self-reported coping skills in adolescence are predictive of subsequent attachment states of mind in young adulthood (Seiffge-Krenke, 2006; Seiffge-Krenke & Beyers, 2005).

In summary, evidence from two samples suggests that attachment states of mind are associated with subsequent coping strategies (Dawson et al., 2014; Scharf et al., 2004); the other has provided evidence that coping in adolescence and young adulthood is in turn predictive of attachment states of mind (Seiffge-Krenke & Becker-Stoll, 2004; Seiffge-Krenke & Beyers, 2005). Dismissing attachment states of mind have been associated with less problem-focused coping and less social network use to deal with stressors. Preoccupation, on the other hand, was associated with more maladaptive and ambivalent coping, but also less use of internal (e.g., problem-solving) coping strategies. Security seems to be associated with use of a wider variety of coping strategies. Importantly, these findings are collectively based on only three samples. Although all three studies used the AAI, interview transcripts were coded in different ways, with some studies using continuous scores and others using categorical assignments. Additionally, coping was measured in different ways across all three samples, making it challenging to synthesize results. More work is needed to clarify the generalizability of these findings.

Self-Reports of Attachment in Adolescence and Adulthood

At about the same time that the AAI was being developed in the field of child psychology, social and personality psychologists were developing self-report measures of attachment orientations for use with adults (Hazan & Shaver, 1987). Notably, although both the child psychology and social/personality psychology traditions of attachment measurement originated from the same early studies on infant attachment, narrative measures of

adult attachment (i.e., the AAI) and self-report measures of attachment have limited convergence (Roisman et al., 2007). Although variation in (in)security as reflected in the AAI appears to be more strongly associated with the quality of early caregiving experienced by adults during childhood (Steele et al., 2014), both types of measurement are associated with adult outcomes (Roisman, 2009; Roisman et al., 2007).

Hazan and Shaver (1987) argued that the three patterns of attachment seen in infants should correspond to three styles of relating to romantic partners in adulthood. In early research in this area, participants were presented with three narrative descriptions of attachment patterns and asked to rate the extent to which they were similar to each description, as well as select the pattern that best described them. Building on these ideas, Bartholomew and Horowitz (1991) developed a four-category measure of attachment that grouped adults by asking participants to select a prototype they most identified with. Subsequently, self-reports of attachment style in adulthood moved toward continuous, rather than categorical, measurement of attachment security (e.g., Fraley et al., 2000). Most typically, adults are rated on their degree of attachment anxiety and attachment avoidance using Likert-type questionnaires; individuals with low scores on both anxiety and avoidance are considered to have a secure attachment orientation.

Prototype Approaches

We identified six studies that used an attachment-prototype measure to assess attachment orientation (Tables 3.1D and 3.2D). Of the results reported in these studies, 55.6% supported a positive relation between secure attachment and more adaptive (or less maladaptive) ways of coping. The remaining 44.4% of associations were nonsignificant. Notably, this subset of studies was more consistent in use of coping measures, with five of the six employing the Ways of Coping Checklist (in various forms; Folkman & Lazarus, 1985) to assess coping strategies.

In the largest-sample study identified in this domain, Birnbaum and colleagues (1997 presented the Hazan and Shaver (1987) prototypes to 233 Israeli adults, aged 20–62 years. They observed that ambivalent and avoidant individuals were much more likely than secure individuals to use social withdrawal, wishful thinking, and self-defeating thoughts as strategies for coping with stress; however, there was no difference between the three groups in use of problem-solving, social support-seeking, or distancing. In contrast, neither study that used Bartholomew's Relationship Scales Questionnaire (Bartholomew & Horowitz, 1991) observed an association between self-reported attachment style and coping behaviors (Kemp & Neimeyer, 1999; Nelson, 2004).

Taken together, studies using a categorical approach to adult attachment assessment have yielded mixed results. Several studies have supported the general notion that secure attachment is associated with more adaptive coping strategies (e.g., social support-seeking) and insecure attachments are associated with more maladaptive coping (e.g., social withdrawal, emotion-focused coping). However, others have found no association between self-reported attachment categories and coping. Given that prototype assessments of attachment are generally considered less valid and have fallen out of favor, future research should focus on alternative methods of assessing adult attachment, including the AAI and continuous measures of self-reported attachment.

Continuous Measures of Attachment

The most well-developed literature concerning the association between attachment and coping skills utilized self-reports of attachment anxiety/ambivalence and avoidance. As reported in Tables 3.1E and 3.2E, 35.1% of reported effects supported a positive association between attachment security and adaptive coping, 58.1% of reported effects were nonsignificant, and 6.8% of reported effects supported a *negative* association between attachment security and adaptive coping.

Although many continuous measures of self-report attachment exist, three of the most commonly used in this literature were Hazan and Shaver's (1987) Attachment Scale, the Experiences in Close Relationships questionnaire, in its various forms (Brennan et al., 1998; Fraley & Shaver, 2000), and continuous measures of attachment based on the Bartholomew and Horowitz four-prototype model. For example, Lussier and colleagues (1997) observed that attachment anxiety/ambivalence and avoidance (as measured with Havan and Shaver's [1987] Attachment Scale) were associated with less use of task-oriented coping strategies and more emotion-oriented coping strategies and avoidance (as measured with the Coping Inventory for Stressful Situations; Endler et al., 1990). Interestingly, attachment security was associated with more task-oriented coping strategies, but not associated with the maladaptive strategies of emotion-focused coping or avoidance. Similarly, Han (2009) observed in a large sample of US adults aged 18–60 years that higher levels of attachment anxiety and avoidance were associated with less use of problem-solving and more avoidance to cope with stressors. In contrast, however, Deniz and Işik (2010) observed in a large sample of Turkish undergraduate students that problem-focused coping was more often utilized by those high on dismissing attachment and secure attachment. Furthermore, social support-seeking was less common for those who endorsed fearful or dismissing attachment behaviors and more common for those rated as more secure (Deniz & Işik, 2010).

Overall, a mixed pattern of results has emerged from the literature focused on anxious/ambivalent and avoidant attachment. In general, those more secure (i.e., low in both anxiety and avoidance) are more likely to use adaptive, problem-focused coping strategies. However, no clear pattern emerged in our review of the literature to suggest that anxious/ambivalent individuals, as compared to avoidant individuals, use specific coping strategies. Rather, it appears that those high on either anxiety or avoidance (or both) are more likely to use maladaptive coping skills generally.

Conclusion

Although our review of the literature generally supported the claims of attachment theorists that security is indicative of more adaptive regulation in times of stress, more empirical work would be valuable in this area. First, although no clear pattern of differential associations between anxious and avoidant attachments on the one hand and coping skills on the other was observed, it is important to recognize the role that inconsistency in the measurement of coping may have played. The variety of coping measures used in the studies reviewed may obscure meaningful differences in associations between various types of insecure attachment and coping behaviors. Greater consistency in the measurement of both attachment and coping in adult samples (as well as the use of measures from multiple traditions within the same studies) can help clarify this finding in future reviews.

Second, our review of the literature highlighted a discrepancy in the volume of studies that examine attachment behaviors and states of mind at various ages. Young adults were greatly overrepresented in the body of work conducted thus far, with a particular overrepresentation of self-report attachment measures as opposed to those using behavioral observations (i.e., the Strange Situation or Attachment Q-sets) or the AAI. Given that these latter types of assessments are primarily used by developmental scientists, rather than social and personality psychologists, it is no surprise that there is also a lack of high-quality longitudinal work to clarify the developmental course of coping behaviors. A great deal of work remains to be done in clarifying whether attachment behaviors early in life are predictive of coping skills across developmental stages. Such studies can help clarify whether an adaptively functioning attachment system is indeed a developmental precursor to adaptive coping behaviors, or is better conceptualized as a mere marker of self-regulation skills. Experimental work that strives to increase adaptive, secure attachment behavior in early childhood (e.g., interventions like child–parent psychotherapy or attachment and biobehavioral catchup; Dozier & Bernard, 2017; Lieberman, 2004) could also be useful in shedding light on the causal link between attachment behavior and subsequent regulation and coping skills. Until such work is done, it remains a possibility that coping behaviors early in life are better conceptualized as contributing to the formation of a secure attachment, rather than the other way around (or both; e.g., Fuertes et al., 2009).

Finally, nearly all of the studies reviewed assessed attachment behavior as it relates to primary caregivers, or attachment states of mind as they relate to romantic partners. However, attachment behaviors and states of mind can vary toward different important figures in children's and adults' lives (e.g., Magro et al., 2020; Van IJzendoorn et al., 1992). Work that strives to capture attachment behavior more holistically better represents the complexity of the attachment system and is likely to lead to clearer results regarding the association between attachment and coping behaviors.

In addition to these empirical gaps, theoretical work remains to be done. First, it is clear that emotion regulation and coping are highly related concepts. Yet, researchers have generally studied these constructs separately (Compas et al., 2014). Future work would benefit from an integration of these two fields to clarify important questions about developmental progression, adaptive behaviors, and precursors. Second, it remains unclear whether the attachment systems and regulation systems are best conceptualized as separate or nested, with attachment behaviors serving a regulatory function. For example, social support-seeking is identified frequently as an adaptive coping mechanism but is also a key marker of secure attachment behavior. Securely attached infants return to their caregivers when in need of protection from stressors or organization of emotions; securely attached adults turn to partners in times of need for emotional support. Disentangling these constructs (for example, by studying the extent to which attachment security predicts various types of adaptive coping that have more or less relevance to the attachment system) remains a challenge for researchers who wish to understand the theoretical relation between attachment and coping, as well as the developmental importance of a secure attachment relationship for the eventual development of adaptive self-regulation and coping skills.

See Table 3.3 for some takeaway messages from this chapter.

Table 3.3 *Takeaway messages regarding the study of attachment, regulation, and coping*

1: **Attachment is theoretically relevant to the development of both regulation and coping.**
- The attachment relationship is the context in which children begin to develop the ability to recognize and regulate emotions and develop the capacity to cope with stress with the assistance of an adult (i.e., co-regulation). Reliably experiencing sensitive, reciprocal interactions builds regulatory and expressive skills that individuals can later utilize in an independent fashion. Ultimately, attachment bonds develop alongside and together with regulatory skills, including coping with stress. Secure attachment is therefore a gateway to adaptive coping because effective strategies are learned through consistent and effective co-regulation.
- Regulatory abilities may also be influenced by the quality of the attachment bond via expectations formed early in life about caregivers' behavior and warmth (i.e., internal working models). Coping appraisals, which are central to the formulation of coping responses, may work in parallel with individuals' expectations of interpersonal responses, informed by internal working models.
- Individuals with an anxious attachment might engage in coping strategies that emphasize emotional reactions that aim to elicit attention from others, given that this strategy likely served an adaptive function in infancy (i.e., gaining the attention of a typically unavailable parent). Conversely, individuals with an avoidant attachment might use more avoidant coping strategies, given their experience with withdrawn or rejecting caregivers who were less likely to offer support or comfort in times of stress. Finally, individuals with a disorganized attachment relationship with a presumably frightening or inconsistent caregiver might utilize an inconsistent pattern of coping strategies, switching between adaptive and maladaptive forms of regulation.

2: **Mixed empirical evidence exists to suggest that attachment and coping are related.**
- Of the effects reported in identified studies, 43.1% were in support of a positive relation between attachment security and higher (lower) adaptive (maladaptive) coping skills. However, 51.7% of findings were null and 5.2% were in a nonhypothesized direction.
- Most studies have examined cross-sectional associations between attachment security and coping. A small number have reported correlations between attachment early in life and subsequent coping behavior, as well as coping behaviors and subsequent attachment security. More work remains to be done to determine the extent to which associations are longitudinal and reciprocal between the constructs.
- Most of the evidence in this field has been gathered using self-reported attachment questionnaires with young adult samples in the USA. More work remains to be done to understand the predictive significance of early attachment behavior and early self-reported attachment to parents for subsequent coping behaviors later in life.

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4 Social Context, Psychological Needs, and the Development of Coping

Jacquelyn N. Raftery-Helmer and Wendy S. Grolnick

Introduction

Olivia and Emma sit patiently at their desks as their respective teachers return graded math tests. In one classroom, Ms. White hands Olivia her exam. Olivia's eyes are drawn to the 50 and large F written in red ink at the top of the paper. Ms. White watches as Olivia's eyes well up with tears and she inches closer to her student, whispering, "it can feel disappointing when we don't do as well as we hope. I wonder if you would like to meet up after class to review where you got stuck." Olivia quietly nods. After class, Ms. White patiently goes over each problem, highlighting for Olivia where she made errors and providing feedback on the parts of the problem that she did answer correctly. Olivia eagerly listens, taking notes that she can later refer back to. "I have some extra problems that might help you practice. Would you like to try them at home or work on them together now?" Ms. White asks. Olivia grins, "I would like to try them now!" She quickly finishes the first problem. "Does this answer look right?" Ms. White nods, pointing out the steps that Olivia correctly completed and gently encouraging Olivia to continue. The second question seems more difficult. Olivia writes an answer, pauses, and then scribbles it out. "That doesn't seem right," she says. Ms. White patiently waits as Olivia reviews her notes, and is careful not to offer any uninvited help. "Ah, I got it!" Olivia exclaims several minutes later. Olivia and Ms. White work together for the next 15 minutes with Ms. White providing help when asked but otherwise serving as a reassuring and encouraging presence as Olivia tries the problems on her own. When Olivia finishes the worksheet, she asks Ms. White if there are any others to take home. After school, Olivia tells her Mom how disappointed she was about the grade but insists that "it will be OK because I'm going to work on some extra math problems that Ms. White gave me."

Across the hall, Ms. Marshall hands Emma her test. About to cry, Emma, too, feels that same sting of failure when she sees an F and 50 scrawled across the top. "You can do better, Emma," Ms. Marshall insists. Emma grabs her test and is about to head for the lunchroom but Ms. Marshall stops her, "I can tell you didn't study for this one." Emma is about to protest and tries to insist that she did, in fact, study – a lot – but Ms. Marshall just holds her hand up. "You need to do these extra problems tonight for practice." Rolling her eyes, Emma stuffs the extra practice problems into her backpack and quickly leaves the classroom. When a friend asks Emma how she did on the test, she insists that Ms. Marshall made the test too hard, didn't cover the material, and is just an "all around horrible teacher." "I stink at math anyways," she says, taking the test and throwing it in the trash. After school, when Emma's dad asks about her day, she does not mention the math test and doesn't bother working on the extra problems.

Table 4.1 *Take-home messages*

1. Children can appraise stressors as threats or challenges.
2. Coping strategies can be active and adaptive, such as problem-solving, help-seeking, and support for feeling or defensive and less adaptive such as blame, cognitive avoidance, and rumination.
3. The degree to which children appraise stressors as threats or challenges depends on their motivational resources and the environment.
4. Environments that support autonomy, provide structure, and are involved promote motivational resources that impact children's appraisal of stress and coping strategy use.

Both Emma and Olivia encountered the stress of failure, an experience that is inevitable for children attempting to learn something new. However, their divergent responses highlight individual differences in how students understand and cope with such stress and how social contexts, like the interactions these students had with their teachers, drastically impact how children understand and cope with stressful experiences. Olivia had a warm and supportive teacher who gave her strategies to understand why she struggled, while allowing her to continue to take ownership over her work. For her, the 50 on her math test was an opportunity to master her math skills as she channeled her efforts into understanding what happened and doing better next time. Emma's teacher was controlling, rejecting, and provided few opportunities for Emma to learn from her mistakes. As a result, her low mark was a sign of her incompetence, and her behavior was aimed at restoring her self-esteem by either blaming (Ms. Marshall, the subject) or ignoring the experience altogether.

This chapter explores the coping strategies that students employ following a variety of stressful situations in which children find themselves, with a focus on the social context. Many scholars agree that coping is a personal resource that includes the ways in which children adapt to stress via attempts to regulate affect, behavior, cognition, and physiology, and efforts to modify the environment (Compas et al., 2001; Skinner & Saxton, 2019). Broadly, when students confront a stressful situation, they must appraise the situation, or interpret its meaning, mobilize resources, both internal and in the environment, and then engage in coping strategies. In our efforts to understand why students differ in their appraisals of stress and the strategies they use to cope with stressors, we will hone in on the social context, with a particular focus on the impact of parents and teacher. The focus on the social context is consistent with the wealth of data collected by myriad scholars (e.g., Compas et al., 2005; Eisenberg et al., 1997; Skinner, 1999) showing that the social environment can influence how stress is experienced and the coping strategies that a person ultimately employs. In doing so, we will utilize self-determination theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2017). Self-determination theory delineates the psychological resources that children need when confronted with stressful situations and how interpersonal contexts that do or do not meet these needs affect children's coping responses. We summarize the primary takeaway messages from this chapter in Table 4.1.

An Introduction to Self-Determination Theory

Self-determination theory (Ryan & Deci, 2017) asserts that people have basic psychological needs – those for autonomy, competence, and relatedness. The need for autonomy refers to the universal psychological

need to feel volitional and for a person to experience their own behaviors as autonomously initiated and not pressured from within or by others (Deci & Ryan, 1985; Ryan & Deci, 2017; Ryan & Connell, 1989; Ryan et al., 1992). It is important to note that autonomy is not analogous to independence. While independence refers to not depending upon other people, autonomy entails feeling choiceful about behaving, irrespective of whether the behavior includes relating to others in more dependent or independent ways. A need for competence entails needing to feel effective, and believing outcomes can be controlled (Deci & Ryan, 1985; Harter, 1982; Ryan & Deci, 2017; Skinner et al., 1990). Lastly, SDT proposes that people need to feel a sense of relatedness or connection and thrive when they feel loved and valued by others (Baumeister & Leary, 1995; Leary, 2010).

Self-determination theory (Ryan & Deci, 2017) also posits that children construct and revise self-system processes – beliefs, attitudes, and motivational propensities – based on their experiences of environments as supporting or thwarting their psychological needs. When a person's need for autonomy has been met, they will develop autonomous self-regulation. Scholars have suggested that self-regulation exists along a continuum. At one pole, children engage in behavior because of externally imposed contingencies (e.g., "I work on my math problems because Ms. Marshall will be angry at me if I don't"). At the other end, they engage in behavior out of a sense of the importance of or value for the activity (e.g., "I work on my math problems because it's important for me to figure out what I don't understand"), or because the activity is inherently interesting (e.g., "I work on my math problems because math is fun!").

When a person's need for competence has been satisfied, they will come to believe that they can be successful and can prevent failure outcomes, or develop a sense of perceived control (Connell, 1985; Muldoon et al., 2005). When this need is met, a person will also feel competent (Harter, 1982), believing themselves to be capable of mastery. A person's sense of self-worth and security with themselves and in their relationships are connected to the need for relatedness. When the need for relatedness has been met, people feel secure in their relationships and worthy of positive regard and love (Bretherton, 1985; Crittenden, 1990).

A Self-Determination Theory Perspective on Coping

To understand how social contexts impact coping we must first understand how children appraise stressful situations. There is abundant literature suggesting that children can appraise stressful situations in different ways (Lazarus & Folkman, 1984) and that how children appraise stressors is linked to the coping strategies that they utilize. In their seminal work formulating the cognitive theory of stress and coping, Lazarus and Folkman (1984) proposed two appraisal processes. First, the researchers suggested that when a person encounters a potential stressful situation, they first evaluate its relevance to well-being (e.g., does this stressful situation pose a potential benefit or harm to self-esteem?) in what is called a primary appraisal. In this early work, Lazarus and Folkman (1984) differentiated a primary appraisal of threat from a primary appraisal of challenge. When a person appraises the stressor as a threat it is seen as harmful in that it provides a risk of harm or loss. When a person perceives a stressor as a challenge, however, they will see the opportunity for mastery or personal growth in the situation. With secondary appraisals, a person evaluates what, if anything, can be done to overcome the stressor, prevent harm or loss,

and improve the benefit or opportunity. In doing so, a person evaluates their own coping strategies, the potential effectiveness of these strategies, and their own sense of efficacy to implement them (Folkman et al., 1986; Lazarus & Folkman, 1984).

An SDT perspective on coping suggests that primary appraisals are best understood in relation to the three psychological needs (Raftery-Helmer & Grolnick, 2016, 2018; Skinner & Wellborn, 1994). Situations that potentially jeopardize a person's experience of autonomy, competence, or relatedness are objectively stressful. However, according to SDT, whether a stressor is appraised as a threat to these needs or a challenge depends upon whether a person's environment supports their autonomy, competence, or relatedness. Specifically, children who feel controlled are likely to appraise stressors as threatening because their need for autonomy has not been met. For example, students who feel controlled in their classroom may focus on the coercive consequences that may follow their low grade and thus see the failure as a threat. With regard to competence, when children aren't clear about what is expected and about the contingencies in the environment and don't see themselves as effective or in control of outcomes, a stressful situation will be perceived as an insurmountable threat. Without confidence in their own capacity to affect change or solve problems, they will feel helpless in ameliorating or mitigating the stressor. Finally, with regard to relatedness, children with insecure relationships, who perceive others as unsupportive or unavailable may be threatened by stressful experiences because of an assumption that they will have to navigate difficult situations alone.

In contrast, stressors are more likely to be experienced as a challenge for children when their social contexts meet their psychological needs. For example, students who feel choiceful about their academic endeavors will most likely perceive failure as an unavoidable consequence of learning something new and difficult instead of as another means to be controlled by the environment. For children who feel competent or believe that they can be effective in producing favorable outcomes, stressful situations will be appraised as a challenge to undertake, a problem to solve, and an opportunity to expand their skills. Lastly, students who feel connected to others – to parents, to teachers, to peers – and who feel secure in these relationships will also be more likely to see stressors as challenging, feeling equipped to tackle the hard situation because they have access to supportive others that can be leveraged.

This theoretical link between need-satisfying social contexts and primary stress appraisals has been supported by a series of research finding. For instance, recent research in both the education (Raftery-Helmer & Grolnick, 2018) and health domains (Quested et al., 2011) has shown that contexts that support autonomy, competence, and relatedness predict primary stress appraisals (Ntoumanis et al., 2009; Skinner & Edge, 2002). Raftery-Helmer and Grolnick (2018) conducted research to determine whether children's perceptions of how much autonomy support they received from their parents might affect how they appraise school-related setbacks. In particular, they measured children's perceptions of parental autonomy support around academics and their appraisal of academic failure as a threat or challenge. They found that when students perceived their parents as providing autonomy support, they were less likely to appraise the academic setback as a threat. One interpretation of this work is that children whose parents support their autonomous problem-solving may take greater responsibility for their academic work

and thus are less likely to feel threatened by academic failure.

In another study examining the link between need satisfaction and primary stress appraisals, Quested and colleagues (2011) measured young-adult elite dancers' basic psychological need satisfaction 1 month before a solo dance performance, and 2 hours before the solo performance. Dancers reported on whether they appraised the upcoming solo as either a threat or challenge. The authors found that dancers who perceived their dance schools as supporting their three psychological needs were more likely to appraise an upcoming dance performance as a challenge. Dancers who perceived their dance school as less supportive of their autonomy, competence, and relatedness saw the upcoming performance as more threatening. The authors suggested that when dancers' needs are supported, they are armed with psychological resources – feeling more authentic and in control, more competent, and generally supported – and thus see themselves as more able to handle the upcoming performance demand. In contrast, if dancers feel less autonomous, competent, and connected, they may be more likely to perceive their personal resources as inadequate. Thus, it is not that surprising that these dancers felt threatened by the upcoming performance.

Another study showed that when mothers supported children's autonomy by allowing them to choose and try new things, their children had higher optimism (Hasan & Power, 2002). These findings provide further evidence that when environments meet children's psychological needs, they will perceive stressful situations through a lens that might allow them to experience the stressor as a challenge to overcome. Children's appraisals of stressors are important to an understanding of coping, especially because they predict the specific strategies that they go on to utilize in response to stress.

Coping Strategies

Coping is best understood as a personal resource that includes the ways that children adapt to stressors by modifying the environment and regulating behavior, affect, physiology, and cognitions (Compas et al., 2001). Although there are hundreds of distinct coping responses, children commonly utilize one of six sets of strategies in response to a stressful situation. Most coping frameworks include responses that involve individuals taking an active approach to try and solve the problem or deal with the stress at hand. Within the literature, these types of responses have been referred to as *problem-solving* (e.g., problem-focused coping – Carver et al., 1989; problem-solving – Causey & Dubow, 1992; Spirito et al., 1991; direct problem-solving – Band & Weisz, 1988) and positive coping (Tero & Connell, 1984), and include specific behaviors such as cognitive decision-making, direct action, logical analysis, problem-solving, and self-reliance (Skinner & Wellborn, 1997). Broadly, these approaches involve efforts to manage the demands of the task (Lazarus & Folkman, 1984) and an outward orientation and focus on ameliorating the stress and mastering the environment. Many coping frameworks also include responses aimed at seeking contact with others (Skinner & Wellborn, 1997). Several theorists now suggest that it is important to distinguish between strategies aimed at seeking guidance and problem-focused support and those that involve seeking emotional reassurance and social support (Ayers et al., 1996). Thus, support-seeking may be best understood as two distinct coping strategies: *help-seeking* (Skinner & Wellborn, 1997) and *support for feeling* (Ayers et al., 1996). In the literature, help-seeking has been understood as using other people as resources to assist in seeking solutions. For children to effectively respond

to stressors, they must first monitor the situation, realize that they cannot overcome the stressor on their own, and request assistance from others. Specific responses have included seeking information, direct assistance, and advice (Skinner & Wellborn, 1997). Support for feeling, in contrast, broadly refers to children's attempts to seek out others to listen to their feelings or provide some empathic understanding so that the stressor is perceived as less emotionally distressing (Ayers et al., 1996). While distinct, these three coping strategies – problem-solving, adaptive help-seeking, and support for feeling – broadly comprise an active approach to stress with an eye toward mitigating the stressor's effects. As such, coping researchers suggest that children who appraise stressful situations as a challenge will more frequently engage in these three strategies.

Other coping strategies reflect defensive responses that shift children's attention away from a task and onto their internal experience to restore feelings threatened by a stressor. To do this, children may pay attention to certain features of the stressful situation (Gross & Thompson, 2007), but may do so by perseverating on things outside of their control. Thus, children may respond to stress by blaming others, venting or showing some other physical release of emotions, becoming aggressive, or confronting others. Broadly, these strategies have been referred to as *blaming others* (Spirito et al., 1991), uncontrollable emotional discharge (Skinner & Wellborn, 1997), or externalizing (Causey & Dubow, 1992). Other children disengage from stressful situations and deliberately conceal their emotional reactions (Schutz et al., 2006) by denying the significance of the event or engaging in *cognitive avoidance* (Gross & Thompson, 2007; also called denial (Tero & Connell, 1984). Lastly, many general coping frameworks include responses involving self-denigration and worry about long-term consequences of setbacks, which has been called anxiety amplification (Tero & Connell, 1984), or internalizing (Causey & Dubow, 1992). Responses within this cluster include *rumination*, worry, self-denigration, self-blame, a focus on the negative, and anxious anticipation. Many theorists suggest that rumination is actually a manifestation of experiential avoidance, or a person's unwillingness to come into contact with distressing internal experiences (Hayes et al., 1996; Lyubomirsky et al., 1999; Mellings & Alden, 2000). These three coping strategies – blame, cognitive avoidance, and rumination, (and their associated constructs) – share that they are all inwardly focused, with efforts to restore or protect the self and would be expected when students feel threatened by a stressful situation.

Research suggests that stress appraisals do predict strategy use (e.g., Folkman et al., 1986). For example, when academic failure or negative feedback is perceived as a challenge, students cope by focusing their attention on their environments so that they can seek out information to understand why the failure occurred and actively problem-solve so that they can complete the task at hand (Skinner & Wellborn, 1997; Skinner et al., 2003, 2013). In contrast, when failure is appraised as a threat, children's coping responses are rigidly focused inward on the self, and students are highly motivated to protect their self-esteem and other internal experiences compromised by the failure. In doing so, these students are more likely to utilize strategies like blame (others and themselves) and oppositional behavior. Even further, recent research on academic coping (Raftery-Helmer & Grolnick, 2018) has shown that students who experience failure as a threat tend to use more defensive strategies to cope with failure including blame, rumination, and avoidance. In turn, these students are less engaged in and participate less in

the classroom. Relatedly, Reschley et al. (2008) found that when 7th–10th grade students felt positive emotions following a negative stressor, they were more likely to report using behavioral (i.e., social support-seeking) and cognitive (i.e., problem-solving) coping strategies. Within a college student sample (Doran et al., 2011), highly amotivated students, or those without motivation or who see little value in pursuing college, were less likely to endorse acceptance, active coping, planning, and seeking social support when coping with an academic examination. While the work by Reschley and colleagues (Reschley et al., 2008) and Doran and colleagues (Doran et al., 2011) didn't measure stress appraisals directly, both studies suggest that the way that children experience stress (with positive affect or as incongruent with valued action) impacts the specific strategies that children utilize.

Need-Supportive Contexts

Along with the growing body of literature systematically examining individual differences in children's experiences of stressful situations and the strategies they use to cope with these experiences, there is increasing recognition of the importance of understanding the social contexts that support or undermine coping. In addition to delineating the intrapersonal resources children need when confronted with negative feedback, SDT also specifies interpersonal contexts, like parent–child or teacher–child relationships, that support these psychological needs. They are: (a) autonomy support, (b) structure, and (c) involvement. Autonomy support involves caregivers' and teachers' support for children's autonomous initiations, points of view, and perspectives (Grolnick & Ryan, 1989). Autonomy-supportive behaviors support children's interests (e.g., allowing a child to participate in a math activity of their choosing), actively solicit the child's perspective, communicate that their point of view has value, and support children's active problem-solving. Such practices facilitate children's autonomy, helping them to feel volitional and autonomously motivated (Grolnick & Ryan, 1989). In contrast, controlling behavior involves pressuring children toward specific outcomes (e.g., imposing the adult's agenda by demanding a child participate in math practice problems against their preference) and often entails ignoring or dismissing a child's perspective or solving problems for them.

Structure, whereby environments provide specific informational feedback, predictable consequences, and clear and consistent expectations, meets children's need for competence (Farkas & Grolnick, 2010). Structure allows children to anticipate outcomes in the environment and plan their behavior. The opposite of structure has been conceptualized as chaos – a term used to describe environments that are arbitrary, inconsistent, noncontingent, unpredictable, and not dependable, and that prevent children from feeling effective in planning and managing their behavior (Skinner & Wellborn, 1994, 1997).

Involvement helps children to feel related to others. Involved adults know about, take an interest in, and are active participants in a child's life (Grolnick & Slowiaczek, 1994) through their provision of both tangible (e.g., time, attention) and psychological (e.g., emotional support, warmth) resources. At the obverse is neglect, which includes diminished, inactive, or indifferent interactions with a child. Whereas involvement sends a clear message to a child that they belong and are valued, neglect communicates that a child is not worthy of time or attention.

A number of empirical studies have found that autonomy support, structure, and involvement are associated with children's coping (see Bradley, 2007 and Power, 2004 for reviews on

parenting and coping) We review the literature on each of these contextual dimensions, starting with autonomy support.

Autonomy Support

While the coping area highlights the importance of support for competence and relatedness, there has been less attention on autonomy support as relevant to coping (e.g., Skinner & Edge, 2002). However, there are a few studies illustrating its significance. Specifically, Friedel et al. (2007) found that when parents pressured their children through peer comparison and prioritized academic grades, children were more likely to endorse performance goals and respond to negative feedback with maladaptive coping or noncoping. However, when parents supported students' autonomous problem-solving, their children were more likely to adopt mastery goals and report high self-efficacy, and in turn stayed behaviorally and emotionally engaged after failure. Raftery-Helmer and Grolnick (2016) showed that autonomy support directly predicted defensive coping (a composite measure that included rumination, blame, and avoidance), finding that when children perceive their parents as autonomy supportive, they were less likely to use defensive coping strategies. In this same study (Raftery-Helmer & Grolnick, 2016), autonomy support also indirectly predicted defensive coping through perceived control. In particular, when children perceived their parents as autonomy supportive, they were less likely to feel that luck or factors outside their control caused their academic successes and failures, and in turn they were less likely to respond to failure defensively. This work replicated earlier findings showing that children whose mothers frequently use psychological control responded to negative feedback with higher self-devaluation and shame (Assor & Tal, 2012), whereas children whose mother provided autonomy support were less likely to blame themselves or attribute failure to internal factors (Pomerantz & Ruble, 1998). Similarly, Knee and Zuckerman (1998) found that students who reported high parental autonomy support used less defensive coping in response to academic stressors. While less work has examined teacher effects on coping, one study by Zimmer-Gembeck and Locke (2007) using a composite measure of teacher behavior (including teacher autonomy support, structure, and involvement) found that these teacher behaviors predicted students' active coping strategies, including direct problem-solving, cognitive decision-making, and seeking understanding. When examining coping with other types of stress, researchers have also found effects of autonomy support. In one study, parents and adolescents completed questionnaires about family members' autonomy support and adolescents reported on their coping (active coping and withdrawal) with conflict in a 4-year longitudinal study. Using cross-lagged analyses, the authors found that adolescents' perceptions of family autonomy support were associated with their use of active coping over time (Seiffge-Krenke & Pakalniskiene, 2011).

Structure

There have been some conflicting findings on the impact of structure on coping. Some work has shown that structure uniquely predicts children's coping strategies. For instance, Raftery-Helmer and Grolnick (2016) found that children who perceived their parents as employing more structure were less likely to endorse using defensive coping strategies (avoidance, blame, rumination) following academic failure feedback. In this study, the effect of parental structure on defensive coping was both direct and indirect through perceived control. There are

two possible interpretations of these findings. First, parental structure may impact children's coping by helping children to believe that they can control outcomes and shield them from believing that their own academic success and failure hinges on luck or some unknown cause. Second, the direct effect of parental structure on coping may indicate that when parents implement high structure in their homes, they may be teaching their children strategies to manage setbacks that directly translate to adaptive coping behaviors. In addition, Zimmer-Gembeck and Locke (2007) combined structure with other contextual dimensions (e.g., autonomy support and involvement) and showed that this composite predicted greater use of cognitive decision-making, direct problem-solving, and seeking understanding. Children whose parents provide high structure have also been shown to use fewer aggressive coping strategies in response to everyday stressors (Hardy et al., 1993).

Other studies, however, have not uncovered links between structure and coping. Raftery-Helmer and Grolnick (2018) found that for sixth-grade students, neither parent nor teacher structure was associated with defensive or mastery coping strategies in response to academic failure, over and above the effects of autonomy support and involvement. The authors cautioned that these results might not replicate for younger students or those less confident navigating academic work, in light of research showing strong independent effects of structure on positive outcomes in more novel domains (e.g., mother–daughter conversations about sex, children's early experiences being unsupervised; Grolnick et al., 2014; Mauras et al., 2013).

Involvement

The research on involvement is more robust, with consistent positive effects of parent and teacher involvement for coping. Coping theorists have long suggested that when the interpersonal context is involved, warm, attentive, and supportive the child should feel less threatened by stressful events (Sandler et al., 1989). As a result, they should come to understand their feelings better and feel more able to cope (Hardy et al., 1993), resulting in more active and approach-oriented coping. Empirical research examining multiple different stressors supports this. Parental involvement has been shown to directly predict active coping strategies following failure including the use of problem-solving, help-seeking, and support for feeling (Raftery-Helmer & Grolnick, 2016). Parental involvement was particularly associated with support for feeling, which is consistent with findings from Gonzalez-DeHass et al.'s (2005) systematic review illustrating that parental involvement offers a sense of security and connection, particularly vital following negative feedback when students are at risk of disengaging from academic work altogether. This pattern of findings was replicated by Raftery-Helmer and Grolnick (2018) who showed that both parent and teacher involvement were directly associated with mastery coping. It is likely that involvement might be impacting the feasibility of different coping strategies. For instance, without involved parents or teachers, students may feel that they don't have supportive others from whom they can elicit emotional support and receive help, and so these may not be useful coping strategies.

Research examining coping in response to everyday stressors also shows consistent effects of parent involvement. Kliewer and colleagues (1996) measured parents' and elementary children's perceptions of the family environment and the parent–child relationship and children's coping strategies. The more children

perceived their mothers as accepting, the more active coping and support coping both girls and boys reported. Interestingly, among boys only, perceptions of paternal acceptance were associated with support coping and parents' perceptions of a cohesive and nonconflictual home environment were associated with active coping. Hardy and colleagues (1993) also found that mothers who reported being very supportive of their child had children who used the greatest variety of coping strategies but also were more likely to use avoidant strategies when they appraised the everyday stressor as outside of their control, which has been shown to be an adaptive way to alleviate emotional distress in stressful situations that can't be changed (Altshuler & Ruble, 1989). Interestingly, when researchers have examined both teacher and parent involvement together, the effects of parent involvement appear more robust. For instance, Zimmer-Gembeck and Locke (2007) found that reports of positive family relationships (a composite that included involvement alongside autonomy support and structure) were associated with adolescents' use of more active coping and fewer avoidant strategies in response to problems at home and at school. The effects of teachers were more limited in their effects, only predicting increased use of active coping strategies in response to stressors in the classroom. Valiente and colleagues (2004) also found that involvement/support predicted coping with a variety of stressful situations. Parents and their 7–12-year-old children completed daily diaries of stressful events and parents' and children's responses. Experimenters coded mothers' supportive strategies (e.g., talking about the problem, comforting, reasoning) and nonsupportive strategies (punish, reprimand). Average and daily supportive parental responses were associated with children's more constructive coping (e.g., asking for help, trying to solve the problem).

Culture and Context of Coping

While SDT may explain how and why children's coping may be influenced by social contexts, ecological perspectives (Bronfenbrenner & Ceci, 1994) suggest that the use and effectiveness of coping strategies may differ in different contexts and cultures. In light of this, we would like to draw attention to mixed results, complexities, and how context and culture may moderate findings within the coping literature. Certain coping strategies may or may not be useful or sanctioned in particular contexts. For example, active coping strategies that emphasize problem-solving and personal responsibility may be detrimental for youth with limited political status and power to affect their circumstances (Tolan & Grant, 2009). For instance, in a sample of low-income African American adolescent boys, only avoidant coping, and not active coping, showed a protective effect, attenuating the relationship between stress and externalizing symptoms (Grant et al., 2000). One possible interpretation of these findings is that coping strategies usually viewed as adaptive (e.g., active, support-seeking) may not be in the context of stressors over which children have little control (Compas et al., 2001). It is possible that active coping for these adolescent males might include aggressive behavior and that avoidance (both cognitive and behavioral) might decrease the likelihood that low-income urban males would engage in externalizing behaviors. Therefore, utilizing avoidant coping may be protective for some children (adolescent boys), for some outcomes (externalizing behaviors) and in some contexts (uncontrollable stressors). In addition, seeking social support may be less effective for youth whose social resources may be overwhelmed by their own stressors. This underscores the importance of examining the function of specific coping strategies (e.g., to master the

environment vs. preserving internal resources) and the feasibility of specific strategies in addition to uncovering the specific supports (e.g., parent, teacher) most helpful within different contexts.

In the same vein, the impact of contextual factors on coping may depend on cultural or developmental considerations. While to our knowledge there are no studies that have looked at this directly in the realm of coping utilizing an SDT perspective, the parenting literature more broadly speaks to the importance of cultural context. Recent research has shown that the same parenting behaviors may be perceived differently by children of different cultural backgrounds. In one study looking at the relations between parental autonomy support and adolescent outcomes, Marbell-Pierre and colleagues (2019) measured two types of autonomy support: perspective-taking/open exchange and allowance of decision-making/choice. Across both the United States and Ghana, perspective-taking/open exchange predicted higher school engagement, intrinsic motivation, and self-worth, and also lower depression. However, decision-making (e.g., "My parents allow me to decide things for myself") and choice (e.g., "My parents allow me to make choices whenever possible"), when combined, were not negatively related to perceived parental controllingness (Marbell-Pierre et al., 2019) in a sample of Ghanaian youth, but were negatively correlated with parental controllingness among a US sample of children. The authors propose that in Ghana, a society characterized as both hierarchical and collectivist, parents making unilateral decisions is culturally sanctioned and isn't perceived by children as undermining autonomy. Such findings are consistent with research showing that some autonomy-supportive behaviors, like allowing choice, are not consistently related to autonomous motivation in collectivistic groups (e.g., Bao & Lam, 2008; Iyengar & Lepper, 1999) and support a "universalism without uniformity" perspective in that autonomy support is universally beneficially but does not uniformly present itself across cultures (e.g., Soenens et al., 2015; Wang et al., 2007). Therefore, when thinking about social context, it may be important to consider the child's experience over and above the observed behavioral practice.

In thinking about coping within a development context, this "universalism without uniformity" (Soenens et al., 2015; Wang et al., 2007) perspective may also apply. Research outside the coping literature has shown that parental structure may offer the most benefits when children are taking part in less familiar or more uncomfortable experiences. For example, Grolnick and colleagues (2014) found that parental structure predicted sixth-grade students' perceived competence in the unsupervised domain (but not the academic or responsibilities domain). The authors reasoned that because unsupervised time was novel for these children and thus stressful at this particular developmental stage children may need more structure and did not see the structure as intrusive. Mauras and colleagues (2013), in their study of mother–child conversations, found that parental structure was strongly related to daughters feeling autonomous, engaged, related, and satisfied with the conversation when discussing sex, an uncomfortable topic of discussion for any adolescent. Parental structure, however, did not relate to these outcomes for everyday conversations. It is possible that structure may be experienced as controlling when it is implemented around personal issues or those that a child may not want to have rules around, yet may be very important when children are vulnerable or struggling to feel competent. Even in work on academic coping, the effects of structure have been mixed, with some studies showing positive effects for active coping (Raftery-Helmer

& Grolnick, 2016) but others showing no effects (Raftery-Helmer & Grolnick, 2018), suggesting that the developmental features of the sample may filter a child's experience of structure as being competence-supportive. For instance, Raftery-Helmer and Grolnick's work may raise questions about whether structure may be most important for younger children or when children are less comfortable navigating situations.

Summary and Future Directions

An SDT perspective helps to address two important questions about children's coping – what features of a person's environment predict coping responses and why (see Figure 4.1)? While a myriad of social contextual factors have been the subject of empirical investigation, SDT points us to what people universally need – to feel autonomous, to feel competent, and to feel connected to others – and the features of the environment that support these needs. In fact, studies reliably find that autonomy support, structure, and involvement predict active, adaptive coping that, while not uniformly measured, includes strategies like support for feeling, problem-solving, and help-seeking (e.g., Raftery-Helmer & Grolnick, 2016, 2018). This perspective, however, offers even greater utility in that it articulates not just what features of the environment will predict helpful coping but why. Specifically, SDT tells us that autonomy-supportive, structured, and involved environments foster internal motivational resources, namely autonomous self-regulation, perceived control and competence, and relational security that will serve as resources associated with how children experience stress. Those children armed with motivational resources will view stressful situations as a challenge to overcome and will utilize coping strategies that will allow them to reengage. Without such motivational resources, students will see stressors as a sign of their own incompetence in a coercive and isolated world. Preoccupied with their own feelings and self-perceptions in the face of these stressors, the strategies utilized will likely involve attributing the situation to outside factors (e.g., blaming), ignoring the threat (e.g., avoidance), or engaging in a cycle of self-deprecation (e.g., rumination).

While this theoretical perspective has moved the literature on coping in important directions, there is a lot more work to be done. In this section, we delineate a number of limitations to the current body of research on coping and directions for future research.

First, the vast majority of studies on coping have been cross-sectional. While many researchers interpret contextual correlates of coping as predictors (i.e., parenting or teacher behavior predicting coping), the nature of

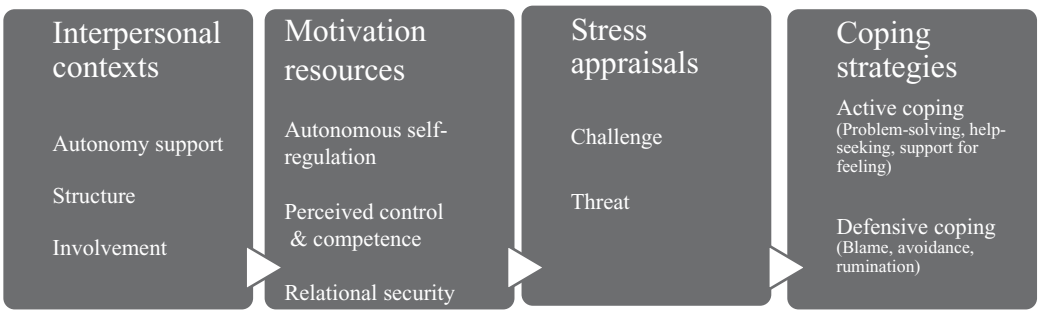

Figure 4.1 A theoretical model.

these relationships has not been empirically established. While social contexts could impact coping strategies, the reverse is equally, likely with coping impacting the way others treat us (Pomerantz & Eaton, 2000; Seiffge-Krenke & Pakalniskiene, 2011).

As an example, across multiple studies there has been an established link between parental autonomy support and defensive coping (Assor & Tal, 2012; Friedel et al., 2007; Knee & Zuckerman, 1998; Raftery-Helmer & Grolnick, 2016; Zimmer-Gembeck & Locke, 2007) with children less likely to use defensive strategies when they perceive their parents to be autonomy supportive. It is entirely possible, and even likely, that parents may react to their child's helpless responding with control. To disentangle the direction of effects in this work, future research should use longitudinal designs, particularly given that cross-sectional data collection is inadequate for testing mediation or process models (Maxwell & Cole, 2007). In fact, while we have proposed a theoretical model in this chapter (see Figure 4.1) that suggests that contexts impact coping through their effects on appraisals and motivational resources, it is important to consider bidirectional and transactional processes. For instance, Skinner et al. (2016) found that baseline use of coping strategies of problem-solving, help-seeking, comfort-seeking, self-reliance, and accommodation predicted improvement in feelings of effectiveness and motivational functioning across a period of 3–5 months. Therefore, we recommend that this conceptual model be tested by measuring constructs at various time points to determine their temporal sequence.

A second limitation of the literature is that studies have predominately relied upon self-report measures of both context and coping strategy use. This is problematic both empirically (because correlations among study variables could be a measurement artifact) and theoretically. Children's reports of their environment may differ from parents' or teachers' own perceptions of their behavior or codings of observations of independent raters. Thus, using multiple informants and independent observations of parent and teacher behavior may help elucidate how children's experience of their environments might differ from adults' observed behavior. It will be important to investigate whether parents' actual behavior (based on independent observational coding) or children's perceptions of their parents are more important in predicting coping, which could have implications for interventions. In addition, coping has been almost exclusively measured by asking children what they do (often retrospectively) when they are confronted with stressors. Reporter bias is a clear concern in this work and future research should consider measuring coping behavior through independent observation, or find some more objective indicators of reengagement following stress (e.g., Skinner et al., 2009) that may be indicative of adaptive or defensive coping strategy use.

Lastly, interactions between contextual dimensions (e.g., autonomy support, structure, and involvement) have been hypothesized, yet rarely uncovered, likely because questionnaire measures confound the dimensions or assess them within different domains (e.g., measuring autonomy support around homework but structure in general). Research outside of coping underscores the importance of examining these dimensions in combination. For example, Grolnick and colleagues (2014) applied rigorous measurement to examine the interaction between parenting dimensions by differentiating parental structure from the way it was implemented, either in a highly controlling or a more autonomy-supportive manner, to determine whether the impact of parental structure would differ if implemented in an autonomy-supportive or controlling way.

Children and parents completed semistructured interviews assessing structure and the manner with which that structure was implemented (autonomy supportive or controlling) in the domains of homework and studying, unsupervised time, and responsibilities. Trained raters coded the interviews for four components of structure and four components of autonomy-supportive implementation of structure. Parental structure predicted children's perceived competence, particularly for unfamiliar domains (e.g., unsupervised time; Grolnick et al., 2014) and across the transition to middle school (Grolnick et al., 2015). Providing structure in an autonomy-supportive way (by jointly establishing rules; engaging in open exchange; and providing empathy and choice) also predicted positive outcomes (e.g., engagement, perceived competence, achievement) for personal and conventional issues (e.g., homework and studying; responsibilities). Thus, it seems essential to differentiate parental structure from the way it is implemented to ensure that the structure is not inadvertently undermining autonomy (e.g., Cheon et al., 2020).

Recent research has also measured autonomy support around academic involvement activities. Lerner and Grolnick (2020) found that when children felt choiceful, understood, and were able to initiate self-directed behaviors, they experienced more positive affect when their mothers were involved. In contrast, when mothers were controlling and pressuring, children had more negative affect toward the involvement. They also found an interaction between autonomy support and maternal involvement in predicting children's autonomous motivation. Specifically, communicating interest in a child's academics positively predicted autonomous motivation, but only when mothers were globally perceived to be autonomy supportive, and not when they were generally perceived as controlling. In an extension of this work, Lerner et al. (2022) measured how autonomy-supportive mothers were when involved in their children's academic activities. This work represents an important first step, one that, to our knowledge, has not been taken in the coping literature, to measure interacting contextual dimensions. For instance, while parents may be generally autonomy supportive, they may become controlling in the context of specific involvement activities, findings that would be masked if researchers continue to measure global contextual dimensions separately. In, fact, Lerner et al.'s study showed that autonomy-supportive involvement was associated with academic outcomes such as autonomous motivation, perceived competence, and worry; relations that were not seen when measuring involvement and autonomy support more generally. Examining interactions among contextual dimensions is noticeably absent from the coping literature and represents an important area of future work.

Conclusions

Let's return to Olivia and Emma, our two students disappointed by the sting of failure. In our effort to understand why Olivia responded to her failing math grade with active attempts to figure out what happened and get the tangible help and emotional resources she needed, we might turn to her available resources and environment. It is likely that she feels volitional and choiceful in her academic efforts, allowing her to see failure as part of the process of learning some new and important math skills. We might speculate that her experience of her classroom is one of consistency, predictability, and feedback – hallmarks of structure – that would allow her to feel in control of outcomes and plan her behavior. We might suspect that she has many supports, especially Ms. White, on whom she

can consistently rely to help when she feels stuck. With others in her corner, Olivia may feel that she can rally people around her and navigate the challenges and disappointments that are thrown her way. When we think about Emma, we might wonder about the ways that her environment is failing to meet her needs. Especially in light of Ms. Marshall's response, we might wonder whether she feels controlled or coerced, whether she experiences chaos, or even isolation, knowing that her experience with others and her world may serve as filters of her experience of negative feedback as one that is unmanageable and threatening. While removing all obstacles, negative feedback, failure, disappointment, and everyday stressors would not serve our children well, we can help all the Emmas of the world by finding ways to intervene to create need-supportive environments so difficult situations are not a roadblock but just an inevitable hurdle to confront and part of the process of growing and thriving.

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5 Processes of Stress Resistance and Stress Resilience

The Role of Behavioral Control and the Medial Prefrontal Cortex

Michael V. Baratta and Steven F. Maier

Introduction

Exposure to traumatic/adverse events and circumstances in humans is frequent, with prevalent lifetime occurrences estimated to range from 50% to 85% in the general population (Benjet et al., 2016; Kessler et al., 1995). However, individuals differ quite dramatically in how they respond to these circumstances. For example, the prevalence of post-traumatic stress disorder is roughly 10% in the general population (White et al., 2015), and most individuals do not develop any stress-related psychopathology following the experience of potent adverse events (Horn et al., 2016).

Clearly, there must be factors that determine how an individual reacts to adverse events. Initially, the focus was on genetic and environmental vulnerability factors that predispose an individual to react negatively to adverse events later in life (e.g., early life abuse; see Targum & Nemeroff, 2019 for review), or aspects of the event itself (e.g., uncontrollability; Seligman & Maier, 1967) that lead to negative outcomes. The implicit view was that individuals that remain relatively unaffected by an adverse event or situation do so because they *lack vulnerability ingredients*. For example, exposure to aversive events over which the organism (human and animal) has no behavioral control (uncontrollable) produces a range of behavioral and neurochemical changes (see later in the chapter) that do not occur if the organism has the ability to exert some behavioral control (controllable) over the events, even if the duration, intensity, etc., of the uncontrollable and controllable events are equated (Maier & Seligman, 1976). Originally, it was thought that the controllable stressor subjects are protected because controllable events simply lack the critical uncontrollability element. That is, uncontrollability was thought to be the active process (see Maier & Seligman, 2016, for discussion and Minor et al., 1991, for a different perspective). However, a variety of work has indicated that there are a number of genetic, epigenetic, developmental, and experiential factors that can *actively* confer resistance (the adverse event has reduced impact) or resilience (recovery is more rapid) (Cathomas et al., 2019; Horn et al., 2016; Nestler & Waxman, 2020), and these are not simply the absence of vulnerability processes. For example, in the case of the uncontrollability/controllability dimension, the presence of control leads to active learning that is essential for the protective effects of control (see later in the chapter).

Resistance/resilience is the topic of this chapter. At the level of basic research (e.g., animal studies), it is often difficult to discern whether a manipulation has affected initial impact of an adverse event or speed of recovery, so we will use the term resilience as a generic term to describe a blunted total impact of an adverse event or circumstance. In the animal literature, resilience has been studied in two very different ways. In one, a group of

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subjects is exposed to a negative event (e.g., social defeat) and some behavior or behaviors (e.g., social interaction) are measured at a later time. As with any measure, there will be a distribution of scores. It is often implicitly assumed that one end of the distribution on the behavioral measure is "good" (e.g., lots of social interaction) and one end is "bad" (e.g., social avoidance). Subjects at the "good" end are viewed as resilient, and then efforts are made to uncover neurochemical, endocrine, immunological, or circuit processes that characterize this subset. Of course, comparisons can also be made to nonstressed controls.

A variety of exciting results have emerged using the above strategy (e.g., Vialou et al., 2014). A second and different approach has been to identify experiences, manipulations, and aspects of the adverse events that produce diminished stressor impacts. Human research has focused on personal characteristics such as emotional regulation capacity (McRae & Gross, 2020), reappraisal (Kalisch et al., 2015; Troy et al., 2010), the use of active coping (Aspinwall, 2010), prevalence of positive emotions (Fredrickson & Levenson, 1998), etc. These are, of course, difficult to study in animals. Here, attention has focused on environmental variables or experiences that organisms can have that produce later resilience. Exercise (Greenwood & Fleshner, 2019), enriched environments (Lehmann & Herkenham, 2011), and early-life mild stressor exposure (Lyons et al., 2010) are examples. In addition, aspects of the adverse event or situation itself can also contribute to stressor resistance/resilience. The controllability of the adverse event or situation (Baratta & Maier, 2019) and the presence of safety signals during the adverse situation (Christianson et al., 2011) are examples.

Our charge in this chapter is to focus on the role of behavioral control and its circuitry in resilience and coping. By control is meant the ability to alter the adverse event or situation by means of one's own behavior. It should be noted that this concept is very close to a number of others: self-efficacy, locus of control, and contingency have similar meanings (Bandura, 1997; Dickinson & Balleine, 2000). In humans, it is clear that it is perceived control, not actual control, that is critical in buffering the impact of the stressor (Ly et al., 2019). In animals, of course, it is only possible to study actual control. Two aspects of control have received experimental attention. One has typically been studied in the context of positive rewards, and concerns whether the exertion of control in and of itself is reinforcing or of value. This is not a topic for discussion here, although it should be noted that both humans and animals (e.g., Catania & Sagvolden, 1980) prefer control and will choose to perform an operant response to obtain rewards rather than getting the very same reward "for free." Indeed, in humans, it has been shown that subjects will choose a smaller controllable reward over a larger uncontrollable reward and that the exercise of control per se activates neural circuits that are critical for goal-directed behavior (Wang & Delgado, 2019). The other, the topic of this chapter, has been studied in aversive contexts and concerns whether and how control buffers the organism against the impact of the adverse events being experienced, as well as later exposures to adversity. We will next discuss control and resilience, and then consider the implications of this work for several general issues concerning resilience. Please see Table 5.1 for a glossary of acronyms used in the chapter.

Behavioral Control

The study of behavioral control in animals, where the details of circuitry and neurochemistry can be studied, requires experimental designs in which animal subjects with control

Table 5.1 *Glossary of acronyms*

Acronym	Explanation
5-HT	serotonin
ACTH	adrenocorticotropic hormone
BNST	bed nucleus of the stria terminalis
CBT	cognitive behavioral therapy
CRH	corticotropin-releasing hormone
CS	conditional stimulus
DLS	dorsolateral striatum
DMS	dorsomedial striatum
DRN	dorsal raphe nucleus
ES	escapable shock
GABA	gamma-aminobutyric acid
HPA	hypothalamic-pituitary-adrenal
IL	infralimbic
IS	inescapable shock
LC	locus coeruleus
LH	lateral habenula
MDT	mediodorsal thalamus
mPFC	medial prefrontal cortex
mRNA	messenger ribonucleic acid
NMDA	N-methyl-D-aspartate
PAG	periaqueductal gray
pERK	phosphorylated extracellular signal-regulated kinase
PL	prelimbic
PVN	paraventricular nucleus
S-R	stimulus-response
SN	substantia nigra
US	unconditional stimulus

over some aspect of the adverse event or situation can be compared with subjects that lack control but receive the identical adverse event or situation. A design ensuring that subjects with and without control over some aspect of the stressor receive physically identical events requires the use of a stressor over which the experimenter has instantaneous control so that events received by the subject without control can be yoked to those determined by the subject with control. Few adverse events that can be used in a laboratory meet this requirement. For example, consider the difficulty of manipulating the controllability of restraint, social defeat, etc. (but see Drugan et al., 2005), in a way that equates physical exposure. Maier and Seligman, and Weiss, developed what has come to be called the "triadic design" at the same time (Maier et al., 1969; Seligman & Maier, 1967; Weiss, 1968). Subjects were used in triplets. When the subjects were rats (the subjects in all but the initial studies), each was placed in a small Plexiglas box with its tail protruding from the rear, with electrodes fixed directly to the tails. Two of the subjects received periodic electric shocks delivered via the electrodes fixed to the tails. For one of the rats (escapable shock, ES) each tailshock terminated whenever the rat turned a small wheel located on the front wall of the small chamber. For the second rat (inescapable shock, IS), turning the wheel was of no consequence and each shock terminated at the same instant that the ES subject turned the wheel. The third subject did not receive tailshock. Thus, ES and IS subjects received identical physical tailshocks, but the ES rat had behavioral control over an aspect of the stressor (the duration of each of the tailshocks), while the IS subject did not (see Figure 5.1A). This design allows determination of whether any behavioral, neurochemical, endocrine, or other consequence is caused by exposure to the tailshock stressor per se (here, IS and ES subjects would be the same and differ from the nonshocked control) or to the control factor (ES and IS would differ). Tailshock rather than footshock was used because it is difficult to administer truly uncontrollable footshocks. This is because, even with scrambled gridshocks, postural adjustments on shock grids can modulate current density, which determines the aversiveness of the footshocks (Campbell & Masterson, 1969). This is noted because allowing the operant response to only reduce the intensity of each shock rather than terminating the shock

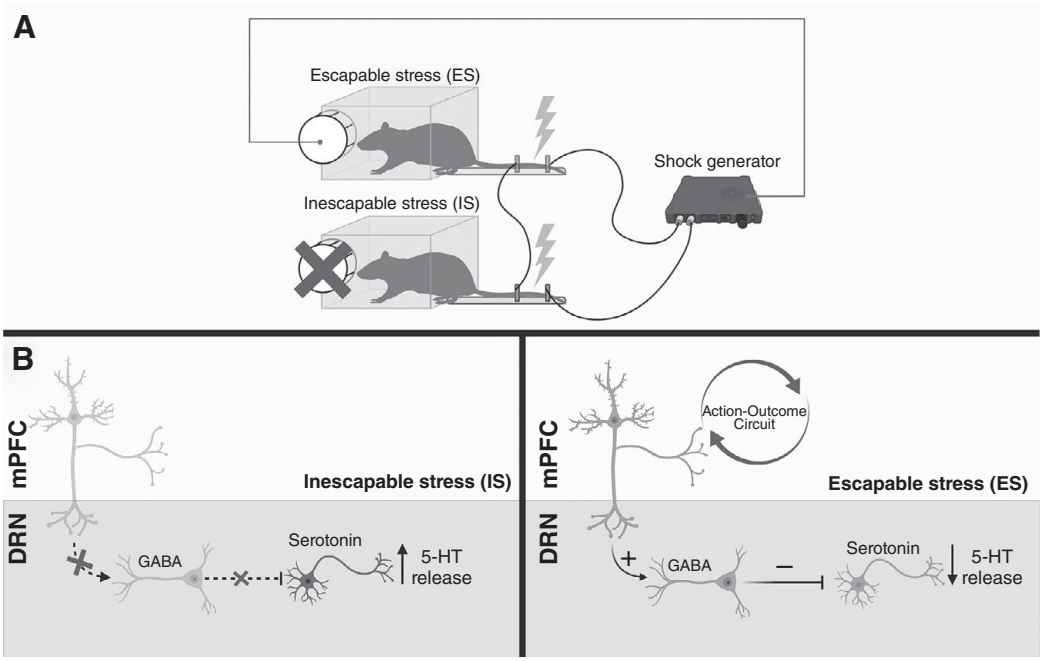

Figure 5.1 (A) Illustration of the stressor controllability paradigm. (B) Schematic diagram of the neural circuits involved in stressor controllability phenomena. In the absence of control (inescapable stress; IS), serotonergic (5-HT) cells in the dorsal raphe nucleus (DRN) are potently activated leading to increased 5-HT release within the DRN and its projection regions that are the proximate mediators of IS-induced behaviors. In contrast, control over the stressor (escapable shock; ES) is detected by medial prefrontal cortex (mPFC) neurons that participate in the corticostriatal action-outcome system. Following detection, a separate population of mPFC neurons project to the DRN and activate local inhibitory GABAergic neurons, thereby inhibiting DRN 5-HT release and preventing the behavioral impact of the stressor.

duplicates the protective effects of full escape (Alloy & Bersh, 1979).

Not surprisingly, IS in the above paradigm produces many of the same behavioral outcomes as do other stressors. This is not surprising because the stressors used in the literature (restraint, social defeat, predator odor, chronic mild stress, etc.) are typically uncontrollable. It might be noted that many of these behavioral outcomes (e.g., social avoidance) have typically been produced by repeated or chronic stressors (e.g., repeated social defeat), but a single session of IS produces them as well (see Hammack et al., 2012, for a discussion), perhaps because a session of IS is a potent stressor. However, these outcomes do not follow ES (see later on for exceptions), even though the tailshocks are exactly the same from a physical perspective. That is, the presence of control blunts the behavioral impact of the adverse event being experienced. Moreover, control most often completely blocked the behavioral impact of the stressor so that ES subjects were indistinguishable from nonshocked controls. In addition, the controls in many of these experiments were home cage controls rather than controls restrained in the wheel-turn boxes as in the original studies. Thus, ES subjects often behaved as did subjects that had received no stressor at all.

Importantly, the experience of control over the potent tailshock stressor does more than mitigate the behavioral effects of the stressor over which control is exerted. Of special importance for understanding resilience, exposure to ES (but not IS) blocks the behavioral effects of IS occurring at a later time in a different environment (Maier & Seligman, 1976; Williams & Maier, 1977), a phenomenon that has been coined "behavioral immunization." Behavioral immunization has two important characteristics. First, it is *long-lasting*, persisting for at least 35 days following the ES experience (Kubala et al., 2012). Second it is *transsituational* and independent of context. In the most dramatic example, Amat et al. (2010) reported that exposure to ES completely blocked the behavioral effects of social defeat administered 7 days later. Great care was taken to minimize any cues that might have occurred in common between the ES and social defeat experiences (e.g., the two manipulations occurred on different floors of the building and were administered by different experimenters). Exposure to IS exacerbated rather than blocked the impact of social defeat, demonstrating that it was the occurrence of control and not the tailshocks per se that led to behavioral immunization.

Does Control Reduce the "Stressfulness" of the Aversive Event?

Perhaps the most obvious explanation of the protective effects of control would be that control reduces the "stressfulness" of the adverse events being experienced so that they are less impactful. It is less obvious how this could account for behavioral immunization, but "toughening up" effects have been reported (Lyons et al., 2010). Whether the overall experience of ES is less "stressful" relative to physically identical IS has been assessed with several measures of hypothalamic-pituitary-adrenal (HPA) axis and autonomic activity. Maier et al. (1986) measured plasma levels of both adrenocorticotropic hormone (ACTH) and corticosterone, during and after ES and yoked IS using parameters exactly as in the behavioral studies. ES and IS produced exactly the same, very robust, ACTH and corticosterone rises and time courses of decay (replicated by Helmreich et al., 2012). Thinking that hypothalamic measures might be more sensitive to differences, Helmreich et al. (1999) assessed gene expression within the hypothalamus (paraventricular nucleus, PVN) for peptides known to be important in regulating pituitary-adrenal activity. Both ES and IS produced the same increases in corticotropin-releasing hormone (CRH), neurotensin, enkephalin, and arginine-vasopressin messenger ribonucleic acid (mRNA). With regard to autonomic activity, Thompson et al. (2013) assessed a large number of autonomic measures during and after ES and yoked IS, and in no case did ES produce a smaller autonomic response. Thus, if HPA and autonomic activity are taken to be agreed-upon "stressometers," ES is not less stressful than IS. This is not to say that conditions/parameters could not be found in which control reduces HPA or autonomic activity, but with parameters that produce the behavioral differences above, control does not reduce either.

An alternative approach is to focus on neural circuitry. Logically, control might be expected to reduce neural activity in regions that are critical in producing the behavioral sequelae of IS. Thus, three questions need to be addressed: 1) What are the key neural changes produced by IS that lead to the wide array of behavioral changes that follow exposure to IS?; 2) Do these neural changes fail to occur if the tailshocks are controllable (ES)?; and 3) Why do these changes fail to occur if the stressor is controllable? We will consider these issues in turn.

Neural Mediation of the Behavioral Effects of Uncontrollable Stress

It would be difficult to find a neutral structure that directly mediates all of the behaviors that are altered by prior exposure to IS. For example, escape behavior is proximately regulated by the periaqueductal gray (PAG) and striatum (Franklin, 2019; Kimura et al., 2003), while fear processes are regulated by the amygdala (Ressler & Maren, 2019). However, there are a number of brain regions that project to and modulate numerous other structures that include those that are known to proximately mediate many of the behaviors altered by IS. The locus coeruleus (LC) and the dorsal raphe nucleus (DRN) are perhaps the clearest. For a number of reasons that are no longer relevant we focused on the DRN. The DRN is the largest of the raphe nuclei and sends serotonergic (5-HT) projections to numerous regions, including many of those that are the proximate mediators (e.g., PAG, striatum, amygdala) of the behaviors altered by IS. The role of the DRN in mediating the behavioral effects of IS has been reviewed extensively (Hammack et al., 2012; Maier & Watkins, 1998) and only a brief discussion is possible here. The most salient findings are that: a) IS intensely activates DRN 5-HT neurons as indicated by the expression of immediate-early genes such as c-fos in identified 5-HT neurons within the DRN (Grahn et al., 1999) and extracellular levels of 5-HT within the DRN measured by microdialysis (Maswood et al., 1998); b) 5-HT is released in critical projection regions such as the amygdala and PAG during IS and later behavioral testing (Amat et al., 1998a, 1998b); c) IS induces changes within the DRN such that the DRN is sensitized and activated during later behavioral testing (Rozeske et al., 2011) – moreover the duration of DRN 5-HT sensitization matches the duration of the behavioral effects of IS (Rozeske et al., 2011); d) pharmacological inhibition of DRN 5-HT activation during IS or during later behavioral testing both prevent the behavioral consequences of IS (Maier et al., 1994; Maier, Grahn, & Watkins, 1995) (demonstrating necessity); e) blockade of 5-HT receptors in structures such as the amygdala (Christianson et al., 2010), PAG, and striatum (Strong et al., 2011) during behavioral testing prevents the corresponding behavioral effects of IS (necessity); and f) pharmacological activation of DRN 5-HT neurons in the absence of stressor exposure mimics the typical effects of IS (Maier, Busch, et al., 1995), thereby demonstrating sufficiency.

Clearly, if DRN 5-HT activation is the key neural change produced by IS that mediates the behavioral sequelae of IS, then ES, even though the physical tailshocks are exactly the same, should not produce DRN 5-HT activation. This is so because ES does not produce the behavioral changes. Indeed, ES does not activate DRN 5-HT neurons (Grahn et al., 1999; Maswood et al., 1998), does not lead to the release of 5-HT in projection regions of the DRN (Amat et al., 1998a, 1998b), and does not sensitize DRN 5-HT neurons (Rozeske et al., 2011). These IS/ES differences are sufficiently dramatic that we will show an example. Figure 5.2 shows extracellular levels of 5-HT, indicating 5-HT release, in the basolateral amygdala (a projection region of the DRN). 5-HT was measured using in vivo microdialysis before, during, and after ES and yoked IS. During IS, 5-HT release increased substantially, with release being maintained for the duration of the session and several hours thereafter. ES also produced a rapid increase in extracellular 5-HT, but as the subjects learned to turn the wheel to terminate the tailshocks 5-HT levels dropped all the way back to baseline. That is, even though the tailshocks continued, 5-HT did not increase even slightly.

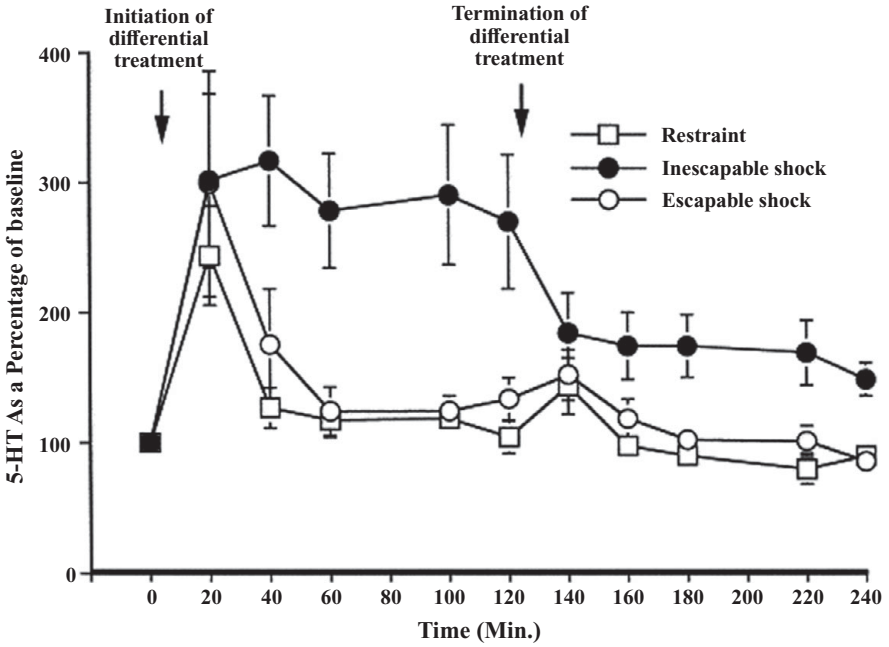

Figure 5.2 Extracellular levels of 5-HT in the basolateral amygdala expressed as a percentage of baseline (mean ± s.e.m). Groups received escapable shock, yoked inescapable shock, or restraint in the wheel-turn apparatus. Samples were collected every 20 minutes before, during, and after experimental treatment. (Adapted with permission from Amat et al., 1998a).

Recall that prior exposure to ES blocks the behavioral impact of IS and other stressors such as social defeat occurring much later (behavioral immunization). If DRN 5-HT indeed mediates the behavioral effects of uncontrollable stressors, then the prior ES exposure should prevent the DRN activation produced by the subsequent IS or social defeat – it does (Amat et al., 2010).

Why Does ES Fail to Activate DRN 5-HT Neurons?

Differential Input to the DRN

The DRN receives inputs from a large number of stress-responsive structures, with these inputs driving DRN 5-HT activity. For example, the DRN receives most of its glutamatergic input from the lateral habenula (LHb), as well as noradrenergic projections from the LC and CRH projections from the bed nucleus of the stria terminalis (BNST). Interestingly, intra-DRN blockade of either glutamatergic (Grahn et al., 2000), noradrenergic (Grahn et al., 2002), or CRH receptors (Hammack et al., 2002, 2003) during IS is sufficient to reduce IS-induced DRN 5-HT activation and block the typical behavioral consequences. Thus, it appears that the DRN is a site of convergence of stressor-induced activity and operates as an integrator of activity from disparate regions that process stressor exposure. The DRN then in turn modulates numerous regions that are proximate mediators of the behaviors that are produced by adverse events.

Since ES fails to increase DRN 5-HT activity, the most obvious possibility is that ES fails

to activate inputs to the DRN from the LHb, LC, or BNST. We have examined this possibility in detail. For example, Dolzani et al. (2016) first determined that optogenetic inhibition of glutamatergic neurons that project from the LHb to the DRN during IS prevents both the 5-HT activation and later behavioral effects. They then examined the activity of these LHb neurons during ES and yoked IS, and surprisingly, *both* IS and ES produced equivalent activation. That is, stressor exposure per se stimulated the activity of glutamatergic neurons in the LHb that project to the DRN – the LHb is *not* sensitive to the control dimension even though input from this structure to the DRN is necessary to produce DRN 5-HT elevation and behavioral change. The same conclusions pertain to LC and BNST input to the DRN (McDevitt et al., 2009).

Top-Down Inhibition from the Medial Prefrontal Cortex

If both ES and IS produce equivalent excitatory inputs to the DRN, yet ES does not activate DRN 5-HT neurons, the only possibility is that the experience of control must lead to *inhibitory* input to the DRN that opposes or cancels the stressor-induced activation. Intriguingly, the medial prefrontal cortex (mPFC), particularly the prelimbic (PL) region, sends excitatory pyramidal glutamatergic projection to the DRN (Vertes, 2004) that synapse preferentially on GABAergic inhibitory interneurons (Jankowski & Sesack, 2004). These GABAergic inhibitory interneurons in turn synapse onto, and inhibit, the 5-HT neurons. Thus, activation of the mPFC and its output to the DRN would be expected to actively inhibit DRN 5-HT neuronal firing and 5-HT release in projection regions of the DRN, and this is indeed the case (Hajós et al., 1998, 1999).

The foregoing suggests the possibility that the exercise of behavioral control during the tailshock stressor leads to top-down inhibition of the DRN by the mPFC. The first question might be whether ES, relative to IS, does indeed activate PL neurons that project to the DRN. It is not enough to measure whether ES activates the PL, since most PL projections go to other regions and only a small percentage of PL pyramidal cells (perhaps 2%) project to the DRN. To answer this question Baratta et al. (2009) injected a retrograde tracer into the DRN, thereby labeling PL cells that project to the DRN. Then, animals received ES and yoked IS and neural activation markers such as c-fos were examined in the PL cells that were retrogradely labeled and project to the DRN. ES dramatically activated PL cells that project to the DRN, and equivalent IS did not. Next, we asked whether the activation of the PL by ES was necessary for behavioral control to be protective. Amat et al. (2005) microinjected an inhibitor of neural activity into PL during exposure to ES and IS. IS still produced its usual behavioral consequences, but now having control was not protective – the PL activation was necessary for protection to occur. It should be noted that the ES subjects learned to turn the wheel to terminate the tailshocks, and did so perfectly (see later in the chapter for explanation). However, without PL activation this exercise of operational control was not protective. Moreover, behavioral immunization to the effects of later occurring stressors was also blocked. Interestingly, PL blockade at the time of the later stressor was also necessary, even if ES occurred in the absence of inhibition of the PL (Amat et al., 2006). Finally, pharmacological activation of the PL during uncontrollable stressor exposure prevented the typical effects of IS (Amat et al., 2006). That is, PL activation was sufficient for protection as well as necessary.

Although the above data indicate that PL activation by ES is necessary for both the

immediate and long-term protective effects of control, they do not indicate why. The mPFC could be critical either because a) the mPFC detects the presence of control or is part of a circuit that detects control, b) control is detected elsewhere with this information then communicated to the mPFC that then uses and acts on this information by exerting inhibitory control over the DRN, or c) both.

Some insight can be gained by considering that the concepts of control and contingency are formally identical. Maier et al. (1969) defined control over an event (e.g., tailshock termination) as occurring in a two-dimensional space formed by the conditional probability of the event occurring given that a behavioral response (e.g., turning the wheel) has occurred and the conditional probability of the event occurring given that the response has not occurred. Control is absent (the event is uncontrollable) along the diagonal of the space where the two conditional probabilities are equal – here, it doesn't matter whether the organism makes the response or not. Some degree of control is present at all points in the space away from the diagonal – the event can be made more probable either by making or withholding the response (Figure 5.3). With regard to ES, the conditional probability of shock terminating given the occurrence of wheel turning is 1.0, and the conditional probability of the shock terminating in the absence of a wheel turn is 0.0. Thus, the situation is very far from the diagonal of the space, and indeed is along an axis of the space. This is exactly the same as others have later defined the contingency between a response and a reward as being the mathematical difference between these two probabilities (Liljeholm et al., 2011).

This is noted because there has been considerable effort directed at uncovering the neural mechanisms by which instrumental contingencies are learned. The history of psychology

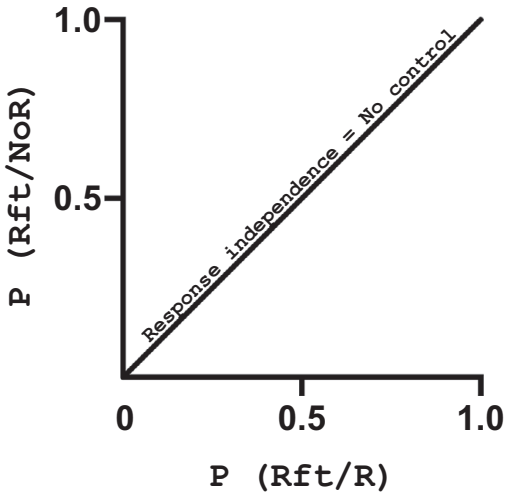

Figure 5.3 Contingency space showing the relationship between two conditional probabilities involving a response and its outcome. P (Rft/R) is the conditional probability of shock termination given that the reponse has occurred (turning a wheel). P (Rft/NoR) is the conditional probability of shock termination given that the response has not occurred. Control is absent (uncontrollable) along the diagonal of the space where the two conditional probabilities are equal.

witnessed a debate between those who argued that instrumental learning involves the formation of stimulus-response (S-R) bonds and those who held that instead instrumental learning is goal directed and involves the formation of action-outcome associations. A variety of research directed at understanding the neural mechanisms that mediate instrumental positive reward learning (e.g., a rat learning to press a lever for food) has made it clear that there are at least two different neural systems by which organisms can learn instrumental responses (see reviews by Balleine & Dezfouli, 2019; Dezfouli & Balleine, 2012). One internalizes S-R associations and has been called "habit learning." It is inflexible and insensitive to contingency but rather only to

pairing of response and reward (pairing is represented by the conditional probability of reward given a response). Here, rewards occurring in the absence of the response are without impact and do not weaken the response. This type of learning is mediated by a circuit that includes the sensorimotor cortex and the dorsolateral striatum (DLS). A different system is sensitive to contingency, is flexible and goal-directed, and internalizes expectation of reward. It has been called the "action-outcome" or "goal-directed" learning system and is mediated by a circuit from mPFC, particularly the PL, to the dorsomedial striatum (DMS), to the substantia nigra (SN), to the mediodorsal thalamus (MDT), back to the mPFC. This is not a simple loop as many of the connections between regions are bidirectional. It should be noted that these same two systems are present in humans (e.g., Hartogsveld et al., 2020).

This research directed at understanding the neural mechanisms that underlie instrumental learning has almost entirely involved appetitive instrumental learning, learning to obtain food, water, etc. Thus, whether aversively motivated instrumental learning, such as escape learning, also employs these two systems is unknown. However, a plausible idea is that control over adverse events is detected by the action-outcome / goal-directed learning system, and that this is necessary for control to be protective.

One way to examine these issues is to focus on the dorsal striatum since the DMS is a part of the goal-directed system while the DLS is a component of the habit system. We (Amat et al., 2014) first examined whether ES or IS would activate the DMS, the DLS, or both. IS did not induce activity in either structure, as might be expected since these subjects do not have an instrumental response. ES, however, induced activity in the DMS but not the DLS, suggesting that the goal-directed learning system is activated during controllable tailshocks. We next inactivated either the DMS or the DLS during ES and yoked IS. Interestingly, the subjects learned the wheel-turn escape response at the same rapid rate during either condition, suggesting that both systems can support escape learning. When the DMS was blocked and so the act/outcome system could not be engaged, now ES activated the DLS indicating that the ES subjects used the habit system to learn the response. Thus, the subjects preferentially used the goal-directed system to learn the wheel-turn escape response, but would use the habit system when the goal-directed system was not available.

As just noted, rats can use either learning system to acquire the escape response that controls tailshock durations. Will learning the controlling response using both systems produce resistance to contemporaneous and future adverse events (behavioral immunization)? To answer this Amat et al. (2014) inactivated either the DMS or the DLS during exposure to ES and IS. When the DLS was inactivated, having control was still protective, as would be expected from the results presented thus far. However, when the DMS was inactivated, control was no longer protective/resilience-inducing, even though the subjects turned the wheel and exerted operational control. DRN 5-HT activation and 5-HT release was also measured under these conditions, and having control did not reduce DRN 5-HT activation if the escape response was acquired while the DMS was inactivated. Thus, having a controlling escape response is protective only if it is acquired using the goal-directed system. It is *not* control per se that is protective, but rather the activation of the goal-directed system during an adverse event or situation. This also explains why, as already described, inhibition of the PL during ES eliminated protection, even though the subjects

turned the wheel to terminate the tailshocks – the habit system was being used, not the goal-directed system.

Learning that there is control over tailshock termination via the goal-directed PL-DMS-SN-MDT-PL circuit cannot, by itself, inhibit DRN 5-HT activation and block the behavioral consequences of IS or produce immunization to later uncontrollable stressors. As already noted, DRN inhibition is produced by the activation of PL pyramidal neurons that project to the DRN. One possibility is that the PL neurons that project to the DMS as part of the goal-directed learning circuit also project to the DRN, so that learning control automatically inhibits the DRN. To determine whether this is so we microinjected one color of fluorescent retrograde tracer into the DRN and a different color into the DMS. The question was whether the two colors would come to reside in the same or in different cells within the PL. The answer was clear – there were virtually no neurons within the PL that expressed both colors and so the PL cells that project to the DMS and the DRN are different, although closely intermixed populations of cells.

So, the PL cells that project to the DRN must receive input that carries the information that the stressor is controllable (Figure 5.1B). Recall that the goal-directed circuit includes a projection from the MDT back to the PL. A recent anatomical study (Kuramoto et al., 2017) indicates that the glutamatergic projection from the MDT to the PL has unusual properties. Each individual projecting neuron innervates a roughly 1 mm cube of PL tissue. Because the PL cells that innervate the DMS and the DRN are intermixed, it is very likely that the same MDT neuron that innervates PL cells that project to the DMS and are part of the goal-directed leaning circuit also innervates PL cells that project to the DRN. If this were so, the circuit that detects control would automatically innervate/activate the PL cells that use this information to inhibit the DRN. To explore this issue we injected a retrograde tracer into the DRN and an anterograde tracer into the MDT, and indeed, PL neurons that project to the DRN are innervated by MDT neurons.

Circuit Plasticity

The fact that exposure to ES will block the DRN activation and behavioral changes produced by uncontrollable stressors occurring as much as 35 days later (Kubala et al., 2012) suggests that experiencing control over an adverse event produces long-term changes ("plasticity") in the circuitry that regulates neural responding to uncontrollable stressors. A number of findings suggest that the PL is a critical site of plasticity. Amat et al. (2006) exposed subjects to either ES, IS, or no stressor at Time 1 and IS in a different environment at Time 2 7 days later. As is typical, ES at Time 1 blocked the behavioral and DRN-activating effects of IS at Time 2. However, pharmacological blockade of PL activity during the IS at Time 2 eliminated the immunizing effects of the prior ES. That is, PL activity at Time 2 was required for the expression of the enduring impact of the experience of control, suggesting that the PL is the site of plasticity.

The production of plasticity generally requires the activation of N-methyl-D-aspartate (NMDA)-type glutamate receptors and the production of new proteins called "plasticity proteins," such as phosphorylated extracellular signal-regulated kinase (pERK). Indeed, pERK is produced by ES, but not IS, in the PL (Christianson et al., 2014). Importantly, pharmacological inhibition of the production of new proteins within the PL after exposure to ES at Time 1 prevented ES from being immunizing (Amat et al., 2006). ES still blunted the immediate impact of the stressor, so the immediate effects of experiencing control require PL activation (see earlier in

chapter) but not the production of new proteins within the PL, but the long-term protection produced by control does. Moreover, blockade of just the production of pERK in the mPFC was sufficient to prevent immunization as is NMDA receptor blockade (Christianson et al., 2014).

Thus, the evidence suggests that the PL is the site of plasticity that mediates the long-term protective effects of control, but the PL contains neurons that are part of both the circuit that detects control and the circuit that uses this information to inhibit the DRN. ES-induced plasticity could occur in either population of PL neurons, or both. So, one possibility is that the uncontrollable stressor at Time 2 now activates the goal-directed learning circuit, even though it normally does not. This would be the equivalent of an "illusion of control" at a psychological level. However, a) PL neurons that project to the DMS were not activated by IS at Time 2 even if preceded by ES at Time 1, b) the DMS was not activated by IS at Time 2, and c) DMS inhibition at Time 2 did not reduce the immunizing effects of Time 1 ES. Thus, there is no evidence that PL neurons that project to the DMS are a site of plasticity.

However, IS at Time 2 did activate PL neurons that project to the DRN if controllable tailshocks had occurred at Time 1 even though uncontrollable stressors normally do not, and DRN 5-HT activity was inhibited. That is, PL neurons that project to the DRN behaved very differently after an experience of ES that had occurred 7 days earlier. Long-term plasticity often involves the growth of dendritic spines, and indeed, the experience of ES produces a persistent alteration of dendritic spines on specifically PL neurons that project to the DRN (Baratta et al., 2019).

So, the experience of behavioral control over tailshocks induces long-lasting changes in PL neurons that project to the DRN. Of course, the experience of control activates these neurons consequent to detection of control, thereby inhibiting DRN 5-HT activation. Is the simple activation of this pathway sufficient to produce the long-term changes in the pathway? To answer this, Amat et al. (2008) pharmacologically activated PL neurons that project to the DRN (as well as other PL neurons) and administered IS 7 days later. PL activation at Time 1 was not sufficient to produce immunization. In another group the PL was activated during exposure to IS at Time 1 and IS was administered in a different environment 7 days later. Intriguingly, pharmacological activation of the PL during IS did produce immunization. That is, the DRN activation produced by IS at Time 2 as well as the behavioral effects of the IS were blocked.

The foregoing suggests that plasticity is produced when PL neurons that project to the DRN are activated *in the presence of an aversive event*. That is, a second signal must converge onto the DRN projecting PL neurons for plasticity in this pathway to result. The identity of this signal is not known, although it must be the product of experiencing an adverse event. This scenario clarifies what seems like a conundrum. We all have numerous experiences with control over events during development, and numerous occasions during which the goal-directed learning circuitry is activated, yet we are not immunized against the impact of uncontrollable adverse events. It may be that the experiences have to be with control over adverse events, thereby providing that second signal, for the detection circuitry to activate and induce plasticity in the PL-DRN pathway.

Sex – Do Females Utilize This Circuitry?

The research that we have just reviewed all used male subjects. Baratta et al. (2018)

explored whether females would also be protected by behavioral control, as are males. Surprisingly, females were *not*. ES produced the same behavioral effects as did IS, and having control did not activate PL neurons that project to the DRN or blunt DRN 5-HT activation.

One possibility would be that females did not learn the wheel-turn escape response, but females learned to turn the wheel to terminate tailshocks at the same rate or even faster than did males (Baratta et al., 2018). Recall that males that learn the wheel-turn escape response using the habit system are not protected by having the escape response. So, perhaps the females used the habit system rather than the goal-direct system to learn the response. Indeed, the DLS rather than the DMS was activated during the ES session in females. This would suggest that females would be protected by control if they were forced to learn the escape response with the goal-directed system. One way to do this is to prevent the use of the habit system by pharmacologically inhibiting the DLS; when this was done, control was protective.

It is not known why females use the habit system preferentially in the wheel-turn task. The mPFC is critical to the goal-directed circuit, and both catecholamines (Arnsten, 2015; Datta et al., 2019) and CRH (Uribe-Mariño et al., 2016) released at high levels within the mPFC can interfere with mPFC function. This is noted because both stress-induced catecholamines (Heinsbroek, van Haaren, Feenstra, Boon, & van de Poll, 1991; Heinsbroek, van Haaren, Feenstra, Endert, & van de Poll, 1991) and CRH (Valentino et al., 2013) are greater in females than males. Alternatively, female bias toward the habit system may be more general (Schoenberg et al., 2019). An intriguing possibility is that females learn instrumental tasks more rapidly than do males, and so females shift more quickly to control of behavior by the habit system than males (Schoenberg et al., 2019).

Does Control Engage Other mPFC Circuits?

As mentioned earlier, only a small fraction (2%) of mPFC cells project to the DRN. The mPFC sends dense projections and exerts top-down inhibition over other subcortical structures that coordinate responses to threat. For example, the infralimbic (IL) region of the mPFC (just ventral to the PL) regulates the suppression of conditioned fear responses through its projections to the amygdala (Milad & Quirk, 2002; Quirk et al., 2010). The exact details of the prefrontal-amygdala circuits that are critical for this suppression are an area of intense study (Giustino & Maren, 2015); however, it is clear that activation of the IL inhibits the expression of fear across a variety of experimental contexts. Furthermore, successful fear extinction training produces plasticity within subsets of IL neurons, including those that project to the amygdala (Bloodgood et al., 2018; Herry et al., 2010). The foregoing suggests a framework in which experiences that increase IL output to the amygdala might lead to the suppression of fear. Not all individuals who experience a traumatic event develop an anxiety disorder, so an understanding of circumstances that might reduce fear conditioning and/or facilitate fear extinction is critical.

Several groups have shown that stress exposure can enhance later fear conditioning, an effect that can persist for up to several months in rats. In these experiments the stressors used were uncontrollable, and unsurprisingly, IS facilitates subsequent fear conditioning that occurs 1 week later in a novel environment (Baratta et al., 2007). Providing a controlling response over the stressor, however, not only prevents this

facilitation, but also reduces subsequent fear conditioning. That is, ES animals exhibit lower levels of fear (assessed by freezing) during tests for contextual and auditory-cued fear compared to animals that are never exposed to stress. Moreover, ES given after fear conditioning accelerates later fear extinction, while IS interferes with extinction. In addition to identifying factors and/or procedures that facilitate extinction, there is considerable interest in preventing fear relapse. There are several well-documented phenomena in which extinguished fear responses reappear, including the spontaneous recovery of fear that occurs with the passage of time following the completion of extinction training (Bouton et al., 2006). Importantly, the experience of ES potently reduces spontaneous recovery of contextual fear when assessed 2 weeks after extinction (Baratta et al., 2007). Thus, behavioral control produces long-lasting acceleration and permanence of fear extinction.

Given the involvement of the IL in the suppression of conditioned fear, it is not surprising that inactivation of the mPFC during ES prevented the fear-buffering effects of ES on subsequent fear conditioning 1 week later (Baratta et al., 2007). It is commonly assumed that the amount of fear measured during testing reflects the associative strength of the *fear memory*. However, fear responding can also be attributed to the strength of *fear expression* to a given level of conditioning. That is, experiential factors such as ES can modify later fear behavior by altering the amount of fear expressed rather than altering fear learning (conditioning/acquisition). IL inactivation *before the fear test*, but not before acquisition, eliminates the reduction in fear produced by prior ES (Baratta et al., 2008). The implication here is that the experience of control reduces the expression of conditioned fear rather than interfering with fear learning. Clearly, ES rats form an association between the conditional stimuli (CS; context and auditory tone) and unconditional stimulus (US; footshock), but don't express that association with fear responses if they had prior experience with ES, and the IL is essential for this suppression. These data are consistent with the extinction studies previously described in which behavioral control is given 24 hours *after* conditioning and 1 week *before* extinction. In these studies the reduced fear response during extinction occurred almost immediately during the first session of extinction, before any extinction learning could have possibly occurred, further suggesting that the experience of control inhibits fear expression. In sum, behavioral control confers resistance to future conditioned fear processes and this protection is due to changes in IL function. Although the IL has been the focus, it does not necessarily rule out a role for the PL in the fear-buffering properties of prior ES. The IL receives dense projections from the PL, which is situated immediately dorsal to the IL (Hoover & Vertes, 2007). It is entirely possible that the amygdala-projecting neurons of the IL receive direct input from the PL neurons that participate in the detection of instrumental control. This represents a potential framework for how control information can be transmitted to mPFC output neurons involved in the regulation of fear, although this has yet to be tested.

Do All Manipulations That Lead to Resilience Use the mPFC Circuitry?

In view of the data suggesting that behavioral control produces resilience in the face of future adverse events via action at the mPFC, it is natural to wonder whether other, or even all manipulations that lead to resilience do so via the mPFC and top-down inhibition. As noted, exercise (Greenwood et al., 2003), enriched environments (Zeeni et al., 2015), the

provision of safety signals (Rogan et al., 2005), and early-life mild stressor exposure (Lyons et al., 2010) also produce resilience. Of these, as far as we can determine, the role of the mPFC has only been explored with regard to safety signals and exercise. Safety signals are stimuli that indicate to the subject that an aversive event will *not* occur for a given period of time in an environment in which aversive events occur unpredictably. The provision of such signals reduces the impact of the adverse situation (e.g., Weiss, 1971). Christianson et al. (2008) set out to determine whether the protective effects of safety signals require the use of the mPFC as does control, and they did not. Instead, safety signals required the use of the insular cortex. Christianson et al. (2008) went on to determine whether the insular cortex might also be important for the protective effects of behavioral control and it was not, providing a complete double dissociation between the mechanisms by which control and safety signals exert their effects. With regard to exercise, 6 weeks of access to running wheels blocks the behavioral and DRN activating effects of IS (Greenwood et al., 2003), but the mPFC is not involved. Even lesion of the mPFC fails to reduce the protective effects of exercise (Greenwood et al., 2013). Interestingly, females are protected by exercise (Tanner et al., 2019), again suggesting that the failure of control to be protective in females is caused by a quite specific difference from males. In sum, this all points to the fact that there are multiple pathways through which stress resistance/resilience is earned.

Does Control Blunt All Aspects of the Reaction to Adverse Events?

It is natural to assume that manipulations that produce resilience essentially attenuate the stressor, so that it is experienced as less aversive. If this were the case, all aspects of the reaction to the adverse event or circumstance should be blunted, but that is clearly not the case. It has already been described that the HPA and autonomic reactions to tailshock are not reduced by having a controlling wheel-turn escape response, even though many behavioral and neurochemical sequelae are reduced or eliminated. Moreover, not even all behavioral sequelae of tailshock are blunted by control (Woodmansee et al., 1993).

How is the selective action of control to be understood? An answer is that it is all in the circuitry. As already described, control over tailshock is detected by the PL-DMS-SN-MDT-PL goal-directed learning circuit. By itself, this cannot be protective and only represents learning/cognition. For this learning to modulate behavioral, endocrine, or neurochemical consequences of the stressor, the structures that represent control learning must communicate to and alter activity in other regions that mediate the behavioral, endocrine, or neurochemical responses in question. For example, IS produces later social avoidance, and this effect is prevented if the tailshocks are controllable (ES). IS produces social avoidance in part because it activates DRN 5-HT neurons. Having control over the tailshocks blocks this effect because neurons in the goal-directed circuit innervate PL neurons that project to and inhibit DRN 5-HT activity.

From this perspective, behavioral control will only blunt reactions to the stressor whose proximate mediating neural structures receive input from the goal-directed learning circuit. Consider the HPA axis response. Cells in the PVN of the hypothalamus manufacture CRH and secrete it into the portal vasculature. CRH then travels to the pituitary, leading to the secretion of ACTH into the bloodstream. ACTH travels to the adrenal gland via the bloodstream, and there leads to the secretion of corticosterone (or cortisol) into the blood. The relation between the DRN/5-HT and

HPA activity is complex (see Lowry, 2002 for a review). 5-HT innervation of the PVN is sparse (Sawchenko et al., 1983) and other transmitters, such as norepinephrine, are major mediators of PVN activity in response to stressors (Herman, 2018). Thus, it is unlikely that the HPA response to IS is determined predominantly by the DRN.

Thus, the PL-DRN pathway that is activated by control would not prevent the PVN/HPA response. Interestingly, although the mPFC can regulate PVN activity, it does so not by a direct projection to the PVN, but rather indirectly via a projection to BNST, which in turn projects to the PVN (Johnson et al., 2019). From the present viewpoint, we would only expect the HPA response to tailshock to be modulated by control if the mPFC cells that project to the BNST are modulated by control, as are the mPFC cells that project to the DRN. Baratta (unpublished data) retrogradely labeled the mPFC cells that project to the BNST, administered ES or yoked IS, and examined activity markers in the retrogradely labeled cells. The mPFC cells that project to the BNST were unaffected by control – IS and ES produced the same level of activation. Thus, the PVN cannot "know" about control and so the HPA response would not be blunted.

Since different resilience-producing manipulations utilize different circuitries, this circuit-based view would suggest that different resilience-producing manipulations will blunt different reactions, or patterns of reactions, to adverse events. In support, exercise, which does not utilize the mPFC as a mediator of its resilience-inducing effects, does blunt the HPA response to stressors (Hare et al., 2014).

Summary and Conclusions

Research on stressor controllability began with the finding that behavioral (Maier et al., 1969) and physiological (Weiss, 1968) consequences of equated inescapable and escapable shocks differed. Thus, Maier et al. (1969) found that subjects given IS later failed to learn to escape footshocks in a shuttlebox, while Weiss (1968) found that rats given IS formed stomach ulcers. Neither outcome occurred if the shocks were escapable. Partly because little was known concerning the behavioral sequelae of stressor exposure, Maier and Seligman assumed that it was the uncontrollability of IS that led to the production of shuttlebox escape learning failure rather than that control actively blunted the impact of the stressor (or both). They argued that ES failed to produce shuttle escape deficits not because the subjects learned that the stressor was controllable but simply because it lacked the key uncontrollability ingredient. The DRN and its role in mediating the behavioral consequences of IS was not studied till years later, and the fact that IS activated DRN 5-HT neurons, but ES did not, seemed to support the idea that it was the uncontrollability of IS that is the active factor in promoting ES-IS differences. It was natural to assume that IS stimulated the DRN while ES simply failed to do so.

However, the research reviewed in this chapter suggests that instead (or possibly in addition), the presence of control leads to an active process that ultimately inhibits the DRN 5-HT activation produced by stressors. It should be noted that this top-down inhibition may not be limited to the DRN, as there is evidence that the amygdala-dependent processes are inhibited as well (Baratta et al., 2008). This active process begins with the recruitment of the goal-directed learning system. As already described, simply exercising operational control (i.e., turning the wheel and terminating tailshocks) is not sufficient to blunt stressor effects, rather, the goal-directed system must be used to acquire/control the escape response.

Why would this be adaptive? It can be argued that the purpose of instrumental learning is to allow an organism to learn what actions *cause* what outcomes in the environment. If an outcome closely follows a behavior this could be chance, or it could be because the behavior has a causal relationship to the outcome. Clearly, it would be adaptive to internalize causal relationships and not chance occurrences since performing the behavior in the future will only produce the outcome if the relationship had been causal. If an organism were only sensitive to the pairing between an act and an outcome (the conditional probability of the outcome given the occurrence of the act) it could not distinguish between a "real" causal and a chance relationship. Rather, the organism would have to be sensitive to the contingency between act and outcome since evaluating the causal nature of the relationship requires a consideration of both the conditional probability of the outcome following the response (pairing) and the conditional probability of the outcome in the absence of the response. It is only the goal-directed system, not the habit system, that is sensitive to contingency.

It is also adaptive that there is plasticity in the system if the event being controlled is aversive. When confronting a new threat an organism can begin by responding actively, attempting to exert behavioral control, or passively. If the event or situation cannot be influenced by behavioral means it is likely most adaptive to behave passively, conserving energy and other resources until action can be effective (de Kloet et al., 2019). Indeed, many of the behavioral changes that follow exposure to uncontrollable stressors such as IS represent a shift toward passivity – escape failure, social avoidance, reduced aggression and dominance, freezing, etc. On the other hand, if the event or situation can be mitigated behaviorally then active responding would likely be favorable. Under the assumption that environments tend to be stable, at least over the short haul, then if an organism experiences control over an adverse event it is reasonable to bias the system toward initial active responding in the future. Of note, in one of the few studies that have examined the impact of developmental timing for behavioral control, the proactive effects of ES persisted longer when given during adolescence than adulthood (Kubala et al., 2012). Future efforts toward understanding this age-graded effect may choose to focus on how control-induced plasticity in the mPFC system differs between these two stages of life.

The final issue to be discussed concerns the relationship(s) between behavioral control and coping more generally. The concept of coping has been used in a broad way. Sometimes the term is used to refer to a strategy, sometimes to a style, and sometimes to a process. Coping is often identified as any response to stress, volitional or automatic, cognitive, emotional, or behavioral. In the animal literature the major distinction is between active versus passive coping, or proactive fight/flight versus reactive conservation-withdrawal (Koolhaas et al., 1999). If, in an adverse situation, the subject behaves actively, then it is said to be engaging in active coping, whereas if it behaves passively (often this is freezing), then it is said to be passively coping. The assumption seems to be that the organism is always "coping," with no consideration that an organism might be failing to cope or to not be engaged in a coping strategy. From this perspective, behavioral control would be seen as a form of active or proactive coping and might be central to active coping in general.

With regard to humans, many of the forms of coping that have been studied contain an element of control and are intertwined with the concept of control. At the experimental level coping is often studied in the context of the

regulation of negative emotions. Emotion regulation has been defined as "processes that individuals utilize to change the trajectory (e.g., type, intensity, and time course) of their emotional experience" (Kim et al., 2019, p. 215). Notice the similarity to how behavioral control has been defined, with the difference being that here the control is exerted not by an overt behavioral response but rather by internal processes. Cognitive reappraisal would be a specific example (Cutuli, 2014). Here, subjects are asked or taught to reduce the negative affect produced by a stimulus (e.g., a snake) by thinking about it differently (e.g., "the snake is not poisonous and can't hurt me"). Interestingly, as with behavioral control, successful reappraisal involves engagement of top-down inhibition from regions of the mPFC to limbic structures, although dorsolateral regions may be of more importance here (Ray & Zald, 2012) (but see Urry et al., 2006). In any event, the determination of what regions of rat mPFC are analogous to what regions of human mPFC is complex. Here, the interesting question is the extent to which control and its circuitry is part of the mediation of the impact of reappraisal and perhaps other forms of emotion regulation.

Poor regulation of negative emotions has been argued to be at the core of a number of psychological/psychiatric disorders, and mPFC dysregulation and impaired top-down inhibition of stress-responsive limbic and brainstem structures have been implicated (e.g., Huang et al., 2014). Interestingly, cognitive behavioral therapy (CBT) has been argued to restore this top-down inhibition (DeRubeis et al., 2008), although the evidence for this is still sparse (Franklin et al., 2016). In CBT individuals are taught skills that they can use to reduce destructive negative thoughts and emotions, as well as to evaluate real circumstances. Embedded in this is that they are taught that there are things that they can do to improve their circumstances – control. The extent to which this is involved in the beneficial effects of CBT is largely unexplored.

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Part II

Methods for Studying the Development of Coping

6 Capturing Coping

Innovative Designs and Considerations for Studying the Topography of Adolescents' Coping

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Introduction

Many theories of stress and coping describe a complex unfolding of dynamics that are socially embedded and occur at multiple levels (Carver & Vargas, 2011; Lazarus, 2000; Lazarus & Folkman, 1984; Modecki et al., 2019; Skinner & Zimmer-Gembeck, 2016). As a result, researchers have turned to intensive longitudinal designs (ILDs) to study individuals' experience of coping as it unfolds. Intensive longitudinal designs involve repeated measurement of the same individuals over short periods of time (e.g., multiple times within the day or across the week). This includes techniques such as experience sampling methodology (ESM; Csikszentmihalyi et al., 1977), sometimes also referred to as ecological momentary assessment (EMA; Shiffman et al., 2008), or the more general term ambulatory assessment (Trull & Ebner-Priemer, 2013).

These methodologies involve using structured techniques to study individuals' real-world experiences by repeatedly measuring mood, context, appraisals, responses, or behaviors that occur "in the moment." Intensive longitudinal designs have been discussed in the psychological literature for many decades (e.g., Cattell, 1957; Diener & Larsen, 1984). More recently, with the advent of smartphones and wearables, the advantages and possibilities of these techniques have generated renewed scientific enthusiasm (Carpenter et al., 2016; Lane et al., 2019), particularly in relation to studying dynamic processes among children and adolescents, who themselves are ready consumers of smartphones and new technologies (Larson, 2019; Modecki et al., 2019; Odgers, 2019). For studying development, ILDs can be especially informative when they are coupled with collection of data from these same participants over a more protracted period (e.g., a year) and/or before and after a key developmental transition, thus providing both a longer-term and more micro lens on longitudinal change (Borghuis et al., 2020; Kuppens et al., 2012).

Intensive longitudinal designs are frequently touted as able to address some of the major complexities of stress and coping processes as they occur in daily life (e.g., Conner & Mehl, 2015; Fahrenberg et al., 2007; Stone & Shiffman, 1992). However, just as no single tool in a toolbelt is suited to tackle every project, we highlight that no single approach, including (and perhaps especially) ILDs, are appropriate for every research question. This remains true when the researcher is studying coping. Even though coping is described as a dynamic process, and ILDs are well-suited for capturing key dynamics of coping (e.g., Duvenage et al., 2019), depending on the major theoretical focus and question of interest, ILDs may not be well-suited to address focal concerns. Moreover, conducting ILD research is not for the faint of heart, especially when it comes to collecting reliable and valid data from adolescents (Larson, 2019; Odgers,

2019). Indeed, challenges exist around designing, implementing, and analyzing data collected using ILDs. Thus, our aim in this chapter is to introduce how the use of ILDs may enhance research on stress and coping, focusing mostly on adolescents, while also raising some challenges and briefly glossing resources and considerations for how to address them.

Coping and development are complex scholarly arenas, having posed empirical challenges to scientists for many decades (Aldwin, 2009; Garmezy & Rutter, 1983; Sandler et al., 1997; Skinner & Zimmer-Gembeck, 2016). Consequently, in this chapter we address five topics related to these arenas that may be of interest to scholars considering the use of ILDs. First, we define coping, briefly introduce theory that outlines the coping process, and describe more typical ways of measuring coping. Second, we discuss how ILDs can be used to move toward the study of coping as a *microprocess* (Meter & Ehrenreich, 2022; Modecki et al., 2019). Third, we draw from research across several of our labs to give an example of how to leverage smartphones to measure stress experiences and coping within real-life contexts. Fourth, we describe several challenges and barriers to using ILDs to study coping, including the types of coping questions ILDs are currently less well-suited to address. We also point to key considerations and published resources for making better use of ILDs in developmental coping research. Finally, we discuss future directions for coping research agenda informed by developmental science and the ways that ILD methods might contribute.

Defining Coping (as a Process)

Measuring and studying the process of coping can be challenging. For example, the transactional model of stress and coping (Lazarus & Folkman, 1984, 1987), which has informed coping research for almost three decades, proposed that:

> Studying coping as a process requires that . . . one must make observations describing coping thoughts and acts that actually have taken place or are occurring, in contradistinction to thoughts and actions the person usually engages in. The latter implies a trait since the word "usually" signifies an effort to transcend specific situational contexts in the search for what is stable. The second condition is that observations must be made in a particular context. Coping as a process can be studied only if we have an opportunity to compare what happened at one moment, or in one context, with another, (Lazarus & Folkman, 1987, p. 143)

Critical to this definition of coping is seeing that it is a process, rather than a single event. Thus, the measurement of difference or change from one's typical cognitive and behavioral state takes center stage and capturing information within and across contexts (or events) is especially important for studying the coping processes. Likewise, Skinner (1999) referred to coping as a process that requires coordination of emotions (as it is often the primary focus in studies of stress and coping). However, the authors also describe coping as involving coordination of physiology, attention, behavior, motivation, and cognition. This identifies coping as an organizational construct that involves both action tendencies (immediate, and sometimes involuntary, responses to stressful events) and the regulation of action (intentional and volitional actions to respond to stressful events). Though both theories describe coping as a process, they vary in their emphasis on change (versus, for example involuntary responses or attention). Hence, depending on the scholarly framework, certain types of ILDs (for example ESM versus passive sensing using wearables) may be more or less appropriate for the research questions at hand.

Across these theories, viewing coping as a *process* does have implications for its measurement. Foremost among these implications is the advice offered by Stone and Shiffman (1992) almost three decades ago. They advised scholars to examine episodes of coping as their unit of analysis rather than sampling across continuous windows of time. These "coping episodes" are expected to have unique topographies related to the coping response's characteristics, duration, and intensity. Stone and Shiffman further argued that methodological design is important; to capture these topographies, methods need to match the specific features of hypothesized coping episodes. This conceptualization of coping episodes maps neatly onto the transactional model of stress and coping, whereby coping efforts are expected to be accessible as distinct episodes rather than an ongoing unconscious stream of responses and actions. The notion of coping episodes also provides scholars with the idea there is a set bracket of time when a coping response unfolds following a stressful event. When these stressful events occur in childhood and adolescence, in particular, coping can become part of development.

It is important to underscore that the term "process" also has a specific meaning within developmental science. Bronfenbrenner and Morris (2006) referred to processes as the frequent *transactions* between an individual and their context and posited that these frequent transactions (i.e., proximal processes) are the roots of human development. In a version of this bioecological framework applied to ethnic minority children, Coll and colleagues (1996) reiterated the importance of transactions between ethnic minority children and their contexts in informing development, especially distal contexts including schools, neighborhoods, and healthcare systems that support racial segregation and socialization. Both definitions (Bronfenbrenner & Morris, 2006; Coll et al., 1996) of process add to the standard English definition, a series of steps required to complete a task and on reciprocal interactions between an individual and their context. Additionally, bioecological theory highlights that the processes (or transactions) that produce developmental outcomes shift and stabilize across phases of human development (i.e., from infancy to childhood, to adolescence, and beyond). These shifts and stabilizations form the crux of developmental science investigations via examining "the dynamic interplay of processes across time frames, levels of analysis, and contexts" (Bronfenbrenner & Evans, 2000, p. 115). A "developmentally friendly" (Skinner & Zimmer-Gembeck, 2007) conceptualization of coping suggests that, beyond the person–environment transactions within a specific coping episode, adolescent coping follows a prolonged developmental process, formally changing and stabilizing across this period (i.e., 12–18 years). Here, a developmental explanation of coping arguably involves examinations of in-the-moment transactions *and* examinations of coping processes across sensitive periods of development. To understand this later, longer-term process, some of the most used tools historically are coping checklists.

The Use of Coping Checklists

Those interested in capturing ways of coping using surveys have traditionally relied upon self-report checklists, whereby individuals endorse various strategies from a provided list, indicating if they have used each strategy or how much they have engaged in any given coping strategy (e.g., Halstead et al., 1993). Researchers then amalgamate checklist scores to form measures of typical coping responses. This general approach to measuring coping has provided insight into how people generally cope (Bettis et al., 2021). In addition, this

research has two other strengths. First, coping behaviors are often measured as stressor-, situation-, time-, and (sometimes) age-specific (Duvenage et al., 2019). Thus, we can identify how typical ways of coping might be linked to context or develop over longer spans of time. Second, this research has detected between-person differences in their typical ways of coping that have been found to account for significant variance in well-being outcomes (e.g., Compas et al., 2017; Davis & Humphrey, 2012).

For scholars interested in a wide range of possible types of coping or the matching of particular stressors to types of coping, checklists remain an important tool, though admittedly with limitations. There are several possibilities for addressing these drawbacks. First, number of dimensions or types of coping are not widely agreed upon, with scholars measuring anywhere from two to three categories up to more than a hundred (Skinner et al., 2003). Indeed, there have been multiple reports of poor or difficult-to-replicate factor structures for coping checklists. Sometimes this is due to the inclusion of inapplicable items for specific stressors or because of low covariation between coping items that ask about responses that can be used in place of others. Some strategies for dealing with this challenge include the use of confirmatory factor analyses that are based on clearly delineated strategies and items that are unambiguous (e.g., Skinner et al., 2003). Another potential option is to make use of item response theory (IRT) and related approaches for distilling down the key aspects of coping (see Hardouin et al., 2011 for an applied step-by-step example specific to coping). IRT methods are psychometric tools that are particularly helpful for checklist approaches (e.g., Revicki et al., 2009). Illustratively, IRTs describe the relation between where a person falls on the continuum of a construct (e.g., "active coping") and the probability that they will give a specific response to a scale item that has been conceived to measure the construct (McHorney & Cohen, 2000). Particularly relevant when it comes to measuring coping, IRT measures tend to be especially helpful for analyzing growth and clinical change (Reise et al., 2005). A third possibility to consider is the application of person-centered approaches such as cluster or latent profile designs to the study of coping, so that the focus is on identifying distinct groupings of people who report similar patterns of coping (e.g., Masters et al., 2022; Witkiewitz et al., 2018). Given the complex interplay that is often theorized between stressor, coping approach, and individual risk and protective factors (e.g., Stroebe et al., 2006), person-centered designs can be well-placed to capitalize on this complexity. In sum, any of these three possibilities can be helpful when the goal is examination of the breadth of potential coping approaches or the "matching" stressors and coping and are well-placed for use across traditional longitudinal designs (e.g., via a more extensive survey battery). However, to investigate shorter-term longitudinal processes, ILDs are especially promising.

Intensive Longitudinal Designs to Capture the Stress and Coping Process In Vivo

Falling in a general class of interrupted time series designs (Walls et al., 2011), ILDs involve many closely spaced measurements, often involving at least 20 occasions (Collins, 2006). Because measurement occasions can be spaced to provide a detailed picture of change in the construct being observed (e.g., emotion or perceived stress), many innovations in the study of stress and coping involve ILDs (Shiffman et al., 2008; Stone et al., 1998). Intensive longitudinal designs include a range

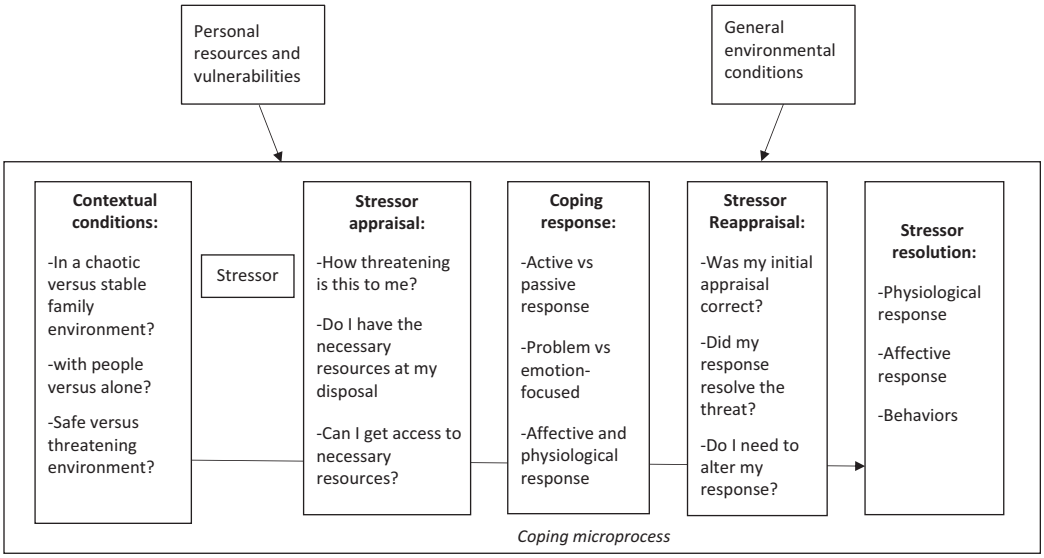

Figure 6.1 Visual illustration of the coping microprocess. The coping episode would begin at the stressor and end at stressor resolution.
Note: An individual is in constant interaction with their environment at each step of the microprocess.

of study designs equipped for the repeated assessment of constructs across micro-time periods (e.g., minutes, days, or weeks) (Meter & Ehrenreich, 2022). To date, most common has been the use of daily diaries and ESM studies that ask individuals to self-report on features of their social situation (context), thoughts, emotions, and behaviors as they go about daily life (Duvenage et al., 2019), although passive sensing technologies (e.g., tracking movements through GPS, physiological information, or capturing typed content on devices), whether combined with ILDs or on their own, are rapidly emerging (e.g., Byrne et al., 2021; Wang et al., 2014; Zuleta et al., 2018). When used to study stress and coping among adolescents, ILDs often ask about stressors, appraisals of stress, emotions, and coping responses (e.g., Aldridge-Gerry et al., 2011; Mori et al., 2015). Some studies narrow down to ask about specific types of interpersonal conflicts (Mushquash & Sherry, 2013) or, for instance, coping with racially and nonracially stressful events (Hoggard et al., 2012), whereas others focus on additional aspects of the coping process such as attributional style (Roesch et al., 2009). For an informative discussion on the varied ways that scholars have sought to assess this process, Duvenage et al. (2019) provide a comprehensive synthesis of the ILDs used to study adolescents' coping.

Indeed, there are multiple advantages of ILDs described in reviews (e.g., Gabriel et al., 2019; Myin-Germeys et al., 2018; van Roekel et al., 2019). For example, one advantage of using ILDs is their potential for producing records of stressful experiences and coping that are timed to coincide with those stressful events as closely as possible. This has been shown to improve validity by reducing the need for retrospective recall, which can be discrepant from reports about current status, and is often inaccurate (Stone et al., 1998). A second advantage is the ability to provide data on dynamic fluctuations. These

techniques can capture within-person variability and prediction of rapid change such as return to baseline or recovery. Overall, however, perhaps the most useful feature of ILDs for capturing coping is to capitalize on their promise for studying microprocesses. By microprocess, we refer to the transactions between a person and their environment, which take place across seconds, minutes, or days, and in the context of daily life. Figure 6.1 provides a visual representation of this coping microprocess. As an illustrative example, we outline how the transactional model of stress and coping provides multiple entry points for the researcher wishing to operationalize and measure the coping microprocess through ILDs.

We highlight here that we would not necessarily expect scholars to assess all of these "steps" nor the wide array of potential moderators or environmental contexts that might impact the coping process. In fact, often researchers seek to measure "too much" when first endeavoring to capture experiences via ESM and diaries (see Larson, 2019 and Modecki et al., 2019 for discussions). Rather, those interested in stress, coping, and related topics will have a specific question of interest (timing of coping and recovery, the role of contexts in stress and coping, etc.) and, based on this interest, ILDs should be designed to best address these specific questions. As an illustrative example of how scholars have fruitfully narrowed their lens to best make use of ILDs to assess the coping process, scholars sometimes address coping with specific stressors – for instance, diabetes (Tracy et al., 2021) or pain (Burns et al., 2015), so that ways of coping, key predictors, moderators or outcomes, and timing of measurement all coincide with only specific phenomena of interest.

More broadly, the transactional model of stress and coping identifies how individuals' initial appraisal of a stressor will relate to their ways of coping (Lazarus & Folkman, 1984; starting after the stressor in the middle of Figure 6.1). Individuals can appraise stressors as controllable versus uncontrollable, expected versus unexpected, and assess their efficacy to cope with the specific stressor (Pillow et al., 1996). Questionnaires used within ILDs can include items tapping cognitive appraisals of recent stressors (e.g., Hoggard et al., 2012). Coupled with items asking about context, researchers can answer questions regarding the interaction of context with cognitive appraisal (e.g., are adolescents more likely to appraise a stressor as manageable if they are with supportive peers versus alone?). Further, as part of the appraisal process, individuals look to their environment to assess the amount and quality of resources available for their coping response (Compas et al., 2017). Here, ILD surveys might be used to create a "stock-take" of the coping resources available in the environment and how this affects their subsequent coping actions.

In ways similar to stress appraisals, data collected via ILDs might address how coping behaviors are tied to appraisals or stressor types (Lin et al., 2004). In line with the transactional model (Lazarus & Folkman, 1984), ways of coping may be dictated by both stressor appraisal and environmental appraisal (as well as other personality factors) (Fanshawe & Burnett, 1991). Using near-continuous sampling through ILDs, researchers might then trace change or stasis in coping actions across contexts. Additionally, coping scholars have theorized that healthy and effective coping involves switching between coping behaviors to fit the context (i.e., coping flexibility) rather than sticking to a set of "adaptive" coping behaviors (Skinner & Zimmer-Gembeck, 2007). Data collected on coping behaviors across individuals' daily lives (for instance, via open-ended assessments or end-of-day brief checklists) might measure how people

move between coping behaviors across contexts, which could serve as a helpful operationalization of coping flexibility. The transactional model also highlights how individuals can reappraise the severity of a stressor once coping actions are initiated. Intensive longitudinal designs can capture these postaction appraisals (i.e., was the stressor as manageable as you initially thought? Was the correct strategy selected or did you need to update your strategy?), which could potentially provide valuable insight into the coping microprocess.

Shown to the right in Figure 6.1, and often of most interest to researchers and clinicians, is the question of whether coping behaviors are adaptive, constructive, or effective in either resolving the stressor, the distress, or both. Intensive longitudinal designs can capture data on appraisals of whether a coping response was helpful. Importantly, too, the benefits of ILDs mean we can move to objective assessments of whether coping was beneficial – ILDs open up the possibilities for considering objective signs of coping success in the data, including emotional variability, bouncing back from stressful events, or participation in healthy versus maladaptive behaviors after a coping episode (Park et al., 2004; Stone et al., 2019).

Finally, there are two other important pieces of the model shown in Figure 6.1. First, as shown on the left of Figure 6.1, ILDs can also capture contextual conditions. These may be considered especially important, leading researchers to deploy repeated assessment of adolescents' physical and social environment throughout the day, which can provide insight into environmental correlates to stressful events and insight into how these antecedents inform adolescents' coping responses (Lyons et al., 2016). Second, shown at the top of Figure 6.1 are the influences of person-level resources and vulnerabilities and (more general) environmental conditions that can impact on the entire stress and coping process. For example, the environment can either be resource-rich, offering a helpful platform for them to formulate an effective coping response, or resource-depleted. Hence, designs might consider how certain resources differentiate different responses to stressful events or test who is more emotionally reactive to a certain type of stressor by focusing on between-person differences in personal resources or vulnerabilities (e.g., Modecki et al., 2017).

Illustratively, several of the authors of this chapter have conducted in-depth ILD research with adolescents within very specific environments, related to lower socioeconomic status (SES) contexts (Modecki & Uink, 2018). Here, our model was that lack of physical resources in the environment might make coping via online sources particularly beneficial for youth well-being in these settings (Duvenage et al., 2020; Modecki et al., 2022). As a result, our work has tapped adolescents' positive and negative emotions across the day along with their social contexts, exposure to daily stressors, and online coping behaviors (Uink et al., 2017, 2018). By tracking adolescents' responses five times daily, while going to significant lengths to ensure high-quality data with good compliance (Uink, 2020), we were able to gauge the way stress and coping impact emotional dynamics – that is, how adolescents living in lower SES settings bounce back from stress, their time to recovery, and the distance between their highest and lowest emotion scores. From this research, we were able to determine the levels of online coping that were associated with more positive emotional responding among adolescents (Modecki et al., 2022) and identify that the intensity of emotional responses to stressors differs across adolescents' social contexts (i.e., less intense emotional response when youth are with peers after a stressor versus being alone; Uink et al., 2017). We have previously coded the impact of

identified stressors via emotional "return to baseline" – in this case the number of sampling moments youth experienced before returning to or above their average momentary emotion (Modecki & Uink, 2018). Similarly, survival analysis (e.g., time until event) related to the next emotional "uplift" of a specific magnitude, or a specific type of focal coping behavior, would be other useful ways to tap the specific outcomes and the timing of these outcomes of stress and coping processes. More generally, these approaches, which overlay a further element of time to repeated measures data, are appealing approaches to making optimum use of ILDs (Modecki et al., 2019).

In summary, coping researchers can utilize ILDs to provide new insights into coping, and ILDs can be designed to fit within one's chosen scholarly framework. Depending on study aims, ILDs can be used to tap novel scientific questions associated with coping processing, dynamics of emotions and behaviors pre- and poststressor, and fluctuating social and environmental contexts. What is more, an accumulation of these coping-related experiences over time might be expected to result in person-level developmental change. That is, through these momentary or daily events and responses, individuals might increase their likelihood for developmental risk for subsequent internalizing problems (e.g., Kuppens et al., 2012), or might enhance the likelihood of a successful developmental transition at a later point in time. Thus, it could be fruitful to link ILD data to person-level measures months or years pre or post to identify how stress and coping experiences are important to the eventual development of the person.

The Implementation of ILDs in the Field

Our experience (and experiences of many other researchers, e.g., Kenny et al., 2016; Klumb et al., 2009; Stone & Shiffman, 1992) using ILDs highlight a number of difficulties researchers can sometimes face in seeking to take advantage of their methodological potential. Indeed, more and more, the field is coming to consensus about the expectations for high-quality ESM and diary designs, so that scholars should be prepared to meet these challenges with data that meets a reasonable standard. At minimum, these standards include designs for adequate power to assess within-person effects, low participant burden and good compensation to ensure adequate response validity, and expectations of acceptable levels of missing data, with at least 70% or more compliance (Eisele et al., 2022; Heron et al., 2017; van Roekel et al., 2019). In particular, while missing data is an issue for ILD studies generally, when it comes to studying coping, high missingness is a major hurdle, given that missing data tends to be related to both the recent experience of stress and to psychopathology symptoms (Duvenage et al., 2019).

Given that good compliance and validity of responses are perhaps the most critical elements for high-quality youth coping studies using ESM and diaries, we have been interested in preferred approaches. In particular, nearly all adolescents and many children have access to smartphones, allowing researchers to leverage these tools, enhancing the likelihood of reasonable compliance (Larson, 2019; Odgers, 2019). For youth coping research, apps or text-based approaches are most often employed (Duvenage et al., 2019), though several labs have also made successful use of phone calls (Dillman Carpentier et al., 2008; Stone et al., 2019). Here, depending on one's theoretical framework (e.g., Skinner, 1999; Skinner & Zimmer-Gembeck, 2016), phone calls may be most useful for tapping details of youths' stressors and/or the range of potential coping responses youth have engaged in

(e.g., checklists). While adolescents generally tend to prefer contact via texts rather than phone calls (Duvenage et al., 2020), disclosure of specific details related to stressors might be curtailed due to the effort needed to type online responses and the lack of real-time reinforcement for that effort (Modecki et al., 2019). At the same time, phone calls might present problems also since there might be discomfort with relaying details of stressors (and associated coping responses) to a relatively unknown research associate via phone conversations.

Before launching a large-scale diary project with adolescents, we opted to test this question empirically. In a pilot study, we sampled 50 late adolescents (18+) across 1 week via a research design that included phone calls, text messages (with a survey embedded), and a "mixed" condition where participants received texts and phone calls. Young people completed short surveys related to their stressors and coping at the end of each day. One cohort completed their surveys via text message (a link to a survey was embedded in the message); one cohort received only phone calls; and one cohort (described here as "mixed") received calls and texts on alternating days. Given the impact of missing data on study inferences and reliability, we were particularly attuned to the role of study design in data missingness (Enders, 2010; Modecki & Mazza, 2017). We were also interested in participants' opinions about each method and the comfort young people felt in disclosing.

Examining rates of missing data (defined as a participant skipping a survey), texts were clearly optimal. Texts provided an 81% response rate, versus a 47% response rate for phone calls. For calls, the research team made up to three attempts to phone participants each night (6 pm, 7 pm, 8 pm), and roughly 20% responded after the first contact, 18% after the second contact (1 hour later), and only 4% after the third contact. Hence, response rates were not only markedly lower for calls, but required a commitment to making at least two phone call attempts to participants for each associated diary entry in order to capture even 50% of targeted participants.

Although texting was clearly optimal for compliance, we also thought that phone calls might reveal more nuance or "texture" related to young peoples' stressors. For the pilot, we queried young people about stressors specific to peers and academics, two common domains of adolescent stress (Jaser et al., 2007). Hence, we examined responses more closely, to address whether more fine-grained details emerged when young people were contacted by phone calls versus texts. Somewhat surprisingly, texts again appeared optimal relative to phone calls. Participants provided good-quality and very descriptive information about stress via text messaging. For example, one participant revealed the following about peer-based stressors: "*X [was] talking about suicide again, when I am now trying to move and focus on me and supporting myself, I feel guilty, but then I need to know I deserve better than this after such a long 11 months of his depression.*" In comparison, phone call surveys revealed more rudimentary stressors and lacked the richness of text message responses. For example, one of the most detailed phone call responses included: "*I have some residual hurt from a recent break-up. And I just had my birthday on the weekend, so it was hard to get through*." In this case, while describing overall hurt, the young person in this example did not provide some of the finer details we might have expected when responding via phone call.

We were also interested in participants' preferences for data collection method. Here, among our mixed group, only 3% of participants indicated a preference for phone calls, as

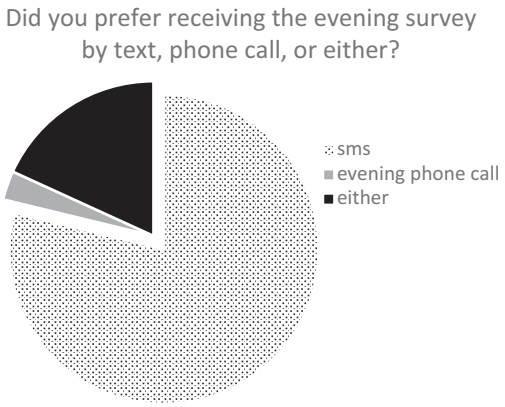

Figure 6.2 Young people's self-reported preferences for phone calls versus texts.

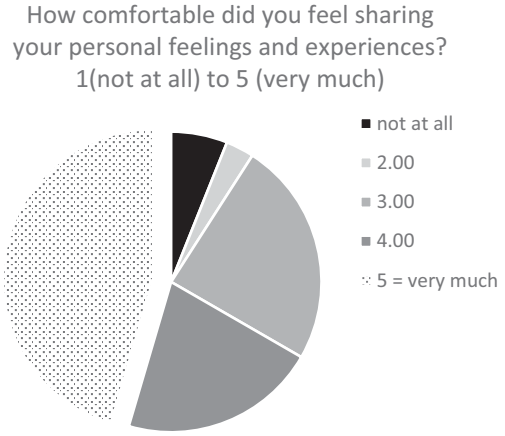

Figure 6.3 Young people's self-reported comfort in sharing daily personal experiences.

opposed to 79% that indicated a preference for text; others had no preference (see Figure 6.2). That said, there was still high acceptability of both phone calls and text messages. Overall, young people reported that they felt extremely comfortable sharing their experiences across the study, with "very much" (M = 3.90; SD = 1.19; 1 = not at all; 5 = very much) being the most common response (Figure 6.3). Young people also enjoyed their participation, with a mode and median of 4.00 (M = 3.51; SD = 0.83; 1 = not at all; 5 = very much (see

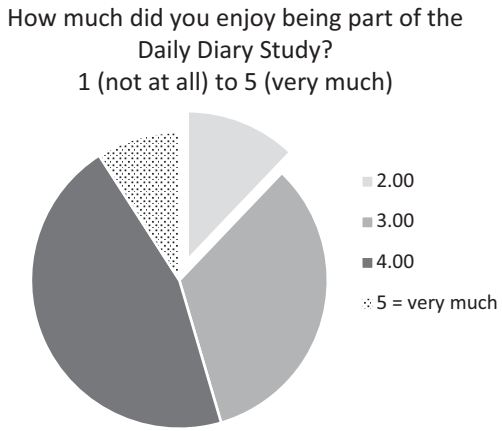

Figure 6.4 Young people's self-reported enjoyment of the diary data collection process.

Figure 6.4). Overall, then, our findings widely favored text-based diary approaches over phone calls, with compliance, richness of responses, and participant preferences each pointing to texts (or apps) as preferable. Yet, other research has found that phone calls function well for families with children with psychopathology disorders (e.g., Silk et al., 2011; Stone et al., 2019) and are not described by participants as either uncomfortable or unenjoyable. As a result, when implementing ILDs, piloting remains crucial, and design decisions will depend on preferences and constraints of one's sample and paradigm.

Studying Coping with ILDs: Timing, Measurement, Data, and New Possibilities

We have highlighted elsewhere the critical importance of piloting ILDs with young people (Duvenage et al., 2019; Modecki et al., 2019). Our reasons for stressing the importance of piloting go beyond methodological options and challenges with compliance. Piloting also affords opportunities for making decisions about the timing of surveys and validating given coping

operationalizations. We next consider these issues in more detail. Following this, we briefly gloss practicalities of data analyses that should be considered before the decision is made to embark on an ILD study. Finally, we touch on new potentials for studying coping via ILDs, including passive sensing and wearables, which could be implemented on their own or could be implemented as a supplement to more traditional forms of data collected in ILDs. We note here that although a full description of the many potential challenges associated with conducting ILDs and the ways scholars have sometimes sought to address these is beyond the scope of this chapter, we refer the reader to useful published summaries (e.g., Gabriel et al., 2019; Russell & Gajos, 2020; van Roekel et al., 2019) for more information about the challenges not covered here, such as commitment, compliance, and cost.

Timing of Measurement

A major challenge to the optimal implementation of ILDs relates to the issue of timing of measurements. Stone and Shiffman (1992) sagely highlighted the essential trade-off related to the size of researchers' measurement filter when using ILDs and the collected quality of data. Querying participants too often can lead to reduced compliance and participant dropout, but querying participants too infrequently can mean that some of the benefits of ILDs (i.e., reduced recall bias, tapping the coping process as it unfolds) are lost. Ideally, timing of measures emerges from the theorized coping process researchers are seeking to investigate. Depending on one's theory, and the type of stressor and ways of coping under examination, the researcher will then need to optimize their study design to tap related coping features – across months, weeks, days, hours, or minutes.

It is not entirely clear what the "best" time frame is for studying stress and coping, as illustrated by the seemingly arbitrary time frames for measuring coping that can be found across ILD studies. For example, in a recent review of the ILD adolescent coping literature, we found that the time between repeated measurements varied widely across studies, ranging from measuring coping 10 times a day (e.g., Bentall et al., 2011) to once a day (e.g., Massey et al., 2009). Part of the reason for this large variability in time frames is that the process illustrated in Figure 6.1 could arguably take place over minutes or hours or days, and estimates would likely vary depending on the type of stressor and coping behaviors under investigation. There are of course trade-offs for assessing stress and coping "intensely" rather than daily or weekly. That said, as ILDs gain in popularity, the field will increasingly benefit from ideal timing of common approaches to stress and coping, ensuring that filters are not too wide and capturing multiple intersecting coping episodes or too narrow and missing critical components of an adolescent's coping response.

To address concerns that crucial details may be missing due to the wrong measurement timing, there is a need for more "discovery work." In this case, coping research could leverage study designs that have assessed best-practice for improving ILD compliance, for example, to discover the ideal time frame to sample a coping episode within a given theoretical framework. For instance, Eisele et al. (2022) randomized 163 university students into six conditions where ESM survey length and sampling frequency varied to understand the relation between ESM survey length, frequency, and compliance. Participants were assigned to 1) a short ESM survey and three sampling points ("beeps") across the day, 2) a short survey with six beeps across the day, 3) a short survey with nine beeps per day, 4) a long

survey with three beeps per day, 5) a long survey with six beeps per day, or 6) a long survey with nine beeps per day. Each participant took part in a 14-day sampling period in their respective condition. Study findings suggested that longer surveys were associated with lower compliance regardless of the sampling frequency, prompting the authors to recommend that long ESM surveys (i.e., 60 items with full branching) should be abandoned in favor of shorter (30 items) surveys. Future research would benefit from leveraging this random assignment sampling time frames method to assess the ideal time frame for capturing a full coping episode within common developmental coping frameworks.

Eisele et al. (2022) examined signal-contingent designs, in which participants are asked to respond to brief surveys across predetermined times (e.g., at bedtime, Massey et al., 2009; every 90 minutes, Schneiders et al., 2006). However, this opens the possibility that relevant data are not reported. One solution is to ask adolescents to report on their stressors and associated coping efforts since they were last signaled (e.g., Uink et al., 2018). However, asking for retrospective reports of coping, albeit across a short period of recall, dampens one of the key promises of ILDs – capturing developmentally salient processes *as they occur* (Hollenstein et al., 2013). Another alternative is to incorporate event-contingent sampling into ILDs. Event-contingent ILDs ask adolescents to complete a survey when a specific stressor occurs. In this way, data on coping microprocesses can be captured as the response unfolds (Duvenage et al., 2019). It is not uncommon for coping studies to be designed as either event-contingent or a mix of event-contingent and signal-contingent (fixed or random times) designs, particularly when tapping problem behaviors that individuals report they use as coping mechanisms, such as drinking, drug use, self-harm, or bulimia (e.g., O'Connell et al., 2007; Wycoff et al., 2021).

Finally, another potentially useful technique for capturing coping as it unfolds, while allowing for the occasional longer surveys, is to mix multiple data collection times across the day with end-of-day or end-of week reports. As one example of using this method, Modecki et al. (2022) collected reports from adolescents about stressors and affect five times a day for 7 days and collected reports of online coping (i.e., seeking emotional support, information, or distraction online) at the end of each day. Adolescents were identified who indicated that they had 1) engaged in any form of online coping and 2) had reported a stressful event at any point during the day. Using the rationale that adolescents deployed their online coping behaviors to respond to that day's stressor, coping responses reported at the end of the day were tied to stressors reported multiple times across the day. Analysis assessed whether online coping behaviors reduced emotional reactivity to stressors within a 3-hour window. Findings pointed to curvilinear relations between adolescents' online coping and emotional reactivity, where moderate levels of online information-seeking, emotional support-seeking, and self-distraction were associated with reduced emotional reactivity to stressors. This project nicely illustrates how researchers can leverage within-day and end-of-day reports to identify and tie together the start point (i.e., stressor), mid-point (i.e., online coping behaviors), and end-point (i.e., affective response) of an adolescent's coping arc.

How to Measure Coping in ILDs

Beyond time of measurement, a related challenge of ILD coping research is a current lack of guidance on how best to measure coping (and related constructs) at the micro-timescale. For example, Stone and Neale (1984) posited

that coping checklists deployed within an ILD framework might beneficially tap adolescents' changing coping repertoires, but they also noted that creating even a brief checklist for use within such repeated measures designs may come up short. Namely, with only two or three items endorsed at each time point, internal consistency tends to be especially low. Further, it can be challenging to construct items that are precisely focused only on one type of coping and not another (e.g., the same item can often reflect several types of coping, such as distraction or relaxation). Here, researchers are encouraged to consider their key scientific concern alongside their driving theoretical framework. Depending on the focus (e.g., focus on timing of "stress recovery" versus an emphasis on specific coping strategies and their use), different measurement approaches will be better suited for different purposes. When type of coping is of major interest, an option suggested by Stone and Neale is the use of open-ended items, whereby participants describe how they coped with stress that day, in the last few hours, or across some other timescale. That said, we have found that open-ended questions can be difficult to manage. There can be high rates of missing data and responses can vary across individuals in ways that can impact on research findings. In particular, in a study of adolescents (13–17 years), open-ended questions were problematic for response rates, particularly when using experience sampling with high-frequency repeated measures (Duvenage et al., 2019; Modecki et al. 2019). Adolescents often skipped open-ended responses across experience sampling questions, making it difficult to ascertain the meaning of missing data. Further, our methodological research identifies age effects; late adolescents were happy to provide written information on stressors and coping via open-ended responses via text message, but younger adolescents showed a solid dislike for open-ended questions. For this reason, some have proposed offering youth-specific compensation schemes for open-ended responses separate from closed responses (van Roekel et al., 2019).

Data Considerations: Planning for Multitudes of Nested Data

Intensive longitudinal data are nested by design (times of measurement nested within individuals – and sometimes individuals are also nested within groups of some sort), which allows researchers to study relations between variables of interest at both the within- and between-persons levels (Hamaker, 2012). As a result, ILDs often result in "mountains of data" – imagine, for instance, a fairly simple ILD with 3 repeated surveys on each of 14 days for 200 adolescents, resulting in more than 8,000 data points. Scholars who are unfamiliar with nested data structures may be daunted by the task of organizing and analyzing these data. Here, we would caution against embarking on an ILD study without first gaining basic understanding of hierarchal linear models (sometimes referred to as multilevel models or mixed models; Bryk & Raudenbush, 1987), given that study design goes hand-in-hand with planned analytic approach. Further, a good understanding of the role of power and effects at both the within-person (e.g., daily responses) and between-person (e.g., adolescents) level will only enhance considerations tied to participant burden and compliance (Modecki et al., 2019). While a primer on nested models is beyond the scope of this chapter, we reference a number of keystone readings of potential benefit to the reader (Enders & Tofighi, 2007; Finch et al., 2019; Heck & Thomas, 2020; Hox et al., 2017; Raudenbush & Bryk, 2002).

One advantage of close consideration of planned analytic approaches when designing

ILDs is that without this, there can be a temptation to measure as much as possible without identifying specific research aims or questions a priori. As we continue to mention, taking full advantage of ILDs for understanding adolescent coping hinges on theory (Duvenage et al., 2019). However, it is also critical to consider expected relations at both the between-person and within-person levels (Fisher et al., 2018). One of the major challenges when it comes to coping is that high levels of coping, stress, and psychopathology tend to be intertwined. Hence relations between within-person constructs are unlikely to be similar in significance, sign, or magnitude to those observed between the same constructs at a between-person level (Gabriel et al., 2019).

In addition to more traditional hierarchal linear models, ILD data can also be leveraged for fitting personalized models, which have increasingly been advocated for within the psychopathology literature (Woods et al., 2020). These models treat the individual as the unit of analysis, studying the variability of individuals across time and contexts. Building on the excellent descriptions of personalized models in psychopathology, there are multiple reasons why considering these idiographic (i.e., N = 1) models could be useful when studying stress and coping (Wright & Woods, 2020). Within the ideographic approach, one's data are considered only relative to oneself (see Beck & Jackson, 2020). This may be especially relevant when assessing how coping relates to emotion or behavioral change, relative to one's typical state. Although ideographic models are growing in popularity in mental health research, a significant challenge is modeling a coping process that both maintains a consistent latent dynamic structure from child to child and – at the same time – also allows for idiosyncrasies at the observable individual level (Molenaar & Nesselroade, 2012). Notwithstanding challenges, the underlying idea here is that it is intraindividual patterns (observed within the same person over time) that are potentially key to understanding and predicting psychopathology among youth. This means that between-person models may be less useful and that idiographic techniques (where the sample size is N = 1) may be important for inclusion (see Beck & Jackson, 2020 in relation to EMA data). Such idiographic methods are generally captured under two umbrellas, those meant to reduce the data to a smaller, more manageable set of dimensions and which may be more familiar to researchers (e.g., P-technique factor analysis) and those meant to capture the complexity and help comprehend unique relationship patterns over time (e.g., graphical vector autoregressive [VAR] models, association techniques) (Beck & Jackson, 2020).

A key analytic development worth noting relates to this latter VAR category of models, using a multilevel version of the VAR model (McNeish & Hamaker, 2020). By leveraging time-series-based ILDs, approaches such as dynamic multilevel modeling (MLM) allow for quantitative between-person differences while also describing variability within-person (Hamaker et al., 2018). This approach is sometimes described as a middle ground between idiographic methods and more traditional psychological methods (i.e., nomethic methods) (Conner et al., 2009; Hamaker et al., 2018). In addition to MLM of individual-specific effects, dynamic MLMs leverage time-series modeling that allows for correlations due to proximity of observations, hence taking advantage of the time-based nature of ILDs (Asparouhov et al., 2018). For excellent primers related to dynamic MLMs, including dynamic structural equation modeling, we refer the reader to a number of relevant readings (Asparouhov et al., 2018; McNeish &

Hamaker, 2020; Hoffman & Walters, 2022; Ruissen et al., 2021).

Into the Future: Passive Sensing Measures and Other Indices of Coping

With the proliferation of smartphones and wearables across children's and adolescents' everyday life, researchers using ILDs are increasingly looking beyond self-report assessments of coping, stress, and related constructs to consider the new possibilities associated with using passive sensing and other mobile collections of psychological data (Duvenage et al., 2019; Odgers, 2019). These ILDs use digital platforms such as devices (e.g., smartphones) or wearables (e.g., Apple watch, Fitbits) to capture data on an individual's environment, stress responses, and unconscious behaviors (e.g., Gordon & Mendes, 2021; Wang et al., 2014). Indeed, there can be questions about whether individuals are fully aware of their coping efforts, and several theories of coping highlight the role of physiological responses to stressors that form part of adolescents' coping responses (Skinner & Zimmer-Gembeck, 2016). Although collecting physiological information to study stress responding is not new, it is now possible to repeatedly (and even continuously) measure physiological information with readily available passive sensing devices and apps made available on smartphones (e.g., Byrne et al., 2021; Zuleta et al., 2018).

As an example of using passive sensing, Wang et al. (2014) leveraged smartphone censor content related to young people's well-being and stress by collecting data on activity, sleep, and conversation for 10 weeks. Alongside university students' self-report of psychological symptoms, they found conversation frequency and duration were negatively related to depression and perceived stress. In another example, Byrne et al. (2021) collected affective text language via custom smartphone keyboards to examine links between perceived and lifetime stress, inflammation, and psychopathology. Twenty-five young adults were sampled twice across a college term during both an early time with few stressors and later during a time of high academic stress. Notably, associations between participants' use of affective language and stress were found, such that total positive words used, total negative words used, and total affective words used across the sampling period were highly correlated with lifetime stress exposure and moderately correlated with higher perceived stress and lower C-reactive protein levels (indicating higher inflammation).

Finally, in a particularly impressive large-scale study of over 20,000 individuals over 3 weeks (330,000+ daily responses), Gordon and Mendes (2021) measured stress, emotion, coping, and blood pressure, making use of the built-in optic sensor in smartphones to employ the MyBPLab app. Every third morning, participants responded to questions related to stress and coping resources and, every afternoon, participants responded to a different set of questions related to stress. Stress was operationalized as 1) demands and 2) a ratio of situational demands relative to individual resources to cope. Findings indicated that high demands and a ratio of high demands and low coping resources were both associated with higher blood pressure reactivity. This finding is consistent with predictions from the transactional model of stress and coping (Lazarus & Folkman, 1984, 1987) that distress (as indicated by physiological or other measures) will be more strongly associated with the congruence between situation demand and available resources, than only the perceived stressor demand. More broadly, this large-scale study and others point to the feasibility and utility

of incorporating passive sensing and app-based psychological reactivity assessments in studies of stress and coping.

Placing Coping within a Development Context

Some time ago, Skinner and Zimmer-Gembeck (2007) called for a "developmentally friendly" conceptualizations of coping, which involves "conceptualizations that provide theoretical links to other developing subsystems, guiding the investigation of how the development of components underlying coping combine to shape the emergence of new coping abilities at successive ages" (p. 121). We extend this notion and suggest that progress toward a genuinely developmental understanding of adolescent coping will benefit from not only ILDs but from the study of coping via the marrying of ILDs with *extended-time repeated measures designs* (i.e., those that measure coping and related constructs across critical windows of development, for example, from early to late adolescence). Both the use of ILDs and extended-time designs have implications for the types of questions that can be answered; extended-period longitudinal designs can provide researchers insights into how coping responses change across adolescence (either for individuals analyzed using person-centered approaches or across individuals, analyzed using variable-centered approaches), whereas ILDs inform researchers how coping occurs at a micro level in response to specific stressful experiences.

Extended-period longitudinal designs leverage typical ways of coping, making these designs beneficial for examining developmental change in coping over time within an individual (i.e., trajectories of change in active and internal coping; Seiffge-Krenke & Beyers, 2005). Indeed, developmentalists have long been making arguments related to studying processes at the individual level, as well as within-person associations (Molenaar & Lo, 2012: Molenaar & Nesselroade, 2012). However, to our knowledge, only a few studies have taken a within-person approach to longitudinal analysis and explored within-person youth coping trajectories (either as single latent trajectories or as multiple mixtures of different slopes, e.g., Ben-Eliyahu & Kaplan, 2015; Fisher et al., 2021; Jenzer et al., 2019). Researchers familiar with extended-time longitudinal designs might take advantage of ILDs and incorporate parallel assessment of coping microprocesses. Such "measurement burst" approaches have been taken in related fields such as emotion research. For example, Maciejewski et al. (2015) asked adolescents to complete 15 ILD studies across 3 years, with each ILD period lasting 3 weeks. Part of the design included a measure of mood via end-of-day reports. After calculating mood variability scores for each ILD period, growth curve analysis was used to determine the developmental trajectory of mood variability. Findings suggested that happiness, sadness, and anger variability decreased across adolescence (i.e., mood stabilization effects), whereas variability in anxiety initially increased between ages 13–15, decreased from 15–17, and increased again between ages 17–18. Measurements of mood variability were part of a 5-year longitudinal study, so the data could also be tested for interindividual differences in mood variability trajectories. Here, findings suggested significant interindividual differences (variance between adolescents) in the rate at which happiness variability decreased across adolescence. Using the same approach, researchers could sample coping microprocesses as they develop across sensitive periods of development. A key question is whether coping microprocesses change across adolescence (e.g., from pre- to early to mid-

adolescence). Changes (or stabilizations) in coping microprocesses could also be linked to individual-level (intraindividual) changes in adolescents' development. For example, it may be worth investigating intraindividual changes in psychopathology or emotion regulation capacity, both of which are shown to relate to coping.

Another pertinent question for the future is assessing the impact of intermittent versus cumulative stress or the type of patterning of daily versus major life events on adolescents' coping efforts. For example, Bolger et al. (1989) found that roughly 25% of days included more than one stressor, but the effect of stressors in multiple stressor days was less than the effect of a stressor happening on an independent day. Here, rather than experiencing an "overload" of stress, it may be the case that individuals carry a "set point" associated with one or multiple stressors within a day, which forms a ceiling on subsequent stress ratings. When considering the developmental stage of adolescence, it is worth wondering whether such a set point might *decrease* with maturation, alongside emotion regulation, for instance (e.g., Modecki et al., 2017). Likewise, there are many skills or resources that could be tested, for example mindfulness or decision-making, to identify those that lower the maximum daily stress experience rating.

Conclusion

Thirty years ago, Stone and Shiffman (1992) advised scholars to consider that coping episodes "have their topographies" (p. 123). This advice is still salient today as researchers increasingly take advantage of new technologies to collect intensive longitudinal data on stress, coping, emotion, and mental health with the aim of describing, testing, or explaining these microprocesses. Especially when studying adolescents, it has become increasingly common to capitalize on the widespread availability of smartphones to collect such data through active or passive (or both) techniques (Odgers, 2019). Whether scholars opt to collect data from youth via daily phone calls or texts, ESM self-report data, or in conjunction with passive sensing or physiological data such as those described here, numerous possibilities exist for mapping the terrain of stressors and coping. In other research, ILDs are also being used to extend other study designs (cross-sectional or longitudinal), which allow for the testing of hypotheses regarding features that can explain microprocesses or can more thoroughly study change and development over shorter and longer periods of time. This means that, for developmental scholars, now more than ever, design considerations must start with theory and existing definitions, acknowledging that exploring these data may also reveal where theories and previous findings need extensions and updates.

We direct the reader to Table 6.1, which refers to key points associated with this chapter. In summary, focusing on definitions of coping, we have introduced theory relevant to measuring the coping process and outlined some of the more typical approaches to coping measurement. We have also outlined how ILDs can enhance the study of coping microprocesses, followed by touching on some of the challenges associated with undertaking these studies in the field. We have further described several data considerations to weigh in conjunction with study design. We have also highlighted the utility of growing approaches using passive sensing and physiological measurement data collected via apps. Finally, we have sought to underscore the utility of bringing a developmental lens to marry it with the study of microprocesses addressed via ILDs.

Table 6.1 *Key points in the chapter*

• Intensive longitudinal designs (ILDs) can answer important questions about stress and coping	Cross-sectional survey studies of stress and coping have generally concentrated attention on (1) between-person differences in coping styles and coping efficacy, (2) psychosocial predictors and outcomes of coping. Longitudinal studies of stress and coping have typically concentrated on within-and-between person differences in coping across periods of development, and associated predictors and outcomes. Intensive longitudinal designs can add to this research by considering coping variability within or across contexts and by opening up opportunities to link coping responses to reactivity and recovery within a day or across days.
• ILDs can help to investigate coping processes	Cross-sectional and longitudinal survey research designs are useful for studying between-person associations between coping and other measures. With creative designs, they can also be used for person-centered analyses and studying within-person change. Data from ILDs can be analyzed in similar ways (e.g., regression frameworks, but using hierarchal linear models to address nesting within-person), and if designed well with attention to theory, measurement, and new analytical techniques, ILDs can describe dynamic elements of the stress-coping process at a *micro* timescale.
• The timescale is an important design issue to consider before using ILDs	Coping has most often been measured by gathering reports of typical ways of coping with recent stress either at one point in time or repeatedly using traditional longitudinal study designs. Intensive longitudinal designs can be used to measure stressful events and associated coping responses multiple times (20+) across a short period (e.g., multiple times a day, daily, weekly). Generally, the consensus is that timescales need to match theory, and that there needs to be a priori consideration of planned statistical approaches with a focus on good compliance in order to be able to adequately leverage time-based data.
• Measurement needs close attention when using ILDs to study stress and coping	Intensive longitudinal designs are not necessarily well-suited for wide, comprehensive measurement of ways of coping with stress. They tend to incorporate very brief versions of coping measures, although alternatives such as coding open-ended responses and passive sensing

Table 6.1 (*cont.*)

	collected via smartphones or other devices are possible. The limited length of surveys in ILDs is a trade-off for achieving the benefits of assessing dynamics and process.
• Advantages of ILDs	Intensive longitudinal designs offer enhanced ecological validity and reduced recall bias. ILD's afford greater ability to capture coping *microprocesses* and dynamic change, can be productively integrated with passive sensing, and are easily deployed through smartphone technology.
• Disadvantages of ILDs	Intensive longitudinal designs generate large amounts of nested data so that knowledge of hierarchical models for assessing change is needed. Designs can risk mis-specifying the length of time to capture a full coping episode so that theory is especially important. Few self-report measures specific to coping have been thoroughly validated for use at the micro-timescale.

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7 Resilience and Coping in Development

Pathways to Integration

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Introduction

Concepts of coping and resilience have an intertwined history in the sciences concerned with human adaptation in the context of everyday challenges of life as well as traumatic experiences. Yet the foci of these two traditions of research reflect a number of differences. In this chapter, we compare concepts and findings in the study of human resilience with the perspectives and findings in the coping literature and consider the potential benefits of integrating these related bodies of work. In the first section, we discuss the shared historical roots of these two concepts and highlight similarities and differences in the research used to advance these lines of inquiry. In the second section, we describe and compare contemporary definitions of resilience in relation to coping. In the third section, we discuss recent progress toward contextualizing these constructs in sociocultural context, including racism and discrimination. In the fourth section we suggest a possible framework for integration and the chapter concludes with a discussion of future directions for conceptual development and empirical research to advance the goal and benefits of an integrated perspective on coping and resilience. The key points in the chapter are summarized in Table 7.1.

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Shared Roots of Research on Resilience and Coping

Ideas about coping as well as resilience have early roots in psychoanalytic theories about adaptation, the ego, and defense mechanisms (e.g., dating to the works of Sigmund Freud, Anna Freud, and Heinz Hartmann, among others); the development of competence and mastery motivation (Robert White); and developmental studies of risk and vulnerability by Lois Murphy and her colleagues, as well as Claire Kopp, Jack and Jeanne Block, and Arnold Sameroff, among numerous others (Lazarus & Folkman, 1984; Masten & Coatsworth, 1995; Masten & Garmezy, 1985). Murphy and her colleagues (Murphy & Associates, 1962; Murphy & Moriarty, 1976), in their classic volumes on coping, dated their interests in coping to the 1930s, culminating in their longitudinal studies of coping in young children at the Menninger Clinic in Topeka, Kansas (USA). Similarly, Norman Garmezy, Michael Rutter, Emmy Werner, Ann Masten, and others trace early ideas about resilience to the same general body of historical psychological theories (Garmezy, 1983; Masten, 1989; Masten et al., 1990). Conceptual histories of coping and resilience also highlight the influence of World War II in bringing attention to the effects of traumatic experiences and efforts to facilitate recovery from wartime trauma (Garmezy & Rutter, 1983; Lazarus & Folkman, 1984; Masten, 2014; Murphy & Moriarty, 1976).

Table 7.1 *Key points in this chapter*

- Early definitions of coping and resilience overlapped in a number of ways, including their concern with adaptation and the processes by which individuals adapt to challenges.
- Resilience is defined as the capacity of a dynamic system to adapt successfully through multisystem processes to challenges that threaten system function, survival, or development; thus, the resilience of an individual depends on the resilience of many other systems and processes internal and external to that person.
- Whereas coping typically refers to efforts by individuals to respond to everyday challenges, contemporary definitions of resilience are broader and more focused on multisystem processes yielding successful adaptation to significant acute or chronic adversities.
- Although theoretical and empirical considerations of culture and context were limited in early literatures on both coping and resilience, incorporating the role of culture and context in research on coping and resilience is crucial because sociocultural beliefs and traditions infuse the interpretation of adversity and successful adaptation, and profoundly influence the development and implementation of coping strategies as well as many processes that contribute to resilience.
- Marginalized families and children must develop distinct coping strategies to deal with various contextual demands and experiences of oppression, racism, discrimination, and segregation. These coping strategies are rooted in cultural histories, legacies, and traditions that differ from those typically identified among mainstream (more privileged) groups and contribute independently to resilience and well-being.
- For marginalized youth and families, utilizing coping strategies that are not in line with cultural legacies, norms, and values may lead to harmful responses and developmental outcomes.
- Resilience science has shifted to a multisystem framework, which focuses on individuals, families, schools, communities, and social-ecological systems. Examples of protective factors across these systems include positive and trusting relationships; a sense of security, belonging, or cohesion; a sense of agency, purpose, or meaning; hope or optimism; positive views of the self, family, or group; and positive routines, rituals, and traditions.
- Although the coping literature currently lacks a cohesive conceptual framework spanning multiple systems and levels of functioning, coping theory and research could be expanded to integrate multisystem models, which would foster the alignment of coping science with emerging multisystem models of resilience.
- The integration of coping and resilience science has the potential to advance theory and improve research and its translation into practice and policy by elucidating the processes linking individual adaptation to historical, cultural, and ecological contexts, as well as the adaptive capacity and coordinated functioning of systems beyond the individual. This knowledge could inform interventions and efforts to prepare for large-scale threats posed by epidemics, disasters, and political conflicts.

Early definitions of coping and resilience overlapped in a number of ways, but also showed some differentiation. Both concepts were concerned with adaptation and in particular with processes by which individuals adapt to challenges. In their early definition of coping, Lazarus and Folkman (1984) defined coping as "constantly changing cognitive and

behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (p. 141). Compas et al. (2001) defined coping as "conscious and volitional efforts to regulate emotion, cognition, behavior, physiology, and the environment in response to stressful events or circumstances" (p. 89). Rutter (1983) described coping in terms of individual differences in the ways people respond to stressful events or situations, including efforts toward problem-solving and regulating emotional distress, which could be effective or maladaptive. In contrast, resilience referred to the phenomenon of doing well in the context of experiences known to pose risks to adaptation in the general population. In a footnote, Rutter noted, further, that while coping usually refers to the behavior of individuals, for children, "it may be at least as important to consider the coping process in terms of family styles and strategies" (p. 27). Rutter also noted that group responses are not necessarily the sum of individual responses. Masten et al. (1990), in an early review of the resilience literature, wrote that the concept broadly encompassed "the process of, capacity for, or outcome of successful adaption despite challenging or threatening circumstances" (p. 426). All of these definitions distinguished both traditions from research focused solely on positive psychology or normative development (when there is minimal discussion on variations in how individuals adapt to challenges and adverse experiences), as well as research focused on risks and psychopathology (which often overlooked the processes that could result in mental health and well-being despite risk or adversity).

Literatures on coping and resilience both distinguished among (1) resources available to be utilized for adaptation (e.g., access to human, economic, or social capital), (2) strategies or ways of adapting (efforts and actions taken to adapt, such as problem-solving, emotion regulation, or seeking help), and (3) outcomes (results) of adaptive efforts (e.g., competence, mental health, successful adaptation). Both traditions acknowledged the importance of experience, learning, socialization, and development in theories about coping or resilience, reflecting a dynamic systems perspective (Eisenberg et al., 2009; Masten, 2007; Rutter, 2012; Skinner & Zimmer-Gembeck, 2007). Additionally, as one would expect, definitions of these concepts evolved over time.

Definitional changes in both traditions correspond to an infusion of developmental systems theory in studies of human development and adaptation (Masten & Cicchetti, 2016; Zimmer-Gembeck & Skinner, 2016). Changes in both traditions reflect growing attention to multiple levels of analysis, transactional interactions among interconnected systems shaping behavior, the complex neurobiology of human responses to challenges, and a growing body of research concerned with cultural variations and human behavior in more diverse social-ecological contexts, including the Global South (Masten et al., 2021; Ungar & Theron, 2020; Zimmer-Gembeck & Skinner, 2016).

Nonetheless, there were and continue to be notable differences in the foci and methods characterizing these two research traditions concerned with adaptation to challenges in human development. Coping historically referred to efforts by individuals to respond to everyday challenges, or in other words "coping research is distinguished by its focus on what children actually do … in dealing with specific difficulties in real-life contexts" (Skinner & Zimmer-Gembeck, 2007, p. 120), whether or not those efforts are successful. Some scholars defined coping with reference to processes of emotion regulation or self-regulation in response to stress (see Compas

et al., 2017; Eisenberg et al., 2009). Resilience definitions typically were broader and more focused on processes yielding successful adaptation to significant adversities of many kinds, both acute and chronic (Masten & Garmezy, 1985; Murphy & Moriarty, 1976). Most notably, however, resilience research included protective processes embedded in relationships and support from sociocultural systems beyond the individual, perhaps because many of the pioneers in resilience science were trying to understand diverging pathways among children known to be at risk for psychopathology (Masten & Cicchetti, 2016). These pioneers were focused on understanding the striking variation in outcomes among groups of children known to be at high risk for mental health and behavioral problems and making sense of their observations that some children developed well despite adversity or risk exposure.

Contemporary Definitions of Resilience in Relation to Coping

Over time, the influences on resilience science of developmental systems theory and multisystem theory and methods, spanning multiple levels of analysis and multiple disciplines have continued to expand (Masten, 2018; Masten et al., 2021; Ungar, 2018; Ungar & Theron, 2020). At the same time, concerns continue to rise related to global threats to human lives and development, including natural disasters and climate change, violence and displacement related to war and political conflict, structural racism and marginalization, poverty and maltreatment, epidemics and the COVID-19 pandemic. Moreover, evidence of potential lifelong effects of these hazards and risks on human health and development have grown (Gone et al., 2019; Sanson et al., 2019; Shonkoff et al., 2012, 2021; Yoshikawa et al., 2020). It is not surprising that this confluence of concerns motivated a surge of interest and research on resilience and a growing realization that prevention, preparing, and responding to these threats to human life and development required a more integrated and multisystem approach (Liu et al., 2017; Masten, 2014, 2018, 2021; Ungar, 2018, 2021).

Contemporary definitions of resilience in developmental science reflect the shift to more integrated multisystem models that encompass molecular to large-scale sociocultural systems and the goal of harmonizing definitions of resilience for scalability across levels and portability across disciplines (Masten, 2014, 2018; Masten et al., 2021; Ungar, 2018). From this perspective, *resilience* can be defined as the capacity of a dynamic system to adapt successfully through multisystem processes to challenges that threaten system function, survival, or development (Masten, 2018; Masten et al., 2021). This and similar definitions (see Masten et al., 2021 for examples) align well with definitions of resilience in ecology, family science, and disaster research, as well as in psychology. These definitions are intended to be applicable to many systems within an individual (e.g., immune system), a whole person or other living system, and the many other types of complex adaptive social-ecological systems that surround and shape individual development and the development of life in this biosphere (e.g., families, economies, communities, human organizations).

Fundamental to emerging multisystem models of resilience are the following assumptions about individual resilience:

- Resilience is dynamic, continually changing as a result of development and changes stemming from interactions of many systems at multiple levels over the life course.
- Resilience changes on different timescales. Generally, resilience gradually increases as human individuals mature, gain human

and social capital, and learn from experience over the life course, and then eventually declines as part of the normal aging process. However, resilience also fluctuates on shorter timescales due to proximal conditions of stress, exhaustion, illness, sleep, nutrition, workload, availability of help, and numerous other short-term changes that can influence adaptive capacity.

- Resilience of an individual depends on resilience of many other systems and processes internal and external to that person.
- There are common resilience factors identified in diverse studies of individuals who adapt well by specific criteria in the context of a wide variety of adversities, suggesting there are fundamental adaptive systems and processes driving human resilience.
- There are striking similarities and alignments across system levels involving human interactions, with respect to resilience factors and processes implicated in studies of resilience in families, schools, communities, organizations, and cultural traditions, suggesting that similar processes may be operating across system levels, potentially reflecting the possibilities of biocultural coevolution of human adaptive systems and a multilevel organization of resilience processes that influence capacity of human-connected systems to adapt well to challenges.
- Resilience can be nurtured through socialization and learning and also bolstered by experience of adaptation to challenges or interventions designed explicitly to build resilience.
- Multisystem disasters, such as the COVID-19 pandemic, require multisystem mobilization to mitigate risks, boost resources, and mobilize adaptive systems at multiple levels.

Investigators who study resilience often focus on two or more levels of analysis, such as protective effects of sensitive caregiving or effective parenting (relational level) against the negative consequences of trauma exposures on brain development or stress-regulation systems (neurobiological levels) and executive function skills (behavioral levels). Often the goal is to explain the variation in adaptive functioning or development among individuals who have experienced significant challenges, with an eye toward identifying malleable processes that contribute to resilience and could inform strategic interventions or policies to promote positive adaptation.

Many targets of intervention are conceivable but identifying movable and practical levers for change with the right developmental timing poses daunting challenges. Nonetheless, humanitarian agencies and policymakers are working toward aligning interventions across systems and levels in an effort to generate more lasting and synergistic salutary effects on development. For example, early childhood programs often combine strategies to improve nutrition, housing, health care, parent–child interaction, and access to early childhood education in a multisystem effort to build a strong foundation for subsequent development (Huebner et al., 2016; World Health Organization et al., 2018).

As the concept of resilience shifted explicitly to a multisystem framework (Masten et al., 2021; Ungar, 2018), its focus became more distinct from the concept of coping. Growing attention on the interactional influences of multiple social-ecological systems on individual development in resilience science increased the differentiation of resilience from coping in terms of breadth and focus (regarding levels and systems studied). Nonetheless, many of the processes implicated by the research on individual coping and resilience remain similar. For example, salient resilience factors (or rather, the adaptive systems and processes they represent) for individual children and youth identified in reviews of resilience (e.g., Masten, 2007; Ungar & Theron,

2020) resemble the adaptive processes often identified and studied in research on coping (Murphy & Moriarty, 1976; Taylor & Stanton, 2007; Zimmer-Gembeck & Skinner, 2016). These include attachment relationships and other forms of social support, agency and mastery motivation, optimism, and self-regulation. Moreover, both traditions highlight conditions that foster development of these adaptive systems and serve to nurture more adaptive forms of these important tools for meeting the challenges of everyday life as well as major adversities.

Summary: The broad concepts of resilience and coping historically have overlapped in important ways. When these concepts are applied to individual human behavior, both concepts refer broadly to adaptation under challenging circumstances. Many of the adaptive processes studied in research on resilience and coping are similar, such as attachment, agency, and self-regulation. Both traditions recognize that the capacity and skills for resilience or coping develop and change over the life course, both from basic developmental processes and also from experience, and are to a considerable extent malleable with experience, and thus amenable to training or intervention. Nonetheless, recent shifts in resilience theory have increased the differentiation of these conceptual cousins. Resilience theory has shifted toward a multisystem framework emphasizing the interconnectedness and dependence of individual resilience on resilience embedded in connections to other ecological systems. In contrast, coping theory continues to focus on individual functioning.

Progress in the Sociocultural Contextualization of Resilience and Coping

Coping and resilience traditions both recognized the role of culture and context in coping or resilience processes and the need for research on processes unique as well as similar in different cultures or socioecological context (Luthar, 2006; Murphy & Moriarty, 1976; Wright et al., 2013; Zimmer-Gembeck & Skinner, 2016). However, both literatures were criticized for early neglect in research of cultural variations and context in theory and empirical studies (Kuo, 2011; Luthar, 2006; Masten, 2014; Panter-Brick & Leckman, 2013; Ungar et al., 2013).

Early theory and research on resilience and coping in mainstream psychology and psychiatry were dominated by a focus on populations in more economically developed regions of the world and majority populations within those regions, with little attention to the influences of sociocultural or historical context, structural racism, or cultural diversity. There were notable exceptions, including the report by Werner and Smith (1982) on their longitudinal studies of a birth cohort born in 1955 on the Hawaiian island of Kauai and followed for decades; these investigators always provided a rich account of the historical and sociocultural context of the study participants, place, and cultural traditions. Nonetheless, theoretical considerations of culture and context were limited, and there were relatively few studies of resilience or coping in lower-income countries, generating the criticisms articulated in critical reviews of these literatures already noted. Concomitantly, there was little attention to the role of cultural values, beliefs, socialization practices, discrimination, or oppression on resilience or coping, either in the North American and European research dominating publication in journals, and even less attention to sociocultural variations across the world.

Over the past two decades, there has been dramatic progress in addressing sociocultural and historical influences on adaptive behavior and socialization, spurred by growing

attention on the role of contextual influences on human adaptation and development and the growth of research among more diverse populations (Gone et al., 2019; Motti-Stefanidi, 2018; Panter-Brick, 2015; Sanders et al., 2017; Scott et al., 2020; Ungar & Theron, 2020). As attention to culture and context in resilience and coping increased, appreciation for scholarship addressing issues related to socialization and the development of adaptive strategies in the context of oppression and discrimination expanded. Theoretical contributions by Garcia Coll and colleagues (1996), Gordon, Wang, and their colleagues (Taylor & Wang, 2000; Wang & Gordon, 1994), and Spencer and her colleagues (1997), among other influential scholars, were harbingers of change.

The failure to investigate how various cultural and contextual processes influence coping and resilience reflects a long-standing tendency in mainstream psychology to focus on individual-level factors and processes rather than understanding how these processes interact with social-ecological systems to contribute to human functioning and adaptation. However, incorporating the role of culture and context in research on coping and resilience is crucial because sociocultural beliefs and traditions influence the development and implementation of coping strategies (Aldwin, 2004; Garcia Coll et al., 1996; Kuo, 2011; Spencer et al., 1997) and also provide the parameters for what should be defined as successful or resilient adaptation (Liebenberg et al., 2013; Ungar et al., 2013) or a "good life" or "honorable life" (Panter-Brick, 2015). Cultural and contextual influences also shape the nature and intensity of stressors individuals face, how individuals appraise a specific stressor, and the resources or mechanisms they consider to ameliorate or combat these stressful experiences (Aldwin, 2004; Kuo, 2011). In addition, research on cultural development and adaptation may serve as a pathway for integrating concepts of coping and resilience.

Development of Coping and Resilience in Children from Marginalized Ethnic and Racial Groups

In contrast to the neglect of sociocultural influences on adaptation in much of the early literature on resilience and coping in North America, investigators who studied the development of children in marginalized ethnic-racial subgroups have highlighted the influence of culture, racism, and discrimination on coping and resilience (Garcia Coll et al., 1996; Murry et al., 2018; Spencer et al., 1997). For example, in a classic paper, Garcia Coll and colleagues (1996) proposed a theoretical model indicating that marginalized families and children must develop different cultural traditions and coping strategies to deal with various contextual demands and experiences of oppression, racism, discrimination, and segregation.

According to Garcia Coll et al.'s theoretical model, social position and stratification processes such as prejudice, racism, and segregation affect an individual's development and adaptation. These cultural stressors and social inequities lead to environments that either promote or inhibit youth's adaptation and require marginalized populations to adopt coping strategies that will increase cultural pride and positive views of themselves and combat messages that devalue their culture, race, and ethnicity. These coping strategies are rooted in cultural histories, legacies, and traditions that differ from those typically identified among mainstream (more privileged) groups. For example, in addition to the coping responses of cultural groups in power, such as problem-focused and emotion-focused coping strategies, marginalized families and youth must learn how to cope with experiences of racism

and discrimination and how to navigate their interactions with individuals from the dominant culture. For example, young Black/African American children are often taught by their parents to suppress their negative emotions (e.g., anger, frustration) when interacting with authority figures and in social settings because the expression of negative emotions are often perceived as aggressive and threatening to individuals from the dominant cultural group (Dunbar et al., 2017).

Similar to Garcia Coll et al. (1996)'s theoretical model, Spencer and her colleagues (1997) developed the phenomenological variant of ecological systems model to highlight the impact of cultural risk factors and environmental demands on the adaptation of marginalized youth. However, Spencer et al. (1997) argued that it is not only the experience of the cultural stressor that matters, but the meaning and interpretation attached to these cultural experiences are equally important. The authors noted that different cultural contexts and experiences influence how we interpret and perceive ourselves. The appraisal of our environments and the meaning we ascribe to our experiences are linked to the amount of stress we perceive, which in turn affects the type of coping responses or methods (i.e., reactive or stable) we adopt to navigate these environmental or contextual challenges.

Coping and Resilience in Immigrant Youth

Forming and maintaining social identities is a crucial part of development (Erikson, 1968). Identity development usually occurs in adolescence and emerging adulthood when youth experience advances in their cognitive ability and are forging autonomy by establishing relationships with new peers and making direct contacts with social networks and institutions outside their family environment (Casey et al., 2019; Erikson, 1968; Motti-Stefanidi, 2015). Navigating these developmental periods requires youth to adopt new coping skills and strategies. In particular, youth and families with multiple identities must develop a myriad of coping strategies to navigate stressors associated with their marginalized identities. For instance, immigrant youth often utilize coping strategies to deal with ethnic-racial discrimination and additional stressors associated with adapting to a new culture, such as learning a new language or customs (Sirin et al., 2013, 2019). Processes of negotiating and navigating among social and cultural demands of two or more cultures by individuals (or cultural groups) represent "acculturation" (Berry, 2005; Suárez-Orozco et al., 2018), whereas "acculturative stress" generally refers to stress or distress experienced by individuals who are learning to navigate differences between their native and host cultures (Sirin et al., 2013). Acculturative stress usually occurs when individuals try to negotiate and manage conflict between two cultural groups that may have incompatible cultural beliefs and values or when dealing with experiences of ethnic-racial discrimination, anti-immigration attitudes, and xenophobia (Sirin et al., 2013; Suárez-Orozco et al., 2018).

Immigrants utilize multiple coping strategies, including those that are commonly used by other marginalized cultural groups such as ethnic-racial socialization (Motti-Stefanidi, 2018; Suárez-Orozco et al., 2018). However, research has shown that immigrant youth and their families also adopt new coping skills that are specific to the acculturation process. These coping techniques are known as acculturation strategies. According to John Berry's acculturation model (Berry, 2005), individuals usually try to reduce acculturative stress by either (1) adopting the cultural values of both their native and host cultures (i.e., integration), (2) retaining the cultural values of the native

culture and rejecting the cultural values of the host culture (i.e., separation), (3) rejecting the cultural values of the native culture and adopting the cultural values of host culture (i.e., assimilation), or (4) rejecting the cultural values and norms of both cultures (i.e., marginalization).

Integration requires the ability to "code-switch" or "cultural frame switch" between cultural environments (Huynh et al., 2011). In North America, individuals who are effective at switching their behavior to successfully meet the demands of multiple cultural contexts tend to be better adapted (Ferguson et al., 2012; Suárez-Orozco et al., 2018). However, research in European countries such as Greece, which favor efforts by immigrants to assimilate, have shown that assimilated youth tend to fare better and report lower incidents of ethnic-racial discrimination (Motti-Stefanidi, 2019).

Ethnic-Racial Socialization, Coping, and Resilience

One of the culturally grounded processes shown to promote adaptive coping and resilience among marginalized youth is ethnic-racial socialization (Umaña-Taylor & Hill, 2020). Ethnic-racial socialization refers to processes by which caregivers and other socialization agents convey an understanding to children about their racialized experiences (Hughes et al., 2006). Ethnic-racial socialization is a developmental process that promotes ethnic-racial identity and can potentially protect youth from discrimination and race-related stress (Rivas-Drake et al., 2014). Ethnic-racial socialization encompasses the transmission of cultural values, traditions, and pride (i.e., cultural socialization), teaching youth skills to cope with discriminatory experiences (i.e., preparation for bias), advocating the wariness of interracial interactions (i.e., promotion of mistrust), and avoidance or silence about racial issues (i.e., egalitarianism; Hughes et al., 2006; Neblett et al., 2012).

Some dimensions of ethnic-racial socialization promote more stable and adaptive patterns of coping (i.e., cultural socialization), whereas other components are seen as more reactive. For example, preparation for bias tends to be viewed as a reactive coping strategy because parents do not often engage in these messages until youths have been exposed to discriminatory experiences (Anderson & Stevenson, 2019). Nevertheless, research has shown that both ethnic-racial socialization and one of its important by-products, ethnic-racial identity, are associated with positive academic, cognitive, health, and socioemotional outcomes in marginalized youth and adults (Neblett et al., 2012; Rivas-Drake et al., 2014; Wang & Huguley, 2012; Yasui et al., 2015).

Ethnic-racial socialization is directly linked to resilience and positive adaptation; however, ethnic-racial socialization also promotes other culture-specific coping practices (Blackmon et al., 2016; Cunningham et al., 2018; Utsey et al., 2007). For example, research has shown that ethnic-racial socialization is related to Africultural coping strategies, which are grounded in African cultural values and traditions. Africultural coping strategies entail cognitive/emotional debriefing (i.e., regulation of emotional responses via distraction, avoidance, or active problem-solving skills), spiritual-centered coping (i.e., believing in God or a higher power to manage stress or adversity), collective coping (i.e., connecting and relying on family members and one's social networks to deal with stress and adversity), and ritual-centered coping (i.e., engaging in rites and rituals to cope with stress and adversity; Blackmon et al., 2016; Utsey et al., 2007). Compared to mainstream coping strategies, Africultural coping focuses more on the

collective rather than the individual (Daly et al., 1995). Reactions to recent incidents of police brutality have highlighted the use of these coping methods in the Black/African American community. Research has shown that these culture-specific coping strategies and sociocultural supports are independently related to resilience and well-being when compared to other mainstream coping skills (Clauss-Ehlers, 2008; Utsey et al., 2007).

Potential Costs of Coping and Resilience among Marginalized Groups

In research on adaptation to adversity among marginalized Americans, the concept of John Henryism emerged to explain a specific pattern of cultural adaptation among Black and low-income individuals to psychosocial stress. John Henryism is a reactive coping strategy that involves high-effort coping and a single-minded determination to succeed despite experiences of adversity (James, 1994). The concept of John Henryism is based on the African American folktale of a steel worker who won a contest against a steel drilling machine but died shortly thereafter from physical exhaustion. John Henryism represents the ability of Black/African Americans to strive emotionally and socially in the face of adversity despite ongoing physiological wear and tear on their bodies (Brody et al., 2013; James, 1994).

Although John Henryism is a common coping strategy utilized by some Black/African American individuals, research suggests that this coping strategy is not consistent with African cultural beliefs and values. For example, Blackmon and colleagues (2016) found that African American heritage and cultural values were negatively related to John Henryism. The researchers argued that this could be attributed to the fact that African American cultural messages are focused on the collective and respect of authority figures, whereas John Henryism represents a more individualistic style of coping (Blackmon et al., 2016). These findings support theoretical work suggesting that coping strategies that are not in line with cultural legacies, norms, and values may lead to harmful responses and developmental outcomes (Garcia Coll et al., 1996; Spencer et al., 1997).

For marginalized groups, adhering to traditional ways of coping (i.e., problem-focused coping versus emotion-focused coping) rather than adopting culture-specific coping strategies in response to structural inequities and racism may also lead to internalized racism. Internalized racism is an individual's internalization and acceptance of the dominant cultural group's negative messages and stereotypes about their ethnic-racial group's abilities and worth, while simultaneously rejecting their own cultural values and beliefs (Bailey et al., 2011; Berman & Paradies, 2010; Jones, 2000). Empirical research has shown that internalized racism is a risk factor for poor adaptation among Black emerging adults (Sosoo et al., 2020) and one of the mechanisms through which ethnic-racial discrimination and other race-related experiences influence adjustment (Graham et al., 2016).

More research on internalized racism and coping is needed to understand the specific coping strategies that are associated with adaptation in marginalized youth. It will be important in future research, for example, to investigate how internalized racism is related to both mainstream and culturally specific coping strategies. More specifically, research can examine whether individuals who endorsed experiences of internalized racism are more likely to utilize maladaptive coping strategies such as John Henryism or more mainstream coping strategies compared to culturally specific coping styles. Given that individuals who exhibit internalized racism tend to

reject their cultural values and internalize negative messages by the dominant cultural group, it is essential that research elucidate the coping mechanisms through which internalized racism leads to positive adaptation or maladaptation.

Summary: Theoretical and empirical considerations of culture and context are crucial to the developmental understanding of coping and resilience. This is especially important for marginalized youth and families who must adopt multiple coping strategies to deal with the contextual demands of racism, poverty, and other structural inequities. Utilizing mainstream coping strategies may be beneficial to marginalized youth, but additional culture-specific coping strategies are essential for their development and adaptation. Therefore, it is important for researchers and clinicians to develop intervention programs that will promote adaptive coping behaviors in marginalized youth, but also engage in collective action that will lead to societal change and transformation (Wadsworth et al., 2018).

Pathways to Integration of Resilience and Coping Science

Recent conceptualizations of coping (Compas et al., 2017; Zimmer-Gembeck & Skinner, 2016) suggest that coping theory and research can be aligned with developmental research on both resilience and psychopathology. Coping concepts reflect fundamental processes of adaptation leading to different pathways of adaptive functioning. Cascading consequences result from differential experiences, individual vulnerabilities, developmental history and timing, adaptive skills and resources, protective influences, exposure to trauma, and so forth. This perspective suggests that pathways to integration of the coping and resilience traditions may emerge from applications of developmental systems theory to human development and its variations considered in sociocultural, historical, and ecological context. As noted by Compas et al. (2017), "understanding the development of skills to regulate emotions and cope with stress across childhood and adolescence is central to understanding sources of risk and resilience and for the development of interventions to enhance these skills" (p. 975).

Although coping and resilience both focus on processes of adaptation to challenges and their development, coping concepts and research have primarily focused on how individuals interact with challenges of daily life and manage stress, whereas resilience research focuses more broadly on how multiple systems afford the capacity for individuals to adapt successfully to challenges, supported by the operation of many systems (within and outside the individual) in concert. Coping research often focuses more than resilience on daily types of stressors, or what Zimmer-Gembeck and Skinner (2016) refer to as "everyday resilience" whereas resilience science focuses more attention on trauma, cumulative risk and adversity, and processes of overcoming chronic disadvantages or threats to healthy development that are significant enough to alter the course of development in potentially lasting and harmful ways. However, some scholars, including Compas, have defined coping more broadly to encompass processes that occur in response to diverse stressors, including "acute life events, chronic stressors, daily hassles, and conditions of chronic adversity" (Compas et al., 2017, p. 942). Compas and colleagues (2017) also describe coping as playing a primary role in the development of resilience and concomitant risk reduction for psychopathology in childhood and adolescence. We agree and suggest that this perspective points to the possibility that a deeper alignment and integration of these two traditions is feasible.

Multisystem Framework for the Study of Resilience

From the perspective of contemporary resilience theory and research, perhaps the most notable difference in the current state of these two traditions of theory and research on adaptive processes in the context of adversity is the rapid and marked shift of resilience science toward a multisystem framework (Masten, 2021; Masten et al., 2021; Ungar, 2021; Ungar & Theron, 2020; Walsh, 2016, 2020). This can be observed in resilience science focused on individuals, families, schools, communities, and social-ecological systems. This shift goes beyond considerations of the social-ecological context in which an individual is developing (e.g., the influences of families, peers, schools, community organizations, culture, and other aspects of context on individual coping), to consider resilience at other systems levels (e.g., family resilience, community resilience) and the processes that may operate across levels related to the profound interdependence of resilience across systems.

Masten and colleagues (Masten et al., 2021) have noted the parallels in resilience factors and processes identified at different system levels concerned with human adaptation to adversity. Individuals, families, schools, and communities can all be viewed as complex and dynamic adaptive systems. In the literature on resilience in youth, families, schools, and communities, similar protective factors have been identified as important for resilience in the context of adversity (Masten et al., 2022; Norris et al., 2008; Ungar & Theron, 2020; Walsh, 2016; Wright et al., 2013). Examples include positive and trusting relationships; a sense of security, belonging, or cohesion; a sense of agency, purpose, or meaning; hope or optimism; positive views of the self, family, or group; and positive routines, rituals, and traditions. These common resilience indicators are believed to reflect the functioning of highly complex and dynamic systems that may have coevolved over the course of biological and cultural evolution because they facilitate survival of individuals and groups under diverse conditions. There is intense interest in discovering how these resilience processes develop and may operate synergistically to promote resilience, not only because the indicators of resilience are so similar across system levels, but also because they often co-occur, both within the lives of individuals and across levels. Norris and colleagues described a network of adaptive capacities in their community resilience framework. Developmental scientists are now developing strategies of modeling networks of resilience that shape human development (e.g., Höltge et al., 2021).

Components of a Multisystem Framework for the Study of Coping

Although coping has been considered at other systems levels (e.g., family coping, community coping), there are few systematic efforts to develop a multisystem framework of coping, although the components can be observed in the literature. The concept of family coping has a long history (see McCubbin, 1979), and recent literature is beginning to consider how the coping of a family is related to individual coping. Stroebe and Schut (2015), for example, discuss the transactional effects of family and individual coping in the situation of bereavement. Noting that there is a "huge gap" between the individual and family approaches to coping with bereavement, these authors propose a family level adaptation of their dual-process model of coping with bereavement originally developed for individual grieving, in an effort to address this gap. The proposed model is a multisystem model of coping that connects processes in the

individual and family, noting parallel processes. The new model simultaneously considers individual- and family-level coping and how they may influence each other. They delineate processes at an integrated level as well as at the individual and family levels.

Coping at the community level is probably best captured by theory and research on disaster response and preparation, although distinctions between coping and resilience are lacking (Norris et al., 2008; Paton & Johnston, 2017). In the context of community response, coping can refer to deliberate collective efforts by communities to prepare or respond to threats posed by "all hazards" or specific threats in a particular region, such as flooding, fire, tornadoes, or other forms of disaster. Norris and colleagues (2008) referred to community resilience as a set of networked adaptive capacities, noting that resilience depends on both resources and their dynamic attributes or the capacity to mobilize what is needed to prevent or address threats posed by forecasted, current, or past calamities. There also is a considerable and understandably growing literature on coping with threats of climate change, such as drought (Tortajada et al., 2017).

Concepts of coping as system-level behavior also are evident in the literature on efforts by schools, organizations, governments, and businesses to cope with stress. Rodriguez and colleagues (2019) describe the emergence of organizational-level approaches to coping over the past quarter century, when the idea of "team coping" or "collective coping" and organizational climate became an important topic of discussion, extending the concept of coping to other levels beyond the individual. Rodriguez et al. (2019) also highlight growing attention to the interplay of individual and collective coping in organizations or what they term "co-active coping" and the importance of pursuing an organizational-level approach to stress and coping research in the workplace and schools. These authors also note the fragmented quality of the literature on coping as applied to organizations. Nonetheless, schools, businesses, and other community organizations are expected to have plans in place for coping with threats, such as terror attacks, tornadoes, active shooters, and fires. The National Child Traumatic Stress Network has numerous handouts to download for parents and educators on responding to such threats, such as "Helping Your Family Cope: For Parents" or "Creating School Active Shooter/Intruder Drills."

Multisystem Framework as a Basis for Integrating Resilience and Coping

What is missing in the coping literature – and only recently garnering attention in the resilience literature – is a cohesive conceptual framework spanning multiple levels and systems. The fundamental concepts of coping appear to be applicable to many systems of human life and development, including families, schools, communities, and many kinds of organizations. The interplay of these systems undoubtedly influences the effectiveness and development of individual coping processes. There are a number of bright spots to guide the way, notably theories and studies of emotion socialization and the role of caregiving in the development of child coping. There is much work yet to be done, but the case for integration is compelling.

The COVID-19 pandemic has underscored the importance of understanding coping and resilience across multiple systems and levels of human functioning, from individual to families to schools and communities, and global organizations, such as the World Health Organization, stock markets, and businesses that manufacture and distribute vital commodities. These systems are influenced by myriad coping processes at multiple levels,

individual and collective. Pandemic effects also have revealed profound economic, health, and access disparities and vulnerabilities, along with enormous gaps in global preparedness for responding effectively to mass-casualty, cascading disasters. As a result, the pandemic has highlighted the urgency of integrating knowledge on multisystem resilience and related domains of research, including coping.

Summary: The coping literature can be unified with resilience science under an umbrella of multisystem adaptation to challenges over the human life course. A concerted effort to align coping and resilience theory and research could prove to be illuminating for efforts to improve adaptation to many life-threatening stressors that will be confronting human life and development for the foreseeable future. Coping research offers numerous insights into potentially malleable processes of appraisal and effective strategies for managing maladaptive responses to stress. Many examples are provided in this volume.

Conclusions and Future Directions

Resilience and coping literatures represent rich and overlapping traditions focused on understanding how individuals adapt to stressful experiences and challenges and how these processes develop and change over the life course. Both traditions have evolved over the decades toward more dynamic and systems-oriented perspectives, with growing attention to multiple systems beyond the individual that influence current responses to challenges and the development of strategies, skills, and resources for responding to the vicissitudes of life. As developmental systems theory infused the study of human development and adaptation, concepts of resilience and coping changed to include multisystem processes at multiple levels of analysis (Masten & Cicchetti, 2016; Zimmer-Gembeck & Skinner, 2016). Models and research gave more attention to influences of cultural, ecological, and historical contexts in the processes involved in responding to stress and adverse experiences. In both domains of work, scholars acknowledged the importance of experience and learning in human adaptation and recognized the need to understand resilience and coping across multiple levels of analysis, including neurobiological, psychological, and social levels of analysis (Eisenberg et al., 2009; Masten, 2007; Skinner & Zimmer-Gembeck, 2007).

There were notable differences in the focus and emphasis of these intertwined traditions, with coping research often focused on efforts by individuals to manage stress in daily life, appraisal processes, and emotion regulation, directed at explaining adaptive and maladaptive responses to stress. Other systems were considered primarily in regard to how they facilitated individual coping strategies. Resilience theory and research typically have been broader in focus, including self-regulation and problem-solving processes but also adaptive capacity embedded in relationships, cultural traditions, and community support systems of many kinds. Now, resilience theory and research are increasingly focused on understanding how adaptive systems at multiple levels operate in concert and how systems at different levels influence each other. The emergence of multisystem resilience (Ungar, 2021), an effort to integrate science on resilience across disciplines and multiple system levels, has increased some of the differences in research on resilience and coping. We suggest that it would benefit both domains for research on coping to expand theoretical frameworks to integrate multisystem models and align with emerging multisystem models of resilience.

A potential area ripe for integration involves research on cultural adaptation, where

individuals, families, and communities may share a common challenge or threat (i.e., ethnic-racial discrimination) that disrupts collective well-being. Studies on both resilience and coping have expanded over the past two decades to include sociocultural contexts. This emerging body of work has highlighted the importance of using culture-specific coping strategies to promote positive adaptation. However, research is needed to understand how the combination of culture-specific coping and traditional ways of coping are related to resilient adaptation. Recent empirical evidence suggests that the utilization of multiple coping strategies may be beneficial to marginalized individuals. For example, research has shown that low-income individuals who used a shift-and-persist coping strategy (i.e., the ability to reappraise stress and regulate emotions [shifting], while maintaining a focus on the future [persisting]) have better psychological and physiological outcomes (Chen et al., 2012). Given that most marginalized individuals are concerned with the collective well-being of their families and communities (Daly et al., 1995), a multisystem theoretical framework of coping could offer insights on how coping across multiple systems intersects to promote positive adaptation among marginalized youth and their families.

The integration of coping and resilience science has the potential to advance theory and improve research and its translation into practice and policy by elucidating the processes linking individual adaptation to historical, cultural, and ecological contexts, as well as the adaptive capacity and coordinated functioning of systems beyond the individual. It is important to understand not only how coping and resilience capacity develop in individuals, but also how these processes are related to the adaptation of other systems connected and interacting directly or indirectly with individual development and functioning, including adaptive functioning of families, communities, economies, societies, social service systems, and other complex, adaptive socioecological systems. This knowledge could inform interventions and efforts to prepare for large-scale threats posed by epidemics, disasters, and political conflicts. As more evidence emerges on multisystem adaptive processes, how they influence each other, and how they change in response to experience, education, or interventions, researchers will be better prepared to provide guidance and expertise to mitigate risk and foster positive changes in human lives and well-being.

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Part III

Neurophysiological and Experiential Bases of the Development of Coping

8 The Development of Neurobiology Underlying Stress and Coping

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Introduction

Stress is a ubiquitous human experience that is prevalent worldwide but, at toxic levels, it can have detrimental effects on major societal domains including public health, economics, and education (van der Kolk et al., 2012). Although decades of research inform our understanding of the pernicious social, emotional, and biological effects of exposure to environmental adversity for individuals across the lifespan (Boyce, 2007; Shonkoff et al., 2012), exposure to stress during infancy, childhood, and adolescence – when development is especially pronounced – has particularly salient, long-lasting effects on biological and psychological outcomes (Lupien et al., 2009; Shonkoff et al., 2012).

Investigation of the mechanisms by which stress "gets under the skin" early in life to impact development has underscored the role of stress in shaping the developing brain. The human brain has evolved highly complex and sensitive circuitry to detect and respond to stress (McEwen, 1993; Teicher et al., 2002). Adaptive responses, such as threat detection and subsequent modifications to behavior, are orchestrated by neurobiological systems that integrate information from systems including sensory perception and processing, hormonal responses, and conscious processing (McEwen et al., 2015). Early environmental inputs, such as exposure to toxic stress, can drastically shape the development of the body's stress response systems in ways that impact subsequent coping across the lifespan.

Here we review current theory regarding the neurobiological systems responsible for coordinating the stress response in humans and highlight the normative development of these systems. We discuss the ways in which exposure to stress can manifest in altered neurobiological development and focus on the effects of exposure to stress on the development of frontolimbic circuitry. Given the vast heterogeneity in outcomes following stress exposure, we emphasize the importance of harnessing a dimensional approach to investigating the impact of stress exposure on neurobiological

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systems underlying stress and coping. Specifically, we highlight three features of stress exposure – stressor type, caregiver involvement, and developmental timing – as particularly important factors that may help to elucidate more precise mechanisms by which stress affects the developing brain. Finally, we review methodological considerations for the continued study of the neurobiological systems underlying stress and coping, and briefly review implications for both clinical practice and policy.

Neurobiological Systems Underlying Stress and Coping

Several theories posit differing views on how stressful experiences effectively "get under the skin" and alter the course of neurobiological development (McEwen, 2012). Prominently, the limbic-hypothalamic-pituitary-adrenal (LHPA) axis plays an important role in regulating the body's stress response system (Loman & Gunnar, 2010; McEwen & Akil, 2020) via modulation of the production of hormones that signal stress. These hormones, known as glucocorticoids, interact with the brain in order to increase or decrease an organism's readiness to either confront or, alternatively, flee from threat (Herman et al., 2005). Chronic, long-term exposure to both low-level and acute stressors can cause dysregulation of the LHPA axis, resulting in both extended production and elevated baseline levels of glucocorticoids in the brain (McEwen, 2012; McEwen & Magarinos, 1997; Yehuda et al., 2016).

Chronically elevated levels of glucocorticoids can have long-lasting effects on the human brain (Koss & Gunnar, 2018; McEwen, 2012; Vyas et al., 2016), though how these effects manifest, specifically, may vary by region. Extensive hyperactivity of the LHPA axis may also result in disruption of the negative feedback loop that is typically responsible for regulating glucocorticoid production, such that elevated glucocorticoid levels may, over time, predispose individuals to experience heightened reactivity to subsequent stressors (Dobrova-Krol et al., 2008; Gunnar et al., 2001; Lupien et al., 2000; Tarullo & Gunnar, 2006). In contrast, there is also evidence that exposure to early-life stress can lead to blunted cortisol production in response to acute stressors (Gunnar et al., 2009; Joos et al., 2019; Kircanski et al., 2019; Koss et al., 2016; McLaughlin et al., 2015; Peckins et al., 2012). Given the complexity of these findings, and additional research suggesting that individual-level factors such as sex may moderate differential patterns of LHPA axis responsivity following stress exposure (Hackman et al., 2012), further research is needed to fully elucidate how stress exposure may contribute to either hypoactivity or hyperactivity of the LHPA axis (Joos et al., 2019). Nonetheless, there is evidence that stress exposure can recalibrate the LHPA axis, resulting in alterations to the development of brain structure and function, as well as aberrant patterns of stress reactivity.

Limbic regions – including the hippocampus, a region of the brain involved in memory and decision-making, and the amygdala, a region adjacent to the hippocampus that contributes to the fear response, among other roles – appear to be particularly sensitive to stress (reviewed in McEwen et al., 2016). These regions are densely innervated with glucocorticoid receptors, making them particularly susceptible to the effects of overactivity of the LHPA axis (Jacobson & Sapolsky, 1991; McEwen, 2012; McEwen et al., 2016). Over time, chronically elevated levels of cortisol may result in atrophy and even death of hippocampal pyramidal neurons (McEwen et al., 1995; Uno et al., 1989; Woolley et al., 1990), in addition to other

morphological changes (McEwen & Milner, 2007). Numerous animal and human studies have also implicated the prefrontal cortex (PFC) – a region thought to serve as the executive hub of the brain – as playing a major role in the coordination of the stress response (reviewed in McEwen et al., 2016). The PFC is responsible for integrating information from other systems and regions, and is heavily involved in orchestrating executive functions such as decision-making (Hiser & Koenigs, 2018; Kamigaki, 2019). Among individuals with a history of stress exposure, differences in connectivity between limbic regions and the PFC have been frequently observed (Fan et al., 2014; Gee, Gabard-Durnam, et al., 2013; Jedd et al., 2015), as have structural changes in neural morphology in this region (Cook & Wellman, 2004; McEwen & Morrison, 2013; McEwen et al., 2016). Whether such neural changes are associated with coping is less well understood; however, the individual nature of coping strategy utilization suggests that variability in the neural impacts of stress may be related to variability in coping. Taken together, these regions comprise stress-sensitive frontolimbic circuitry, which has emerged as an important mediator between stress exposure and symptom emergence (Tottenham, 2015).

Effects of Stress on Neurobiological Systems Underlying Stress and Coping

As previously discussed, a significant body of literature has demonstrated that exposure to stressful and traumatic events during childhood can affect systems throughout the brain, with converging evidence across human and animal research that amygdala-prefrontal-hippocampal circuitry may be particularly susceptible to environmental stress. The sensitivity of these structures to stress may be due to their dense innervation with glucocorticoid receptors (de Kloet et al., 2005; Honkaniemi et al., 1992; Lupien et al., 2009; Plotsky et al., 2005; Wang et al., 2014; Woolley et al., 1990). Chronic stress has been shown to be associated with increased dendritic arborization and spine density of the amygdala (Mitra et al., 2005; Vyas et al., 2002, 2003), as well as with atrophy in regions involved in downregulating the stress response, such as the medial PFC (mPFC) and the hippocampus (Magarinos et al., 1997; Radley et al., 2006; Vyas et al., 2002).

Individuals exposed to early-life stress demonstrate differences in amygdala volume, though findings are mixed, with some studies showing increased volume (Heyn et al., 2018; Keding & Herringa, 2015; Mehta et al., 2009; Tottenham et al., 2010), a finding consistent with stress-induced amygdalar neurogenesis (Hölzel et al., 2010; McEwen et al., 2016). Notably, however, other studies have reported that individuals exposed to early-life stress exhibit smaller amygdala volumes, relative to individuals without a history of early-life stress exposure (Hanson, Nacewicz, et al., 2015; McLaughlin et al., 2016), and indeed some studies have found no differences in amygdala volume between stress-exposed and nonexposed individuals (Bremner et al., 1997; Carrion et al., 2001). Children with a history of stress exposure also exhibit relatively reduced prefrontal, striatal, and hippocampal volumes compared to their counterparts without a history of stress exposure (Dannlowski et al., 2012; Edmiston et al., 2011), possibly consistent with stress-related neuronal atrophy (Magarinos et al., 1997; Radley et al., 2006; Vyas et al., 2002). Research has also observed alterations in white matter tract integrity in association with early-life stress exposure, including in tracts connecting limbic and prefrontal regions (Bick et al., 2015; Hanson et al., 2013; Ho et al., 2017; Kircanski et al., 2019). Changes in white matter tract integrity

may reflect disruptions to processes such as myelination (Antontseva et al., 2020; Bonnefil et al., 2019), and/or experience-dependent plasticity in white matter tracts (Hofstetter et al., 2013; Magalhães et al., 2017).

In addition to shaping structural changes of the developing brain, stress exposure is also implicated in alterations in neural function. Both children and adults with histories of exposure to stress demonstrate greater amygdala reactivity in response to emotional and threat-related cues (Dannlowski et al., 2013; Gee, Gabard-Durnam, et al., 2013; Tottenham et al., 2011; van Harmelen et al., 2013) as well as greater activation in the mPFC and ventrolateral PFC in response to emotional faces and tasks that require cognitive control (Ganzel et al., 2013; Garrett et al., 2012; Godinez et al., 2016). Together, greater amygdala reactivity and increased prefrontal activation may indicate increased sensitivity to emotional and threat-related stimuli, which, in turn, may require greater top-down regulation by the PFC (Tottenham, 2015). Additionally, such patterns of activation may indicate delayed maturation of the emotion-regulatory function of this circuit (Herringa, 2017). Atypical functional connectivity of this frontolimbic circuit has also been observed in individuals with a history of stress exposure. Studies have identified atypical patterns of functional connectivity between the amygdala and the PFC (Burghy et al., 2012), medial prefrontal gyrus (Jedd et al., 2015), pregenual cingulate (Fan et al., 2014; Marusak et al., 2015), subgenual cingulate (Herringa et al., 2013), and dorsal anterior cingulate cortex (Wolf & Herringa, 2016). In sum, early-life stress exerts robust effects on the development of both the structure and function of frontolimbic circuitry, which has important implications for the development of symptomatology following early-life stress exposure.

The substantial body of research supporting links between stress exposure, frontolimbic circuitry, and psychiatric symptoms motivates investigation of how, and in what order, these associations emerge during development. Current evidence indicates that stress-associated changes in frontolimbic functional connections can be induced in juvenile mice (Johnson et al., 2018; Yan et al., 2017), and have been observed in children as young as ages 4–7 (Park et al., 2018) and through adolescence (Gee, Gabard-Durnam, et al., 2013; Herringa et al., 2013; Herzberg et al., 2021; Pagliaccio et al., 2015). Research examining structural changes in frontolimbic circuitry has also found that structural changes in tracts connecting limbic and prefrontal regions mediate associations between exposure to stressors (in this case, food insecurity) and psychiatric symptoms in late childhood and adolescence (Dennison et al., 2019). Additionally, frontolimbic functional connectivity may continue to mediate associations between childhood stress exposure and psychiatric symptomatology into adulthood (Burghy et al., 2012; Kaiser et al., 2018). A nascent body of research investigating the neural correlates of maternal stress exposure on infants has also found that preterm infants whose mothers reported higher numbers of stressful life events exhibit altered structural connections in white matter tracts connecting limbic and prefrontal regions (Lautarescu et al., 2020). Taken together, there is emerging evidence that the structure and function of frontolimbic circuits are altered in conjunction with exposure to early-life stress, and that these changes may mediate associations with elevated symptomatology. In order to unpack these complex associations and leverage such findings for clinical utility, it will be important to further explore how elements of stressors such as type, timing, and chronicity affect development of frontolimbic circuitry.

The Importance of a Dimensional Approach to Considering the Effects of Stress on the Developing Brain

As already reviewed, decades of research have documented associations between exposure to stress and alterations in the development of the neurobiological systems underlying stress and coping. Historically, in order to assess the effects of stress on neural structure and function, researchers have relied on one of two primary approaches: amalgamating distinct forms of stress exposure into a unitary construct of general stress exposure (e.g., De Bellis et al., 1999) or, alternatively, examining a single type of stress in isolation (e.g., Tottenham et al., 2010; Zeanah et al., 2003). However, there has been a recent proliferation of dimensional models that propose specific features of stress that may differentially impact the developing brain (Cohodes et al., 2021; Sheridan & McLaughlin, 2014). In the section that follows, we highlight three such factors that may moderate the effect of stress on the developing brain: the type of stress exposure, whether a caregiver is involved in stress exposure, and the developmental timing of stress exposure. Furthermore, we draw attention to interactions between these features of stress in order to demonstrate the importance of rich characterizations of stress exposures as a mechanism for understanding the effects of stress on the developing brain, and further, for differentiating the range of stressors with which youth are asked to cope.

Type of Stress Exposure

Recent work has demonstrated the importance of taking a granular approach to the characterization of specific types of stress exposures (e.g., differentiating physical abuse and neglect), and examining dissociable associations between specific types of stress and neural structure and function. In this vein, Edmiston and colleagues (2011) compared gray matter volume in adolescents exposed to abuse (physical or emotional) versus neglect (physical or emotional). Experiences of physical abuse, physical neglect, and emotional neglect were all associated with reduced rostral PFC volumes; however, there were differential associations between these exposures and gray matter volumes in other regions, including the dorsolateral PFC, insula, amygdala, and hippocampus (e.g., physical abuse was associated with decreased gray matter volume in the dorsolateral and orbitofrontal cortices, insula, and ventral striatum whereas physical neglect was associated with decreases in gray matter volume of the cerebellum). Furthermore, this study did not identify any associations between gray matter alterations and either emotional or sexual abuse. Thus, this pattern of findings indicates potentially important, dissociable effects of specific types of stress exposure on structural brain development. This line of work further suggests that solely considering generalized exposure to a unitary construct of stress may obscure meaningful specificity. In addition to these findings related to gray matter alterations, previous research has also distinguished differential impacts of distinct types of stress on white matter connectivity in youth (Dennison et al., 2019). Caregiver neglect and food insecurity were associated with increased white matter integrity in the uncinate fasciculus; in contrast, abuse was associated with reduced white matter integrity in the external capsule. These white matter tracts are implicated in reward processing, with reduced integrity associated with deficits across behavioral and neural indices of reward processing (Dennison et al., 2019). As the uncinate fasciculus connects the rostral temporal lobe (including parts of the limbic system, such as the amygdala) with the orbital and medial PFC, the authors propose that the

increased white matter integrity in the uncinate fasciculus associated with caregiver neglect and food insecurity may reflect accelerated development of PFC–amygdala connectivity. Furthermore, the reduced white matter integrity in the external capsule, which connects the striatum with the medial and ventral PFC, may relate to altered reward learning (Dennison et al., 2019). Taken together, these studies indicate that specific forms of stress exposure may be associated with disparate alterations in the developing brain and underscore the importance of a more fine-grained approach to assessing the effects of stress on neurodevelopment.

Evidence for the Dissociable Effects of Exposure to Threat and Deprivation

One particularly well-developed line of research in this area has examined the distinction between stress exposures characterized by the occurrence of experiences that signify harm ("threat") versus exposures characterized by a dearth of expected inputs from the environment ("deprivation"; McLaughlin et al., 2014; McLaughlin & Sheridan, 2016; Sheridan & McLaughlin, 2014). This work has identified a dissociation in behavioral outcomes between these two broad categories of stress exposure. Current theory suggests that threat-related exposures are associated with alterations in fear learning and emotion processing while deprivation-related exposures are associated with more detrimental cognitive and executive functioning outcomes (Sheridan & McLaughlin, 2014). Specifically, youth exposed to stressors characterized by deprivation exhibited reduced cognitive control in a neutral (i.e., nonemotionally valanced) context relative to their stress-exposed counterparts who experienced stressors characterized by threat (Lambert, King, et al., 2017; Machlin et al., 2019). Furthermore, exposure to threat has been associated with reduced use of automatic emotion regulation strategies (Lambert, King, et al., 2017), as well as alterations in fear learning (Machlin et al., 2019), whereas exposure to deprivation was not associated with either of these observed outcomes (Lambert, King, et al., 2017; Machlin et al., 2019). Taken together, these results provide further evidence of dissociable behavioral manifestations of these two features of stress exposure.

At the neural level, preliminary evidence indicates that exposure to experiences characterized by threat and deprivation may also have differential impacts on frontolimbic circuitry (i.e., the neural regions implicated in the core affective processes of fear learning, emotion processing, and cognitive and executive functioning). Several studies have identified associations between exposure to threat-related stress and alterations in prefrontal-amygdala connectivity. Specifically, exposure to threat-related stress was associated with more strongly negative ventromedial prefrontal cortex (vmPFC)-amygdala task-based functional connectivity (Peverill et al., 2019), with additional evidence for a dose-dependent association between the severity of threat-related stress exposure and negativity of amygdala-dorsolateral PFC resting-state functional connectivity (Kaiser et al., 2018). However, it is important to note that much of the evidence for the proposed association between exposure to threat-related stress and alterations in prefrontal-amygdala connectivity has been derived without controlling for exposure to deprivation; thus, the specificity of these effects to threat-related exposures, uniquely, remains a fundamental question. In contrast, after adjusting for exposure to abuse, exposure to deprivation has been found to be distinctly associated with inefficient functional recruitment (i.e., greater recruitment with similar task performance) of the parietal cortex

and PFC during high working memory load (Sheridan et al., 2017). In addition to the dissociable impact of threat versus deprivation at the neural level, preliminary evidence also suggests that exposure to threat and deprivation may have unique impacts on physiological responses to stress. Controlling for exposure to deprivation, exposure to threat-related stress has been linked with blunted HPA-axis and sympathetic reactivity (Busso et al., 2017). In contrast, controlling for exposure to threat, exposure to deprivation was not associated with altered physiological reactivity (Busso et al., 2017).

In summary, here we have highlighted stress exposures characterized by threat and deprivation as a relevant example of the potential value in investigating distinct associations between certain types of stress exposure and neurobiological outcomes. Though key questions remain in this line of work, initial findings underscore the importance of considering the type of trauma to which an individual was exposed as a critical determinant of the effects of stress on the developing brain. However, it is essential to note that adverse experiences frequently co-occur in childhood (Dong et al., 2004; Finkelhor et al., 2007; Green et al., 2010; McLaughlin et al., 2012). For example, a child who witnesses an incident of domestic violence that later results in the removal of a primary caregiver from the home could be considered to have experienced elements of both threat and deprivation (Cohodes et al., 2021). While the prior work previously described lays an important foundation for parsing the differential effects of specific types of stress exposure on the developing brain, a richer characterization of co-occurring types of stressors – likely utilizing methodological approaches such as person- or pattern-centered analyses, as well as machine-learning tools – will ultimately be required to extricate the distinct effects of specific types of stress (Cohodes et al., 2021).

Caregiver Involvement in Stressors

Representing another important current direction in the study of unique signatures of exposure to specific dimensions of trauma, there is substantial evidence that stressors involving caregivers may have a unique impact on neurodevelopment. Caregivers may be involved in stress exposures in a variety of ways, including via direct involvement (e.g., caregiver perpetration of abuse or neglect) or parent–child dyadic exposure to stress (e.g., shared exposure to domestic violence). Prior to reviewing literature documenting specific sequelae of caregiver-involved stress exposure, we review the role of caregiving as a species-expected input for the developing brain, as this lays a critical foundation for understanding the pervasive effects of exposure to caregiver-related trauma.

Caregiving as a Species-Expected Input in Human Development

The brain is innately plastic and is shaped by many factors that extend beyond experiences of stress or adversity. As such, there is great variability in neural characteristics across individuals, and across development, and there is no singular definition or exemplar of a "normal" or "typical" brain. Nevertheless, a helpful way to conceptualize "typical development" is through the lens of considering species-expected inputs (McLaughlin et al., 2017; Nelson, 2007; Nelson & Gabard-Durnam, 2020; Tottenham, 2012). Beginning in the prenatal period, humans have evolved to expect certain environmental inputs, such as the presence of supportive caregiving, and decades of research have demonstrated the importance of stable, nurturing caregiving early in life in supporting children's healthy socioemotional development. For example, during infancy and toddlerhood, a potent

developmental stage characterized by massive neuronal proliferation, increases in myelination, and volumetric increases (Lebel & Deoni, 2018; Vasung et al., 2019), the presence of a supportive and nurturing caregiver is an expected input that has been closely linked to normative development of language, cognition, and behavior (Ellis et al., 2009; Gee, 2020; Glynn & Baram, 2019; Mason et al., 2019; Tottenham, 2012).

Recent research has begun to probe the specific mechanisms by which the presence of a caregiver supports typical neural development; such work provides compelling evidence that the establishment of associations between caregiver presence and safety (a hallmark of secure attachment), as well as predictability of caregivers' responses, supports caregivers' ability to modulate activity in corticolimbic circuitry later in development (Gee & Cohodes, 2021). During infancy, children establish attachment relationships with caregivers (Ainsworth, 1969; Bowlby, 1958; Harlow, 1958; Schaffer & Emerson, 1964) and have the opportunity to learn that their primary caregivers respond to their needs, behave predictably, and consistently signal safety (Gee & Cohodes, 2021). Throughout the first year of life, infants begin to explore the world with caregiver support, and, as infants grow into toddlers, caregivers are reinforced as predictable sources of comfort and safety as children increasingly explore their independence (Lieberman, 2017). From a neurodevelopmental perspective, the establishment of caregivers as predictable sources of safety serves the critical function of promoting caregivers' ability to buffer against experiences of stress both in this specific developmental period and throughout development. Specifically, the presence of a caregiver has been shown to reduce LHPA axis activity by suppressing cortisol activity (Hostinar et al., 2014), as well as to modulate mPFC-amygdala connectivity, resulting in dampened amygdala reactivity to emotionally valenced stimuli (Gee et al., 2014). This pattern of findings is consistent with studies in the animal literature documenting that caregiver presence suppresses corticosterone and amygdala activity in rodent pups (Moriceau & Sullivan, 2006). At both a behavioral and neurobiological level, children rely on caregivers to actively support emotion regulation and to buffer reactivity to stressful experiences, with caregivers transitioning to a more supportive role during adolescence (Gee, 2016; Gee et al., 2014). Though these links have yet to be tested empirically, caregiver effects on developing frontolimbic circuitry may promote more adaptive coping across the lifespan by facilitating an individual's engagement in support-seeking behaviors, and increasing expectations that bids for social support will be met. In line with the adult attachment literature (Collins & Feeney, 2004), experiences of safety in the context of caregiving relationships early in life may facilitate trust in later relationships and a propensity to seek safety and closeness with others throughout life, which may facilitate coping during times of stress.

Impacts of Exposure to Caregiver-Related Trauma Exposure on Brain and Behavior

The importance of supportive caregiving in normative child development is further emphasized by studies documenting the long-term effects of disrupted caregiving. Against the backdrop of the biological necessity of attachment (Cassidy & Shaver, 2002), stress exposure that involves deviations from species-expected caregiving may contribute to particularly detrimental outcomes for the developing child, such as difficulties with interpersonal relationships, self-regulation, attention, and aggression (D'Andrea et al., 2012; van der Kolk, 2003).

One of the most frequently studied forms of caregiver-related stress is exposure to parental deprivation in the form of institutionalized care, and there is extensive evidence to suggest that this specific exposure has unique, detrimental impacts on the developing brain. Research from landmark studies, such as the Bucharest Early Intervention Project (BEIP), a randomized controlled trial that assigned 6- to 31-month-old children to either be placed in a limited number of foster care homes or to remain in institutionalized care following abandonment at or near the time of birth, offers longitudinal data on the impacts of early parental deprivation (Nelson et al., 2007). Studies resulting from the BEIP have provided strong evidence that children deprived of the species-expected presence of primary caregivers in the first years of life experience alterations in typical developmental trajectories (Gunnar et al., 2009; Humphreys et al., 2018; McLaughlin et al., 2015; Rutter, 1998), and are at increased risk for mental health disorders throughout childhood and into adulthood (Cameron et al., 2017; Ellis et al., 2009; Glynn & Baram, 2019; Humphreys & Zeanah, 2015; McGoron et al., 2012). Specifically, early parental deprivation is associated with global effects on brain structure, including widespread reductions in cortical thickness (McLaughlin et al., 2014; Sheridan et al., 2012). Relative to children who were raised by their biological families, children with a history of institutionalized care exhibit larger amygdala volumes (Tottenham et al., 2010) and amygdala hyperreactivity to emotional faces (Tottenham et al., 2011). Parental deprivation is also associated with altered connectivity between the mPFC and the amygdala (Gee, Gabard-Durnam, et al., 2013). Specifically, children exposed to early parental deprivation exhibited a more mature pattern of negative mPFC-amygdala connectivity, whereas children who were never exposed to parental deprivation exhibited positive mPFC-amygdala connectivity. This mature pattern of negative mPFC-amygdala connectivity resembles that observed in adolescents and adults; thus, the early emergence of this phenotype suggests that early parental deprivation may accelerate the development of neural circuitry underlying emotion regulation. This accelerated development of mPFC-amygdala circuitry may be part of an adaptive response to early stress. Among children exposed to early parental deprivation, those exhibiting the mature phenotype were less anxious than those exhibiting the child-like phenotype (Gee, Gabard-Durnam, et al., 2013). Furthermore, parental deprivation has been demonstrated to alter the development of the HPA axis, although the directionality of these results has been mixed (Flannery et al., 2017; Gunnar et al., 2001, 2009; McLaughlin et al., 2015). Taken together, these studies provide evidence for long-lasting effects of early parental deprivation on the development of neurobiological systems underlying stress and coping.

Although attachment relationships can be established in the presence of threatening cues (e.g., Perry & Sullivan, 2014), caregiving adversity experienced during infancy has been shown to interfere with caregiver buffering across species. Relative to their nonmaltreatment-exposed counterparts, maltreatment-exposed rodent pups do not demonstrate lessened fear-related behavior in the presence of a caregiver, and also show reduced caregiver buffering during the adolescent period (Opendak et al., 2019; Robinson-Drummer et al., 2019). Among nonhuman primates, infant maltreatment is also associated with reduced maternal buffering of cortisol reactivity (Sanchez et al., 2015). Similar patterns have been observed among children who have experienced caregiver deprivation early in life. Specifically, in contrast to peers who were raised by biological parents from birth,

postinstitutionalized children did not exhibit decreased amygdala reactivity in their adoptive caregivers' presence (Callaghan et al., 2019), suggesting that a lack of species-expected caregiving input early in life may be associated with alterations in an individual's ability to access extrinsic buffering support from caregivers at the neurobiological level.

In addition to parental deprivation, direct caregiver perpetration of maltreatment, such as physical, sexual, or emotional abuse, has been linked with a range of structural alterations in the developing brain. Specifically, exposure to childhood maltreatment has been found to be associated with alterations in gray matter volume in the amygdala and the hippocampus, as well as lower structural integrity of the uncinate fasciculus (Edmiston et al., 2011; Hanson, Knodt, et al., 2015; Hanson, Nacewicz, et al., 2015; McLaughlin et al., 2016; Morey et al., 2016), suggesting an association between exposure to caregiver-related stress and structural alterations of the developing brain. Functionally, exposure to childhood maltreatment has also been found to be associated with disruptions in patterns of connectivity between the PFC and several regions, including the amygdala and hippocampus, as well as altered activation in the amygdala and hippocampus (Herringa et al., 2013; Lambert, Sheridan, et al., 2017; Lange et al., 2019; Zhu et al., 2019). Bridging across these studies, the amygdala, hippocampus, PFC, and uncinate fasciculus are implicated in memory- and emotion regulation-related processes, such as threat generalization and context encoding, which are central to the development of internalizing- and externalizing-related symptomatology. Thus, alterations in these brain structures and related circuitry may confer vulnerability for increased symptomatology (Hanson, Knodt, et al., 2015; Hanson, Nacewicz, et al., 2015). In summary, taken together, this pattern of findings indicates important structural and functional alterations in neurocircuitry related to caregiver-related stress and highlights the importance of considering stress exposure that involves caregivers as a key, dissociable type of stress that has unique developmental impacts. Caregiving inputs throughout childhood and adolescence play a significant role in children's neural, cognitive, and socioemotional development, and disruptions to this species-expected input can be detrimental.

Developmental Timing of Stress Exposure

In addition to investigations of the impact of specific types of stress exposure, and caregiver involvement in a stressor, on the developing brain, a separate line of work has highlighted the importance of considering when a stressor occurs in developmental time in assessing the effects of stress on neurobiological development (for a review, see Gee & Casey, 2015). The brain undergoes rapid and dynamic development from birth through adulthood (Casey et al., 2019; Gabard-Durnam et al., 2014; Gee, Humphreys, et al., 2013; Gee et al., 2018; Hare et al., 2008; Wu et al., 2016) and, given these vast changes across development, the developmental timing of a stressor likely relates to both the short- and long-term impacts of exposure to stress (Cameron, 2001; Eiland & Romeo, 2013; Lupien et al., 2009; Sabatini et al., 2007).

Results of various studies of children exposed to institutionalized care, such as several using data from the BEIP previously described, suggest that stress exposure that occurs earlier in life may have more detrimental developmental effects. Specifically, children who were exposed to parental deprivation in the first 2 years of life (between 0 and 24 months) exhibited more deleterious long-term neurobiological outcomes, such as blunted

sympathetic nervous system and HPA axis responses to psychosocial stress (McLaughlin et al., 2015) and developmentally stunted physical height and weight (Rutter, 1998). These findings are consistent with a broader literature on sensitive periods of development during which exposure to stress may have especially strong influences on developmental outcomes (Gabard-Durnam & McLaughlin, 2020; Gee, 2020). Additionally, stress exposure in late childhood and early adolescence may have particularly strong impacts on long-term amygdala structure (Evans et al., 2016; Pechtel et al., 2014), perhaps due to the trajectory of amygdala development, which peaks during preadolescence (Uematsu et al., 2012). The rapid growth in amygdala volume through preadolescence may create a window of particular vulnerability to the impact of stress, whereas exposure to stress after the amygdala has reached its peak volume may have a comparatively weaker impact on amygdala structure. These results highlight the importance of considering the age of stress exposure when evaluating the impacts of stress on neurobiology and, specifically, point to early childhood, late childhood, and early adolescence as periods during which the impact of stress may be particularly salient for the developing brain.

In addition to highlighting specific time periods during which exposure to stress may have a relatively greater impact on neurodevelopment, the extant literature examining timing-related factors has underscored the importance of considering the chronicity of stress exposure. Studies of children exposed to early institutionalized care reveal that a longer duration of institutionalization is associated with larger amygdala volumes in childhood (Tottenham et al., 2010) and smaller left amygdala volumes in adolescence (albeit in a small sample; Mehta et al., 2009). While the mixed directionality of results reflects the need for more research with large sample sizes, these findings of chronicity-related differences in amygdala structure indicate the importance of considering the time course of stress exposure when investigating the effects of stress on the brain. The age of onset and duration of stress exposure have also been linked with alterations in frontolimbic structure and function in a sample of individuals exposed to physical abuse and/or intimate-partner violence (McCrory et al., 2013).

While recent research has greatly enhanced our understanding of how the timing of stress exposure impacts neurobiology across development, the precise timing-related mechanisms by which exposure to early-life stress affects long-term neurobiological outcomes require further investigation. One potential mechanism involves accelerated biological aging following early stress exposure, including precocious development of frontolimbic circuitry (Belsky, 2019; Belsky et al., 1991; Callaghan & Tottenham, 2016; Colich et al., 2020; Ellis et al., 2009; Rickard et al., 2014). For example, children without a history of institutionalized care exhibit a marked shift from positive amygdala-mPFC task-based functional connectivity in childhood to negative amygdala-mPFC functional connectivity in adolescence (Gee, Humphreys, et al., 2013). This shift to a more mature pattern may reflect developmental changes in regulatory connections, as it is associated with decreasing amygdala reactivity and age-related declines in anxiety (Gee, Humphreys, et al., 2013). However, as already described, both children and adolescents with a history of exposure to institutionalized care exhibited a more mature pattern of negative amygdala-mPFC connectivity (Gee, Gabard-Durnam, et al., 2013). This striking pattern of findings suggests the possibility of early maturation of frontolimbic circuitry following exposure to early-life stress, perhaps due to a shift in or

premature closing of a sensitive period that occurs to aid adaptation to a challenging early environment (Gee, Humphreys, et al., 2013). Despite these advances in our understanding of patterns of acceleration, the function and long-term consequences of these developmental shifts are not fully understood. Alternatively, stress sensitization might present another mechanism by which timing moderates the impact of stress on development. Stress sensitization suggests that exposure to stress in one phase of development may make an individual more vulnerable to subsequent stress exposure (Bandoli et al., 2017; Espejo et al., 2007; McLaughlin et al., 2010). For instance, stress exposure during childhood may have a greater impact on children who experienced severe caregiving-related stress in infancy, relative to their counterparts who experienced nurturing and stable caregiving in infancy (Wade et al., 2019). In line with the stress sensitization hypothesis, this finding suggests that stress early in life alters one's sensitivity to stress at subsequent stages of development. While preliminary evidence indicates that accelerated biological aging and stress sensitization may be involved in the association between early-life stress and long-term outcomes, future research is needed to fully elucidate these etiological mechanisms.

Overall, timing-related findings provide evidence for a linear association between the duration of stress exposure and severity of neurobiological effects, as well as for possible nonlinear sensitive periods across development. In interpreting these results, it is important to note several critical questions that require additional investigation. At present it is difficult to disentangle the effects of an earlier age of onset of stress versus a longer duration of exposure (Cohodes et al., 2021). Furthermore, many of the studies presented earlier have assessed timing-related effects in mixed-age samples. These designs inherently limit our ability to differentiate the effects of timing from progressive neurodevelopmental changes (Heyn et al., 2018; Weems et al., 2015). Future research intended to dissociate the effects of chronic exposure from earlier age of exposure onset, as well as research in single-age cohorts of children, will yield important clarity in this area of the literature (Cohodes et al., 2021). In addition, we note that, across development, there is significant variability in the resources and processes that an individual relies upon to cope in the face of a stressor due to the biological state of the developing brain (Eschenbeck et al., 2018). Therefore, the impact of a stressor on the developing brain, and, by extension, on an individual's capacity to cope with a stressor, likely depends on the specific tasks of typical development that are disrupted by stress exposure. In light of this, longitudinal studies that are designed to parse the development of utilization of specific coping strategies – and underlying neurodevelopmental processes that support this utilization – will shed light on this important area of future research. Further, future studies that assess how these processes and underlying mechanisms are impacted by adversity will have important implications for targeted prevention and intervention work.

Interactions between Type, Caregiver Involvement, and Timing of Stressor

While the disparate literatures probing type- and timing-related effects of stress on the developing brain offer valuable insight, it is necessary to consider how possible interactions between these factors might further elucidate the neurobiological sequelae of stress exposure. Current theory and emerging evidence suggest that the impact of the type of stress experienced might differ depending on the developmental stage during which the stress exposure occurs (Cohodes et al., 2021). For

example, as previously described, stress exposures that involve a caregiver may be expected to have a distinct impact on the developing brain relative to exposures that do not involve a caregiver; however, current theory suggests that specific effects of this type of stress exposure may vary depending on the age at which the child was exposed. Caregiver involvement in stress exposures may have a more deleterious impact on developmental trajectories when the stress exposures occur in infancy and early childhood due to the increased influence of a caregiver's presence on external regulation during this time (Cohodes et al., 2021; Gee & Cohodes, 2021; Gee, 2016, 2020; Gee et al., 2014; Hofer & Sullivan, 2001; Hostinar et al., 2014; Tottenham, 2015). The potency of the influence of a caregiver's presence on an individual's regulation is diminished by adolescence; thus, stress exposures that involve caregivers are posited to have less of a detrimental effect in adolescence or adulthood, relative to early childhood (Gee et al., 2014; Hostinar et al., 2014).

In line with this theoretical reasoning, early empirical evidence also suggests that the timing of stress exposure might have differential outcomes depending on the type of stressor an individual is exposed to. For example, a recent study identified a timing-related dissociation between the impact of neglect versus abuse on hippocampal volume among male and female participants. Specifically, adult male hippocampal volume was best predicted by exposure to neglect in the first 7 years of life, whereas female adult hippocampal volume was best predicted by exposure to abuse experienced in early adolescence (Teicher et al., 2018). Separately, recent evidence suggests that exposure to physical maltreatment during childhood was associated with reduced amygdala reactivity to emotional faces, while exposure to peer emotional abuse during adolescence was associated with increased amygdala reactivity (Zhu et al., 2019). In the context of the threat versus deprivation model reviewed earlier, early-life stress characterized by threat has been linked with accelerated neurodevelopment and cellular aging – perhaps in order to facilitate adaptation to harsh environments (e.g., by promoting independence necessary for survival and increasing threat detection) – whereas early-life stress characterized by deprivation was not related to accelerated development (Colich et al., 2020).

In summary, there is compelling initial evidence that the effects of timing on the developing brain differ depending on the particular type of stressor an individual experiences, and specifically, depending on whether a stressor involved a caregiver. However, despite this initial empirical evidence for type-by-timing-by-caregiver involvement interactions, further research is necessary to deepen our understanding of how the timing of stress exposure might impact outcomes for specific types of stress, and stress involving caregivers, across development. The extant literature underscores that, when considering the effect of stress exposure on neurodevelopment, it is helpful to account for the type, developmental timing, and whether a caregiver was involved in that exposure, as well as to investigate potential interactions between these salient factors.

Future Directions

The Importance of Multimodal, Multidimensional Approaches

Though the extant literature has begun to elucidate the broad neurobiological impacts of exposure to early-life stress, much remains unknown about the ways in which exposure to early-life adversity confers risk for neurodevelopment. Though there is a clear link between

exposure to stress and alterations in the development of the neurobiological mechanisms responsible for coordinating the stress response, exposure to stress – even to the same type of stress – does not have a consistent effect on all individuals (Gabbay et al., 2004; Lupien et al., 2009; Gee & Casey, 2015). This heterogeneity in outcomes indicates that broadly considering all stressors to be equivalent – or solely relying on comparisons of individuals with and without exposure to stress – may preclude critical advances in our understanding of the ways in which specific features of stress exposures contribute to developmental trajectories following exposure (Cohodes et al., 2021). Future research in this area will benefit from several key methodological considerations.

First, harnessing multidimensional approaches to assessing early-life stress will enhance our understanding of the ways in which specific features of stress confer risk for neurodevelopment and subsequent coping. For example, using dimensional measures of stress to assess a cumulative list of ages at which a stressor occurs, rather than assessing the binary presence or absence of lifetime exposure to a particular stressor, and, specifically, querying whether stress exposures are characterized by salient features such as predictability, controllability, and caregiver involvement, will inform our understanding of the mechanisms by which these specific features of stress impact neurobiological and functional outcomes for youth exposed to adversity (Cohodes et al., 2021). Additionally, collecting in-depth information on coping strategies in order to better understand how coping varies by age, exposure type, and salient dimensions will also facilitate greater understanding of the synchrony of stress exposure, neural adaptation, coping, and symptom emergence. Though this type of methodological approach is resource intensive, it greatly increases the richness of clinical data available to represent an individual's history of stress exposure and is therefore invaluable in facilitating more complex, data-driven queries of the ways in which fine-grained features of stress exposure – and the interactions between them – affect the developing brain. Conducting secondary analyses on previously collected datasets with the goal of restructuring data to analyze specific dimensions of interest may promote earlier investigation of these key questions, as ongoing protocols are adapted to adopt a more dimensional approach.

Second, multimodal approaches to assessing the psychobiological sequelae of stress will yield a more comprehensive understanding of how exposure confers risk and resilience at both the neural and behavioral level, which has important clinical implications. To date, many studies assessing the neurodevelopmental sequelae of exposure to early-life stress have utilized neuroimaging data to capture neurobiological function at a given time point in development. This snapshot of functioning is then analyzed in relation to information about an individual's reported history of stress exposure. Given the importance of understanding the clinical relevance of neurobiological changes following stress exposure, multimodal methodological approaches will greatly increase our understanding of the ways in which brain and behavioral changes following stress exposure mutually inform one another. Specifically, research protocols must not only assess the biological state of the developing brain but also an individual's utilization of coping strategies and broader clinical presentation via concurrent detailed phenotypic assessment. In addition, as stress is likely to affect both stress regulation and reactivity, future studies that aim to disentangle the effects of stress on coping should be optimally designed to differentiate effects of stress exposure on stress reactivity itself, and

the effects of stress on the systems that regulate behavior under stress.

Third, future studies should aim to utilize prospective designs rather than relying solely on retrospective accounts of stress exposure. Though retrospective reports of exposure to early-life adversity – often collected via interviews in adulthood – have afforded much of our current understanding of the neurobiological impacts of stress exposure, these assessment tools have been shown to be only weakly associated with prospective measures (Baldwin et al., 2019). A shift to documenting prospective accounts and impacts of early-life stress exposure – preferably using multidimensional assessment tools including novel instruments such as ecological momentary assessment – will greatly facilitate a new wave of research in this area focused on isolating specific signatures of exposure to dissociable features of stress exposure.

Finally, given the importance of querying complex interactions among many features of stress exposure, it may prove challenging to establish adequate statistical power in isolated studies. Increasing efforts to establish harmonization among contemporaneous data collection efforts and incorporation of rich assessment tools that systematically document the presence of key dimensions of stress exposure into the batteries of large-scale longitudinal studies of brain development (Hoffman et al., 2019) will be essential to support adequate investigation of the remaining questions in this area.

Implications for Clinical Practice and Policy

The continued study of the effects of stress on the developing brain has important implications for both the development of novel clinical interventions and the prevention of the negative sequelae of youth exposure to stress at the societal level. Increasingly detailed understanding of the multilevel dimensions that impact brain development – and the interactions among these dimensions – has the potential to directly inform critical advances in the field's conceptualization of the etiological processes underlying the development of psychopathology and mechanisms of coping. Specifically, the identification of distinct aspects of stress exposure that are particularly detrimental at certain ages may further inform our understanding of sensitive periods. This identification of experiences that have especially salient effects on the development of frontolimbic circuity at specific developmental stages will support the development of more targeted intervention and prevention approaches that are focused on enhancing coping or that are focused on bolstering specific buffering mechanisms (e.g., leveraging increases in an individual's perception of control or predictability of the environment to reduce stress reactivity in novel contexts). Finally, a rich understanding of the impact of early-life adversity on the developing brain also underscores the importance of systems-level change, at the policy level, to protect vulnerable youth and to eliminate systemic infliction of trauma on families. As a salient example, scientific understanding of the implications of caregiver-related trauma, and the potent role of caregivers in buffering children from the negative effects of stress, directly informed policy and intervention efforts for children separated from their caregivers at the United States–Mexico border under the United States' "zero tolerance" policy (Gee, 2021).

Conclusion

In conclusion, here we have reviewed the current state of the literature documenting the effects of exposure to stress on the neurobiological systems underlying stress responding and coping across development, as well as

implications for future research directions, clinical practice, and policy. There is substantial evidence that one mechanism by which stress exposure "gets under the skin" early in life is via recalibration of the LHPA axis, which has persistent effects on neurodevelopment at both the structural and functional level. Limbic regions, including the hippocampus and amygdala, appear to be particularly affected by stress. The extant literature highlights alterations in functional connectivity between limbic regions and the PFC, as well as structural changes in these regions, among individuals who have been exposed to early-life stress, with evidence that these changes mediate associations between stress exposure and elevated symptomatology. We highlight the important role of caregivers across typical development and, against this backdrop, review evidence for the detrimental effects of disruptions in early caregiving on the development of frontolimbic circuitry. In addition, in light of an increasing focus on dimensional approaches to considering the effects of stress on the developing brain, we review literature to date that has investigated the dissociable sequelae of exposure to two specific features of stress exposure – type of stress and the developmental timing at which stress exposure occurs. Current theory posits that exposure to stress early in childhood may have particularly detrimental effects on the developing brain, and that there may be dissociable effects of stress exposures characterized by threat versus deprivation, as well as stressors that involve caregivers. Reflecting the importance of interactive effects between different features of stress, we underscore that investigating type-by-timing interactions – for example, caregiving adversity that occurs early in childhood – may help to elucidate the complex and multifaceted effects of stress on the developing brain. Though the extant research investigating the neurobiological sequelae of exposure to early-life adversity has afforded a foundational understanding of mechanisms by which stress affects psychobiological development, a future wave of research that embraces novel multilevel, multimodal, and dimensional methodological approaches has the potential to greatly enhance both clinical prevention and intervention, as well as societal change, for youth affected by adversity.

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9 Biological Systems Underlying the Development of Adaptive Functioning and Coping

Christine Sigrist, Julian F. Thayer, and Julian Koenig

Introduction

As outlined in the previous chapters of this Handbook, *coping* with stressful events is an integral aspect of our everyday life. Beyond various psychological resources and processes enabling an individual to overcome adversity, biological systems enable adaptive functioning and support coping. In the following, we will review the involvement of the autonomic nervous system (ANS) on different levels of interaction with psychological phenomena associated with *coping*. Special emphasis is placed on *neurovisceral integration* – the interplay between higher-order processes of the central nervous system (CNS) and the ANS – which will inform our understanding of coping from a biological perspective. In short, this framework implies a bidirectional mechanistic pathway between the ANS and CNS. Heart rate variability (HRV), as will be reviewed, is interpreted as sufficient read-out of the readiness of this higher-order circuitry, reflecting the capacity of the organism for adaptive functioning. In the following, we will review how ANS–CNS co-regulation develops, highlighting sensitive periods across the human lifespan. We will also outline phases of heightened vulnerability, in which adverse experiences might overstrain our capacity to adequately cope with the respective situation, subsequently resulting in an increased risk of developing pathological conditions. Finally, we argue how a certain level of exposure to adversity might be required to enable later adaptive functioning, and thus *coping*.

The interested reader is referred to existing reviews concerning other prominent biological systems – such as the hypothalamic–pituitary–adrenal (HPA) axis – implicated in coping and resilience (Russo et al., 2012).

Adaptive Functioning and Coping from a Neurovisceral Integration Perspective

As outlined in Thayer et al. (2012), a hallmark of successful adaptation is flexibility in the face of changing physiological and environmental demands. The *neurovisceral integration model* (*NIM*; Thayer et al., 2012; Thayer & Lane, 2000, 2009) provides a conceptual framework enabling an understanding of adaptation and coping from a psychophysiological perspective, highlighting the importance of ANS–CNS interaction in the adaptations to environmental challenges. The NIM adopts a dynamical systems perspective when considering the human organism, highlighting that specific phenomena, such as *coping*, are interpreted as complete, self-organizing, and self-regulating entities that emerge from reciprocal interactions among lower-order constituents (Lewis & Douglas, 1988). From a neuroscientific viewpoint, the NIM integrates various subsystems of the CNS regulating autonomic, attentional, and affective processes

Part of this chapter is based on the doctoral thesis by the first author.

into a network of functional and structural units. How can we understand *coping* and its development from this perspective?

A general presumption in this regard must be that coping is a desirable outcome of physiological regulation. The body aims to overcome distress, restore homeostasis, make progress toward goals even in demanding circumstances, and enable future adaptive functioning. To accomplish this, the organism draws on resources that may show inter- and intra-individual variability as a function of various third factors (e.g., genetics, trait, and state-dependent factors). If the demand is met, coping can be achieved by the organism, and adaptive functioning is maintained. If the demand exceeds these resources, dysfunction and disease may result. Although these thoughts might oversimplify the true complexity, they will serve us well to understand the developmental aspects of this system. Importantly, we assume that prior experiences of (successful or unsuccessful) *coping* will impact future outcomes of the respective processes. In brief, the process of coping is "a learning one," and such a viewpoint might also apply in understanding its development.

The NIM proposes a core set of neural structures to provide an organism with the ability to integrate information from within and outside the body, and adaptively regulate cognition, perception, action, and physiology accordingly. This set of structures within the CNS includes subcortical structures such as the amygdala, and regions within the prefrontal cortex (PFC), in particular, the ventromedial PFC (vmPFC) – which together constitute a reciprocal inhibitory neural circuit. Within this circuitry, prefrontal cortical regions exert tonic inhibitory control over subcortical regions. In the event of threat or stress, however, vagal (parasympathetic) withdrawal and disinhibition of sympathoexcitatory circuits can be observed, leading to an organismic response to the respective stressor or threat being faced. Inhibitory neural circuits are assumed to maintain an important role in the regulation of both stress responses and emotion, while a disruption of neural inhibitory processes may result in pathological outcomes, in both physiological and affective domains.

Sympathetic and parasympathetic nerves constitute the ANS. Most organs of the human body are dually innervated by sympathetic and parasympathetic nerves (Wulsin et al., 2018). In any organ system, these two branches of the ANS may function in a complex relationship, including antagonistic, complementary, or cooperative action, and their relative balance and integrated action may be set by genetic influences and mostly modified by environmental ones. Considering the human physiological system in its complexity, the ANS, by producing patterns of dynamic variability, contributes to the organismic aim of minimizing energy expenditure (Kok et al., 2013; Thayer et al., 2010; van der Kolk, 2015; Wulsin et al., 2018). Critically, besides most other organs, the ANS also innervates the heart, via the stellate ganglia and the vagus nerve. The interplay of these nerves at the sinoatrial node of the heart produces complex variability in the heart rate time series – resulting in HRV (Saul, 1990; Thayer & Lane, 2000). Heart rate variability presents a readily available marker of human ANS function that largely advanced our understanding of adaptive psychophysiological functioning in the past decades.

As a measure of cardiac autonomic activity, HRV is not only reflective of cardiac activity, but presents an indirect output of the central autonomic network (CAN) regulating the interplay of sympathetic and parasympathetic (vagal) influences on the activity of the heart at the brain level. Of note, autonomic control of the heart is highly complex, but autonomic neural control via the sympathetic and

parasympathetic nervous systems have been identified as predominant factors (Nolte et al., 2017; Smith et al., 2017). Thus, HRV is more than a crude marker of ANS function but represents ANS–CNS interaction. Importantly, this pathway is not a one-way street: Peripheral end-organs, including the heart, propagate sensory information back to the CAN; therefore, HRV is seen as an "index of central-peripheral neural feedback and CNS–ANS integration" (Thayer & Lane, 2000, p. 205).

Based on this premise, the NIM proposes measures of cardiac autonomic activity to index the inhibitory activity of the PFC, further reflecting the capacity of adaptive functioning, as well as executive control functions more generally (Beauchaine, 2015a). Deficient top-down control (e.g., by the vmPFC) of limbic structures (e.g., of the amygdala), and reductions in the functional connectivity between limbic and prefrontal structures, are assumed to be linked with deficient self-regulation – resulting in maladaptive functioning (Beauchaine, 2015b; Churchwell et al., 2009; Hilt et al., 2011). Stated simply, when facing heightened distress, the PFC aims to downregulate limbic structures. This simplified neural circuitry can be understood as the *core of coping*.

According to the NIM, the CAN (Benarroch, 1993, 1997) is one important network within the CNS underlying the "flexible adaptation of the organism to changing environmental demands" (Thayer & Lane, 2000, p. 202). The CAN comprises *structural units* within cortical and subcortical structures, including the anterior cingulate, insular, and ventromedial prefrontal cortices, the central nucleus of the amygdala, the paraventricular and related nuclei of the hypothalamus, the periaqueductal gray matter, the parabrachial nucleus, the nucleus of the solitary tract, and the medullary tegmental field (Thayer & Lane, 2000). These structures form a common reciprocal inhibitory neural circuit, where subcortical regions support defensive behaviors, and prefrontal cortical regions exert tonic inhibitory control over these subcortical structures (Thayer & Brosschot, 2005; Thayer & Lane, 2009). The CAN is therefore assumed to present an integrated component of an internal regulation system, controlling visceromotor, neuroendocrine, and behavioral responses that are critical for goal-directed behavior and adaptability (Benarroch, 1993; Thayer & Lane, 2000) – ultimately constituting our capacity for coping from a neurovisceral integration perspective. As a central element of self-regulatory processes in the NIM, the concept of emotion is interpreted as an "organismic response to an environmental event that allows for the rapid mobilization of multiple subsystems for action" (Thayer & Lane, 2000, p. 202). Thus, emotion[1] is conceptualized to represent an integrative index of an internal monitoring system, signaling momentary adjustment to a constantly changing environment. Emotional responses serve to support the selection of an appropriate behavioral response (sub) system, as well as the inhibition of less appropriate responses, from a preexisting behavioral repertoire (Thayer & Lane, 2000).

To summarize, the NIM assumes that complex coexisting physiological, behavioral, emotional, and cognitive processes, which rely on a common functional and structural neural basis (i.e., the CAN), are linked with processes of response organization and selection, serving to

[1] Importantly, we have previously suggested that the regulation of stress responses is emotion regulation and, as such, studies that have investigated emotion regulation may yield insights into successful stress regulation and vice versa (Thayer et al., 2021) – highlighting the role of emotion in the process of coping.

modulate psychophysiological resources in attention and emotion (Friedman & Thayer, 1998; Thayer & Friedman, 1997) – and thus are involved in self-regulation and constitute one's capacity to cope with adverse experiences. The NIM highlights the importance of dynamic adjustments of physiological arousal to situational and environmental demands (Appelhans & Luecken, 2006; Friedman, 2007; Friedman & Thayer, 1998) and relies on markers of vagal regulation at the level of the heart. Further, it suggests a role for individual differences in HRV in physiological, affective, and cognitive regulation, while the critical role of inhibition for effective functioning in a complex environment is emphasized (Thayer & Lane, 2009). By doing so, the NIM conceives vagal regulation of heart rate as a marker of prefrontal control over subcortical activity, and thus of the functional integrity of self-regulatory systems (Thayer & Lane, 2000, 2009).

Sensitive Periods in the Development of Coping

In further elaboration of the NIM (Koenig, 2020), we have previously considered important developmental trajectories underlying the dynamic CNS–ANS co-regulation, assumed to be associated with adaptive functioning and the risk for the development of disease. Importantly, while the CNS needs input from the environment to show normative development – particularly during sensitive periods – adverse environmental experiences may have long-lasting effects on brain function and behavior. *Sensitive developmental periods* have recently been described as developmental learning mechanisms of neurobiological encoding of particular expectable environmental experiences (including, for example, a variety of inputs pertaining to sensory, cognitive, and affective domains), which are necessary for an adaptive development of the human organism across a variety of capacities (Gabard-Durnam & McLaughlin, 2020). These thoughts inform our biological understanding of the development of coping.

As already mentioned, a flexible network of neural structures that is dynamically organized in response to environmental challenges (Thayer & Lane, 2009), including a reciprocal inhibitory cortico-subcortical neural circuit allowing the PFC to exert inhibitory control over subcortical structures, is important for coping with adverse experiences. For example, when facing a threatful situation, the tonic inhibitory control of subcortical structures can be rapidly decreased, leading to sympathoexcitatory fight or flight responses, necessary for survival. When this network is disrupted, a rigid, defensive behavioral pattern may emerge, with associated attentional, affective, and autonomic inflexibility (Thayer & Siegle, 2002). Critically, the functional interaction of the ANS and CNS is assumed to be shaped early in the course of life, while adolescence is assumed to present the most sensitive period of development in this circuitry, forming the foundation for adaptive neurovisceral regulation throughout the rest of the lifespan (Koenig, 2020).

By paradigmatically considering studies regarding the normative development of cardiac autonomic function and its association with emotion regulation, we have previously argued that vagal (parasympathetic) influence over cardiac autonomic activity increases early in the course of life, and that this increase is important in shaping development (Koenig, 2020). Specifically, the assumed normative increase in vagal parasympathetic influence (reflected by an increase in HRV) over the course of early childhood and adolescence is assumed to reflect neurodevelopmental processes of cortical thinning in prefrontal and subcortical brain regions. Cortical thinning,

in turn, is linked with better neuropsychological performance (i.e., verbal learning and memory, visuospatial functioning, and spatial planning and problem-solving) and might be essential for better coping (Squeglia et al., 2013; Vijayakumar et al., 2014).

Based on several lines of previous research, including findings that connections between the PFC and limbic structures are fine-tuned during adolescence allowing for increasing top-down regulation of limbic structures via the PFC, and that these processes may underlie characteristic instabilities of affect and behavior during this developmental period (Ahmed et al., 2015; Casey et al., 2008; see further Koenig, 2020), it is proposed that the development of the ANS (i.e., the normative increase in vagal activity in sensitive developmental periods such as the transition from adolescence to early adulthood) is critical for patterns of PFC maturation and associated individual capacity to adaptively cope with stress (particularly, coping) to emerge. Altered ANS functioning during adolescence (i.e., the absence of normative increase in vagal activity) is hypothesized to lead to heightened sensitivity to stressors and stress vulnerability, and ultimately an increased risk for psychopathology. But what drives vagal dominance and its normative increase during adolescence?

Considering potential antecedent factors, it is suggested that ANS dys-maturation might be mediated by early environmental factors and the caregiving environment. We have previously discussed the role of early-life stress in more detail elsewhere (Sigrist et al., 2021). Of note, it has been suggested that several other factors are likely to contribute to the absence of normative ANS maturation (see, e.g., Mulkey & du Plessis, 2019). Yet, substantial evidence has been accumulated that early-life stress, and in particular highly severe forms of early-life adversity, leave unequivocal neurophysiological marks (Heim et al., 2019), including alterations in the major stress response systems such as the ANS and HPA axis (see Chapters 10 and 11 in the present Handbook).

Potential mechanisms and pathways effecting such neurophysiological changes are discussed in several influential and partly competing neurobiological models. Among these, a more recent model (Agorastos et al., 2019; Daskalakis et al., 2013; Nederhof & Schmidt, 2012) provides an explanatory basis well-aligned with the ideas put forth in the *dynamical systems model of neurovisceral integration in development* (Koenig, 2020), namely, the three-hit concept of vulnerability and resilience. This model emphasizes the high degree of cerebral plasticity, and suggests that an interaction of the individual genetic background (hit-1) with early-life stress exposure (hit-2) results in an evolving phenotype characterized by altered stress-axis regulation and sensitivity due to early developmental programming, further interacting with later-life challenges (hit-3) to result in a higher (or lower) vulnerability, depending also on the type of challenge experienced (Agorastos et al., 2019). In turn, this model insists that early environmental conditions shape adaptive functioning and coping on a biological level.

Importantly, this model can be distinguished from cumulative models of stress exposure, such as the highly influential diathesis-stress model (e.g., McEwen, 1998), in critical ways. It is assumed that exposure to early-life stress can also have advantageous effects, most importantly, by representing a possible source of adaptation, potentially even promoting resilience (Agorastos et al., 2019) – this concept is frequently named *differential susceptibility*. In the diathesis-stress model, it had been suggested that if the accumulation of stressors along the lifespan exceeds a certain threshold, the development of disease in

individuals with high stress exposure is enhanced. Unarguably, however, such a viewpoint neglects aspects of coping and adaptation. Importantly, the decades-long work of McEwen and colleagues also contributed significantly to the advancement of our understanding of resilience; for example, by systematically measuring the type, duration, and quality of stress exposure in the rodent model, stress has been revealed to affect most behavioral domains following an inverted, U-shaped pattern (as reviewed, for example, in McEwen & Gianaros, 2011). While the shape of this inverted U may differ with many factors, these findings also suggest that a certain level of stress exposure, depending on the context in which it is experienced, may be advantageous in the development of responses for coping with future stress experiences (Russo et al., 2012). Importantly, the aspect of resilience is highlighted also in the dynamical systems model of neurovisceral integration, where cardiac vagal activity is assumed to represent a marker of increased risk when decreased, but a marker of better resilience when increased (Koenig, 2020) – representing the wide repertoire of adaptive potential.

Here we suggest that successful coping with moderate early-life stress might in fact be a necessary condition for later adaptive functioning. In this view, successful coping might be seen as a muscle that requires a certain degree of load (*training*) to rise to better performance. Individual differences in (1) the exposure to different levels of early-life stress and (2) their successful or unsuccessful handling may thus explain intra- and inter-individual differences in one's capacity for coping. These experiences are necessary to shape functional action of the previously outlined neural circuitry, constituting the neurobiological mechanism underlying coping.

Moderate early-life stress may be represented by normative experiences in our upbringing. Acquiring more and more autonomy from parents or caregivers, adapting to new kindergarten or school settings, making friends, and finding a romantic partner, may represent early developmental tasks in childhood and adolescence, testing our capacity to adjust, ultimately constructing our biological readiness to face subsequent situations of heightened distress and demands. This idea – of "pro–resilience effect of encountering and overcoming stress-inducing situations during development" – has been previously described (Russo et al., 2012, p. 1478). Here we provide a formal theoretical model considering the underlying neurovisceral aspects of resilience in humans, with a focus on the integrative action of the ANS.

Adaptive Functioning in Health and Disease

Based on this neurovisceral perspective, it had been argued that in order to arrive at a complete model, the complex variety of pathways that ultimately cause a specific disorder of interest should be accounted for (Brosschot et al., 2006). As a commonly held view in the field of developmental psychopathology, based on findings that the majority of mental disorders have their onset during childhood or adolescence (Merikangas et al., 2009, 2010; Meyer & Lee, 2019), psychiatric disorders are seen as developmental disorders (Koenig, 2020). Aiming to arrive at a model providing a conceptual understanding of the etiology of psychiatric disease, while assuming that psychiatric disorders are in fact developmental disorders and the outcome of insufficient *coping* and absence of *resilience*, the NIM has been elaborated toward an explanatory model of developmental psychopathology, considering neurodevelopmental aspects and sensitive periods of early human development from a neurovisceral perspective.

Animal research on the effects of exposure to stressful events suggests that under certain circumstances, such exposure can lead to blunted reactions to future adverse events (Maier, 2015). This process has been called by various names including stress inoculation, poststress thriving, and stress resistance. One mechanism that has been shown to produce such protective or resilience responses is behavioral control. In Chapter 5 in the present volume, Baratta and Maier explain that behavioral control in the form of control over exposure to *escapable stress* can "immunize" rodents to future *inescapable stress*, such that the behavioral and physiological stress responses normally associated with *inescapable stress* are absent or blunted. Importantly, they have identified the medial PFC as a key structure in the neural circuitry that mediates this stress-buffering effect. Specifically, the PFC is part of a top-down inhibitory circuit that modulates brainstem stress-responsive structures such as the amygdala (Maier, 2015), which would otherwise be chronically activated. We and others have identified this circuitry in emotion and stress regulation (Sakaki et al., 2016; Thayer et al., 2012; Thayer & Lane, 2000). In addition, we have shown that HRV may serve to index this circuitry such that greater levels of HRV are associated with greater inhibitory control and emotion regulation (Smith et al., 2017; Steinfurth et al., 2018).

In peripubertal monkeys, it has been shown that early intermittent maternal separation promotes resilience via an increase in cortical volume of the vmPFC (Katz et al., 2009). The authors suggested that "the … process of coping with [early-life] stress increases prefrontal myelination and expands a region of cortex that broadly controls arousal regulation and resilience" (Katz et al., 2009, p. 294). As outlined earlier in this chapter, and in previous elaborations (Koenig, 2020), we assume similar processes in humans in shaping adaptive ANS function. Support for this idea comes from a recent study of preschool and kindergarten children (Patron et al., 2021). In this study, 42 children who were 4 years old were assessed over a 4-year period in the transition from preschool to kindergarten. Heart rate variability was assessed yearly and the 4-year trajectory calculated. In addition, early-life stressors were assessed. It was found that whereas the HRV trajectory had little effect on the well-being of children with few early-life stressors, for those children with greater numbers of early-life stressors the greater the increase in HRV over time the better their well-being after 4 years. Thus, for those children exposed to many early-life stressors their HRV, as a proxy for prefrontal inhibitory control, may have buffered the negative effects of those early stressors on their well-being.

Concluding Remarks

The interplay of the autonomic nervous system with other physiological systems (e.g., other stress-response systems such as the HPA axis, or the immune and circadian systems) is considered essential to individual development, adaptation, and well-being (e.g., Agorastos et al., 2019; Chrousos, 2009; Chrousos & Gold, 1992). Furthermore, studying the adaptive functioning of the ANS (i.e., balance and interplay between sympathetic and parasympathetic activity) is complex, and it is has been pointed out previously that, to study the complexity of autonomic regulatory processes, it might not be enough to focus on one single marker (such as HRV) at a time (Pozzato et al., 2019). A combination of several markers indicating differing states of ANS activity (Prinsloo et al., 2014; Walker et al., 2017), or combining autonomic indices with markers from other stress-response systems, such as the HPA axis, might increase predictive ability concerning outcomes of interest. The combination

of markers from different physiological systems within a machine-learning framework might present a promising research avenue, as demonstrated in a previous study focusing on various autonomic and endocrine markers in the context of early-life adversity (Aimie-Salleh et al., 2019). We have previously suggested that research is warranted aiming to "disentangle findings on aberrant and normative development rooted in the complex interplay of various physiological systems and their interaction under development" (Koenig, 2020, p. 2).

To recapitulate, the dynamical systems model of neurovisceral development assumes that ANS maturation, characterized by a (non-linear) increase in vagal activity starting in early childhood, and continuing throughout adolescence, is tightly linked with PFC development and one's developing coping capacity. When the ANS does not have the opportunity to mature sufficiently during sensitive neurodevelopmental periods, this is assumed to be associated with insufficient maturation of prefrontal brain regions further involved in coping, resulting in emotion dysregulation, increased vulnerability, and an associated risk for the development of psychopathology. In the respective model, exposure to severe forms of early adversity is discussed as one potential antecedent factor contributing to abnormal brain and ANS maturation. This notion is supported by related strands of neurodevelopmental research, including the three-hit concept of vulnerability and resilience (Daskalakis et al., 2013) aiming to provide an explanatory model for the neurodevelopmental consequences of exposure to early-life adversity and its efficient or inefficient regulation. Here, we extended such ideas, suggesting that in turn, exposure to mild or moderate forms of stress are necessary to develop adaptive coping. In line with other theoretical conceptualizations, it becomes evident that potential consequences – as a result of early exposure to adversity – can range from heightened vulnerability and disease risk on the one end, to resilience based on protective factors from disease on the other end of a continuum. Importantly, both have to be considered sides of the same coin that we call life.

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10 Childhood Adversity and the Development of Coping

Dante Cicchetti and Jason José Bendezú

Introduction

The experience of early adversity comprises a set of pathogenic conditions external to the child that confer risk for maladaptation. The deleterious effects of these adverse experiences take hold in children's developing brains and bodies, and, in so doing, often initiate a probabilistic pathway toward compromised physical and mental health into adulthood (Cicchetti, 2017; Gunnar et al., 2020). As a result, the manner in which children strive to adapt under early adverse conditions is critically important in delineating effortful coping processes and involuntary stress reactions that potentiate or mitigate against such negative developmental cascades and adversity-related sequelae (Cicchetti & Rogosch, 2009).

In this chapter, we focus on one type of early adversity, child maltreatment, and its contribution to the development of coping. Our central thesis is that abusive and neglectful caregiving shapes psychobiological systems in such a way that (a) restricts access to learning experiences and executive resources requisite for more sophisticated forms of coping, and (b) increases the likelihood of rudimentary coping skill utilization and involuntary stress responding. First, we review some of the ways child maltreatment and coping have been conceptualized and operationally defined, highlighting those definitions that serve as primary references in the sections that follow. Second, we summarize pathways through which maltreatment can contribute to the development of coping. Specifically, we outline effects of maltreatment on psychosocial processes and stress-sensitive biological mechanisms (e.g., neuroendocrine, inflammation, neurocognitive, neurobiological) that can undermine adaptive coping development. Lastly, we conclude with translational implications, noting how coping-based preventive intervention may alter trajectories toward maladaptation. Specifically, we argue that therapeutic instruction in coping skills may capitalize on the plasticity of children's developing brains and bodies, with the potential to reverse the multilevel deleterious effects of maltreatment.

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Conceptualizations and Definitions

Our work has benefited from adopting a multidimensional approach to child maltreatment between caregivers and children (Barnett et al., 1993), with the study of such early adverse experiences encompassing sexual abuse, physical abuse, physical neglect, and emotional maltreatment subtypes. These varied subtypes cover a diverse range of phenomena that collectively characterize the failure of the early caregiving environment. Sexual abuse involves sexual activity (e.g.,

pornography exposure, touching privates, sexual intercourse) between a caregiver and a child. Physical abuse comprises any intentional act on behalf of a caregiver that causes injury (e.g., bruises, broken bones) to a child. Physical neglect consists of a caregiver's lack of provision of a child's basic physical needs (e.g., food, clothing, shelter) and supervision over a child's physical whereabouts. Emotional maltreatment encompasses caregiver behavior (e.g., criticism, marital conflict, emotional abandonment) that compromises children's socioemotional development (e.g., emotional security, self-esteem, autonomy).

Capturing the complexities of child maltreatment as it pertains to the development of coping is likely enhanced by attention to several qualitative and temporal descriptors of such experiences. In our work, such nuanced understanding of child maltreatment has been achieved by utilizing official records of its occurrence that have been coded with the Maltreatment Classification System (MCS; Barnett et al., 1993; Manly, 2005). The MCS captures the aforementioned subtypes, but also the onset, frequency/chronicity, and severity of maltreatment experiences. Such an approach permits the examination of specific subtype as well as cumulative subtype exposure (e.g., co-occurring abuse and neglect) effects on psychological and emotional adjustment. Still further, timing of maltreatment (e.g., early vs. recent onset) may be particularly salient to the study of typical or aberrant coping development and risk for psychopathology.

The study of coping, like maltreatment, also presents a number of fundamental difficulties pertaining particularly to varied conceptualizations as well as the wide range of strategies and skills covered. In this chapter, we reference theoretical models and operational definitions provided by the Responses to Stress (RTS) framework (Compas et al., 2001). From this perspective, coping consists of voluntary emotional, cognitive, and behavioral attempts to modify a stressor or modulate one's responses to it. The results of numerous factor analytic studies suggest that effortful coping can be broken down into three main categories: primary control engagement coping (PCEC), secondary control engagement coping (SCEC), and disengagement coping (DC). Strategies of PCEC focus on altering a target stressor (e.g., problem-solving) or modifying the social environment in service of altering the target stressor (e.g., expressing emotions to someone). As such, PCEC is comprised of both intrapersonal (e.g., "I think of different ways to change or fix the situation," "I do something to try and fix the stressful parts of problems") and interpersonal (e.g., "I ask other people or things for help or for ideas about how to make things better," "I get sympathy, understanding, or support from someone") skills. Strategies of SCEC focus on altering one's cognitions about a stressor (e.g., cognitive restructuring, positive thinking) and typically take place at the intrapersonal level (e.g., "I think about the things I'm learning from the problems, or something good that will come from it," "I tell myself that I can get through this, or that I will be okay or do better next time"). Strategies of DC focus on orienting away from a stressor (e.g., avoidance, denial) and can take place at the intrapersonal (e.g., "I try to believe that it never happened") and interpersonal (e.g., "I try to stay away from people and things that make me feel upset or remind me of the stressful aspects of problems") levels. The RTS framework also includes a set of stress responses that are less volitional in nature. Involuntary stress responses (ISRs) encompass immediate, automatic stress reactivity at the cognitive (e.g., attention to threat), behavioral (e.g., escape), and emotional/physiologic (e.g., hyperarousal) levels. Though the effectiveness of a particular coping strategy may depend on fit with aspects

of the individual utilizing it (e.g., cognitive capacity) or the context (e.g., maltreating) in which it is used (e.g., Bendezú et al., 2019; Cicchetti & Rogosch, 2009; Wadsworth, 2015), PCEC and SCEC are generally associated with positive outcomes and DC associated with negative outcomes (Compas et al., 2017). Poorly managed ISRs are also associated with the emergence of psychopathology (Compas et al., 2001).

Accounting for both controlled and automatic responses to stress in dual-process coping models lends insight into the manner in which maltreatment thwarts the development of engagement coping. From the RTS perspective (Compas, 2009), the normative development of coping is characterized by a shift from automatic responses to stress toward autonomous volitional control of stress reactivity, presumably because the ability to employ effortful coping responses to manage involuntary stress reactivity improves as children age into adolescence and adulthood. Maltreatment, therefore, may contribute to aberrant coping development by impeding the shift toward volitional control and impinging upon children's ability to utilize effortful coping in service of managing involuntary stress reactivity. In the following sections, we detail pathways through which the early maltreating environment complicates engagement coping development. Specifically, we discuss maltreatment as a potentiator of involuntary stress reactivity that interferes with children's effortful coping attempts after stress exposure (i.e., *regulatory interference*; Bendezú et al., 2016; Cole et al., 2017) as well as a failure of the early caregiving environment to socialize children toward effortful coping and away from involuntary stress responsivity (Cicchetti & Lynch, 1995). Additionally, we outline ways in which maltreatment impinges on the biological foundations of coping, highlighting neuroendocrine, inflammation, cognitive, and neurological coping resources that are restrained in the face of ongoing threat and neglect over the course of development for maltreated youth.

Psychosocial Processes

The early caregiver–child relationship is one of the first contexts in which children develop inner resources for adaptive coping with stressors. Secure attachment fosters a sense of confidence and knowledge that caregivers will be responsive, available, and open to communication when needed most (Ainsworth, 1990; Bowlby, 1982). In so doing, secure attachment sets the stage for children's consideration of alternative solutions for managing stress (e.g., intrapersonal, face a controllable stressor head on individually; interpersonal, seek support when faced with an uncontrollable stressor that cannot be managed individually) (Bretherton et al., 2005). Indeed, early proximity-seeking for securely attached children is subsequently differentiated into a variety of adaptive interpersonal coping strategies (e.g., seeking comfort, help, advice, support). To this end, secure attachment in the early caregiver–child relationship and practice with interpersonal strategies may also provide a basis from which later intrapersonal strategies develop (e.g., early interpersonal problem-solving as a precursor to later intrapersonal problem-solving; early interpersonal distraction as a precursor to later intrapersonal distraction). Internal working models about the dependability and availability of care (or lack thereof) likely also promote adaptive behavioral patterns of engagement (e.g., desire to explore, approach) and disengagement (e.g., desire to seek safety) (Cassidy & Shaver, 2008).

As such, the early caregiving environment also represents one of the first contexts in which effortful coping skills and ISRs are learned and conditioned, respectively

(Compas et al., 1999; Morris et al., 2007). Though based at least in part in temperament and genetically based biological predispositions, ISRs are also automatized, maintained, and exacerbated through associative conditioning processes that do not include conscious control (Compas et al., 2004), helping to alter children's brains and bodies toward habitual, involuntary responses to stress (e.g., fight, flight) that quickly meet the demands of inhospitable rearing environments. While ISRs promote survival for children living in maltreating contexts (e.g., maintained emotional and physiologic arousal when contending with potential caregiver abuse or missed experience-expectant experiences with caregiver neglect), they preempt effortful coping processes and their development by narrowing attentional focus to managing threat and limiting the availability executive resources that would otherwise be used for cognitively complex engagement coping (e.g., problem-solving; Bendezú et al., 2016). Poorly developed engagement coping skills and, thus, poorly managed ISRs can also make it difficult for youth to garner support from social others in domains outside the maltreating home environment (e.g., peers). Poorly managed ISRs in interpersonal contexts may have a particularly deleterious impact on girls, given their higher sensitivity to interpersonal stressors relative to boys as well as greater reliance on friendships for social support when managing stressors (Rudolph, 2002; Skinner & Zimmer-Gembeck, 2009).

Abusive and neglectful caregiving is also characterized by a lack of socialization toward sophisticated means of managing stress. There are three modalities by which parents socialize children on how to respond to stressful situations: modeling, coaching, and family interactions. Maltreating families fail to model or coach children toward engagement coping (e.g., problem-solving, emotional expression). Rather, sexual (e.g., coercive contact), hostile (e.g., yelling), aggressive (e.g., physical threats), and punitive (e.g., derisive criticism) interactions with children encourage the use of disengagement coping (e.g., avoiding abuse, pretending the abuse is not real, wishing the abuse would stop or go away). Functional adaptation accounts of coping suggest that punishment and reinforcement also play a role (Wadsworth, 2015), insofar as children's active efforts to intervene in abusive contexts may compromise physical safety and emotional security (e.g., expressing negative emotion to a caregiver may elicit an abusive response) while passive efforts to evade abuse may neutralize immediate threat of harm (e.g., suppressing negative emotion expression or avoiding caregivers when negative emotions are experienced). Thus, abuse may favor overreliance on disengagement coping relative to engagement coping, which may serve to heighten or maintain ISRs. Still further, neglectful caregiving environments fail to socialize children toward effortful coping skills altogether (Gruhn & Compas, 2020), as well as awareness and understanding of youth's own and social others' emotional and physiological states (Shipman et al., 2005). Lower emotional self-awareness and empathy may hamper engagement coping skill utilization at the intrapersonal (e.g., knowledge of one's response to stress in order to initiate engagement coping) and interpersonal (e.g., knowledge of others' emotional states to evaluate suitability for social support) levels. Inexperience with expressing negative emotion to social others, overreliance on expressive suppression and social avoidance, and limited coping skill socialization and emotion knowledge may be especially debilitating for girls as they age into adolescence, given that emotionally close relationships (e.g., friendships) increasingly serve as a context for socialization of more sophisticated interpersonal coping skills (Glick & Rose, 2011; Rose et al., 2016).

Although disengagement forms of coping and ISRs may serve adaptive functions in the short term (e.g., ensure safety in high-threat environments), their habitual use and unmitigated experience confer risk for the development of psychopathology (Compas et al., 2017). Such risk emerges when disengagement strategies are frequently used and involuntary responses are frequently experienced in low-threat scenarios where effortful engagement and self-control are socialized and expected (e.g., daycare, primary schooling). Researchers have, thus, argued that a variegated coping repertoire that helps children flexibly meet the demands of different environmental stressors may be optimal (Wadsworth, 2015). However, maltreatment, in particular, makes such flexibility difficult to achieve, in part because of the severity of the stressor, threat to emotional and physical safety, the intensity of the ISRs induced, and grave consequences associated with deviating from habitual avoidant responding. This difficulty has implications for coping-based therapeutic work. While preventive interventions may provide school- or clinic-based opportunities for maltreated youth to develop and practice a more particolored palette of skills, such therapeutic efforts may over time fail to promote engagement strategy utilization and reduce unabated reliance on avoidance if these forms of coping remain functionally maladaptive and adaptive in children's adverse home environments.

Neuroendocrine Function

Research increasingly suggests that the roots of psychopathological development take hold when acute or chronic stress (e.g., maltreatment) is experienced early in life or during sensitive developmental periods of neural plasticity, in large part due to overtaxation of stress-sensitive neuroendocrine systems; for example, the hypothalamic-pituitary-adrenal (HPA) axis (McEwen, 2013). Importantly, these systems underlie coping. When triggered by a stressor, the HPA axis releases glucocorticoids, such as cortisol, that mobilize glucose-mediated energy stores that serve to increase cognitive attunement to and facilitate adaptive management of the stressor (Kaltas & Chrousos, 2007). Acute and chronic stress exposure contributes to dysregulated HPA function, often indexed by initial stage HPA hyperactivation that over time evolves into hypoactivation (Miller et al., 2007). Overexposure to glucocorticoids that accompanies HPA hyperactivation is known to have neurotoxic effects on higher-order brain regions (e.g., prefrontal cortex; Shansky & Lipps, 2013), those requisite for cognitively sophisticated engagement coping. HPA hypoactivation, while protective against cortisol-related neurotoxicity, fails to mobilize biological resources requisite for generating appropriate behavioral responses to acute stress. Rather, HPA hypoactivation is accompanied by "spillover" effects onto peripheral stress-sensitive systems (e.g., sympathetic nervous system) that, in addition to overtaxing and potentially damaging central nervous system resources leading to physical disease (Danese & McEwen, 2012), facilitate heightened threat monitoring as well as more automatic stress responding that are ever ready to neutralize potential threats. Together, these findings suggest that acute maltreatment experiences and ongoing exposure to abuse and neglect may compromise neuroendocrine functioning in such a way that restricts access to executive resources requisite for sophisticated engagement coping and promotes avoidant and prepotent stress responding.

Findings from our recent investigations focusing specifically on maltreatment as a stressor are consonant with these claims, with

differences in the qualitative features of neuroendocrine dysregulation accounted for by maltreatment timing and subtype, as well as child gender. Many of these studies have been conducted using samples of maltreated and nonmaltreated, low-socioeconomic status (SES) (e.g., from families eligible for Temporary Assistance to Needy Families) preadolescent youth ages 8–12 years attending a research summer day camp. Saliva samples were collected over the course of the day for 5 days and assayed for cortisol. Family USA Department of Human Services records and children's maltreatment information were coded using the MCS (Barnett et al., 1993). We additionally interviewed families with no child abuse registry documented history of maltreatment.

Guided by theoretical and empirical accounts of neural plasticity and rapid stress-sensitive neurobiological systems (e.g., frontolimbic) development during the early years of life (Thompson & Nelson, 2001), we tested the hypothesis that physical and sexual abuse prior to the age of five (i.e., early onset maltreatment) would be associated with compromised neuroendocrine functioning, with the most pronounced effects observed of maltreated youth currently struggling with internalizing difficulties (Cicchetti et al., 2010). While early onset maltreated youth were more likely to experience internalizing symptoms relative to maltreated youth without early incidents and their nonmaltreated counterparts, those with co-occurring symptomatic functioning also were more likely to exhibit a flat pattern of cortisol secretion over the course of the day. These findings are consistent with accounts of blunted diurnal changes and hypocortisolism as patterns of HPA dysregulation linked to allostatic load-related disturbance (McEwen, 2013), extending the notion that early relative to late maltreatment onset may be a stronger contributor to such dysregulation and disturbance in preadolescence. Dysregulation of the HPA of this sort ill-equips early maltreated children to marshal neuroendocrine resources needed to cope efficaciously with stressors, which may thwart the development of more sophisticated engagement coping skills as children age into the second decade of life.

A more recent investigation also points to the utility of additionally considering the recency of maltreatment exposure when examining early and late onset maltreatment effects on neuroendocrine regulation (VanZomeren et al., 2020). In this study, we showed that youth who experienced initial maltreatment after the age of five (i.e., late onset maltreatment) were more likely to exhibit blunted daytime cortisol patterns, relative to their early onset (i.e., before the age of five) maltreatment counterparts. Importantly, a larger percentage of late onset maltreatment youth (63%) had recently experienced maltreatment when compared to early onset youth (20%). These findings are consonant with early meta-analytic evidence suggesting that cortisol outcomes are more pronounced for recent stress exposure (Miller et al., 2007) and recent meta-analyses proposing that more proximal stressor exposure contributes to stress-related circadian dysregulation and related neuroendocrine dysfunction (Adam et al., 2017).

Another investigation suggested that patterns of neuroendocrine dysregulation linked to a pervasive history of maltreatment exposure may differ for boys and girls (Doom et al., 2013). Given theory (Kajantie & Phillips, 2006) and evidence (De Bellis et al., 1994; MacMillan et al., 2009) pointing to cortisol hyper- and hyposecretion in maltreated boys and girls, respectively, we examined qualitative differences in neuroendocrine activity as a function of youth maltreatment history and gender. When operationalized as the sum of maltreatment subtypes, severity, and

developmental periods when maltreatment occurred, maltreatment pervasiveness predicted elevated and blunted diurnal cortisol levels for boys and girls, respectively. Inference about the gendered nature of dysregulated neuroendocrine function for maltreated youth was strengthened by subsequent multihormone analyses of coordinated cortisol and dehydroepiandrosterone (DHEA) activity. Of note, pervasively maltreated boys exhibited higher cortisol–DHEA diurnal ratios relative to girls with lower cortisol–DHEA ratios.

These multihormone findings are particularly relevant to understanding how maltreatment may deleteriously alter neuroendocrine foundations of fully developed engagement coping. Well-orchestrated cortisol and DHEA activity (e.g., close 1:1 correspondence) is critical to executive processes that support sophisticated stressor management. By opposing the effects of cortisol (Pinto et al., 2015), DHEA permits cortisol-mediated glucose mobilization to enervate neurobiological circuits (e.g., frontolimbic; Shansky & Lipps, 2013) and support executive processes (e.g., attentional control, working memory; Shields et al., 2016) necessary for complex coping skills. When unopposed by DHEA, disproportional cortisol elevations brought on by a history of pervasive maltreatment exposure may constrain complex coping skill utilization via allostatic load–related processes and noxious effects on neurobiological substrates that support coping (McEwen, 2013). Indeed, high cortisol relative to DHEA has been linked to adolescent internalizing psychopathology (Goodyer et al., 2001). As a complement to these findings, some of our prior work has shown that rising DHEA levels over the course of the day for maltreated children are associated with healthier socioemotional functioning (Cicchetti & Rogosch, 2007). Taken together, these results perhaps suggest that DHEA helps maltreated youth utilize circulating cortisol to cope with depressive and anxious thoughts and feelings in an adaptive manner. Alternatively, pervasively maltreated girls exhibited lower cortisol to DHEA diurnal production, a pattern previously linked to antisocial behavior in adolescent girls (Pajer et al., 2006). Thus, one possibility may be that lower cortisol associated underarousal and high DHEA associated anxiolytic effects (Grillon et al., 2006), at an extreme disproportion, may contribute to blunted neurophysiological states that poorly equip girls to utilize engagement coping for managing prepotent response tendencies toward risky or disruptive behaviors, those that function to upregulate hypoarousal (Kamin & Kertes, 2017).

Inflammatory Processes

Relative to neuroendocrine function, surprisingly little empirical attention has been paid to maltreatment-related injury to immune system functioning and the potential role abuse-triggered proinflammatory processes play in atypical coping development. There are, however, theoretical models that have been born out of this fairly nascent evidence base that implicate immune system disturbance as a mechanism of risk in chronic stress exposure to psychopathology linkages (Chen et al., 2015; Shields et al., 2017; Slavich & Irwin, 2014). Most importantly, these models have as their central focus both coping and self-regulation processes, illustrating conceptual pathways by which dysregulated inflammatory activity can compromise coping ability and lead to self-regulatory failure.

The shift-and-persist model (Chen et al., 2015) posits that the experience of chronic stress may contribute to low-grade inflammation processes implicated in the pathogenesis of numerous forms of psychopathology (e.g., depression). Specifically, the model outlines

how chronic stress–related alterations to biological stress response system functioning (e.g., exaggerated HPA, autonomic nervous system, and cytokine reactivity) contribute to *glucocorticoid resistance*, whereby immune cells (e.g., monocytes, macrophages) responsible for modulating proinflammatory processes become less sensitive to cortisol's anti-inflammatory signaling properties. The resulting downregulation of glucocorticoid-receptor activity permits these immune cells to respond aggressively in an unchecked manner to potential injury and insults to children's developing brains and bodies, including those sustained from exposure to early adversity, thereby contributing to low-grade inflammation. The shift-and-persist model further suggests that adaptive and maladaptive coping patterns in response to chronic stress have the potential to ameliorate and exacerbate biological stress responsivity that confers risk for the development of glucocorticoid resistance, and vice versa. Thus, coping development in the face of adversity may depend, in part, on well-regulated neuroendocrine and inflammation processes.

The immunologic model of self-regulatory failure (Shields et al., 2017) offers a developmental perspective on how early-adversity-related inflammation can compromise the emergence of self-regulatory capacity, with a focus on bidirectional communication between the immune system and brain facilitated by the HPA axis and sympathetic-adrenal-medullary (SAM) system. In the face of stress, HPA-related glucocorticoid (e.g., cortisol) activity and SAM-related noradrenergic (e.g., epinephrine, norepinephrine) activity function as key down- and upregulators, respectively, of proinflammatory cytokine activity (e.g., tumor necrosis factor-α, TNF-α; interleukin-1β, IL-1β; interleukin-6, IL-6). In this way, stressor-activated HPA and SAM systems reduce and increase inflammation, respectively, with cortisol produced by the SAM-innervated HPA helping to suppress the initial SAM response and protect against brain and bodily damage that may result from prolonged SAM and, thus, increased inflammation activity. Indeed, proinflammatory cytokine activity and inflammation processes directly and indirectly influence neuronal activity (e.g., microglia activation, stimulation of cytokine receptors on neurons and the vagus nerve), which then contribute to structural and functional changes in brain regions and circuitry (e.g., amygdala, prefrontal cortex, orbitofrontal cortex, insula, striatum, nucleus accumbens) implicated in the development of self-regulatory capacity, emergence of healthy coping, and skills for managing involuntary stress reactivity. The manner in which poorly managed stressful experiences come to interfere with self-regulatory capacity and lead to eventual failure is by impinging on any number of these processes, with cascade effects across levels, for example hyperactive SAM and blunted HPA systems that upregulate and fail to terminate proinflammatory processes, respectively, that can exert neurotoxic effects on frontolimbic activity.

Our emerging studies examining child maltreatment to inflammation linkages are consistent with these conceptual models and the emerging empirical evidence base upon which they were formulated. Specifically, our investigations have revealed additional nuance in maltreatment–inflammation linkages by attending to those qualitative and temporal descriptors of maltreatment experience as well as inflammation genetic variation. We have focused on C-reactive protein (CRP) as a biomarker of systemic inflammation, in particular, given recent meta-analytic evidence suggesting that maltreatment, specifically, is positively associated with CRP levels (Coelho et al., 2014). We also have examined functional allelic variants of CRP genes, given

evidence of CRP genetic variant augmented risk for the emergence of depression (Bufalino et al., 2013). Utilizing a sample of low-income, maltreated and nonmaltreated youth attending a summer day research camp, Cicchetti and colleagues (2015) tested whether the effect of timing of maltreatment on inflammation biomarkers would vary by inflammation biomarker genotype, and whether inflammation to internalizing symptom linkages would also vary by timing of maltreatment. Consistent with VanZomeren et al. (2020), our most dramatic maltreatment effects were observed in children with late (after the age of five) relative to early (before the age of five) onset maltreatment, that is, those children with a more recent history of exposure to maltreatment. Among these children, those with at least one A allele from CRP SNP rs1417938 exhibited higher CRP levels compared to their late onset maltreatment counterparts carrying the TT genotype. Still further, CRP levels were positively associated with childhood internalizing symptoms, but, again, only for those youth with late onset maltreatment experiences.

Our results highlight that maltreatment-related disturbance of immune system functioning is not isolated to those with early experiences, perhaps in contrast to a body of literature articulating the deleterious impact of early relative to later maltreatment occurrence on psychosocial functioning (Dunn et al., 2013; Kaplow & Widom, 2007; Manly et al., 2001). Rather, one possibility may be that inflammation, like cortisol (e.g., Adam et al., 2017; Miller et al., 2007), during preadolescence is more greatly impacted by more temporally proximal experiences of maltreatment. One plausible explanation may be that elevated inflammatory processes potentially constrain the development of coping through transactions with children's ever-changing environments. Shields et al. (2017) note that youth immune system dysregulation exerts its most deleterious impact on healthy development when it cascades into academic and social difficulties. Importantly, as children age into adolescence, the interpersonal peer and academic contexts, in addition to the family, become increasingly salient venues by which youth experience a host of novel stressors (e.g., making new friends, completing a group project), but are also socialized toward more sophisticated skills (e.g., emotional expression, problem-solving) for navigating them (Zimmer-Gembeck & Skinner, 2016). Thus, maltreatment-related inflammation during preadolescence, via impairment of self-regulatory capacity (Shields et al., 2016), may increase the likelihood of failure in both academic and interpersonal domains, as well as restrict opportunities to learn and develop more complex coping repertoires outside the more immediate and perhaps chaotic home environment. Such failure and limited learning opportunities may reciprocally compound into further inflammation elevations. Importantly, not all recently maltreated preadolescent children exhibited such elevations and links to internalizing, suggesting that attention to genetic variation may be key in understanding inflammation-linked susceptibility and constraints on coping development (Compas et al., 2017).

Utilizing a methodological approach similar to Doom et al. (2013), a more recent investigation illustrated how pervasive maltreatment exposure to low-grade inflammation linkages may vary for boys and girls (Ehrlich et al., 2021). Guided by evidence suggesting that females may be more vulnerable to inflammation-related disturbance associated with early adversity (e.g., Baldwin et al., 2018; Chen et al., 2016), we tested whether varied facets of children's maltreatment histories (e.g., maltreatment status, diversity of maltreatment experiences, chronicity of

maltreatment exposure) were associated with low-grade inflammation, and whether those associations were moderated by sex of the child. For this study, we used a comprehensive and robust index of children's low-grade inflammation, a composite of five biomarkers harvested from children's nonfasting blood samples: CRP, IL-6, IL-8, IL-10, and TNF-α. Our results showed that maltreated girls exhibited higher low-grade inflammation levels relative to maltreated boys. Examinations of maltreatment diversity and chronicity further disentangled these gendered effects, with girls who experienced two or more forms of maltreatment during two or more developmental periods exhibiting higher inflammation levels relative to girls who experienced one form during one period.

Gender differences that emerged in both Doom et al. (2013) and Ehrlich et al. (2021) for neuroendocrine and inflammation processes, respectively, provide converging evidence highlighting the differentially deleterious impact of maltreatment on girls' stress-sensitive biological functioning, functioning that underlies self-regulation and coping. Specifically, while maltreated boys exhibit elevated cortisol and lower inflammation levels, maltreated girls evinced lower cortisol and elevated inflammation levels. From an allostatic load perspective (Cicchetti, 2011a, 2011b; Juster et al., 2011), chronic stress experience (e.g., pervasive maltreatment) over time contributes to initial stage dysregulated cortisol hyperactivity that evolves into cortisol hypoactivity. This hypocortisolism end stage, through impaired glucocorticoid signaling, is accompanied by marked poor modulation of elevated proinflammatory cytokine activity (Guilliams & Edwards, 2010), compromised brain function in regions and circuits requisite for successful coping (Shields et al., 2017), and increased risk for later internalizing disorders (e.g., depression; Badanes et al., 2011). Thus, it may be that maltreated boys in our sample exhibited only the initial stages of allostatic load–related disturbance, while maltreated girls' cortisol-inflammation profiles indicated more advanced staging and related psychobiological impairment.

Although longitudinal research is needed to verify whether, in line with allostatic load models (Miller et al., 2007), such maltreatment-linked biological patterning and gender-based differences therein continue in etiologic fashion through to adolescence and adulthood, it may be appropriate to speculate here as to specific psychosocial factors that may have at least in part accounted for these observed gender differences. Disruptions in interpersonal relationships, shame, and self-blaming affect may be three relevant psychosocial factors, given evidence that each is more common and more predictive of adjustment in maltreated females than males irrespective of maltreatment subtype (Cicchetti & Valentino, 2006; Kim et al., 2009; McGee et al., 2001). Thus, girls may be more susceptible to maltreatment-related inflammatory processes, given that shame and self-blaming affect can color interpersonal interactions, disrupt the development of social problem-solving skills, and increase the likelihood of experiencing additional interpersonal relationship difficulties. Indeed, girls not only are more sensitive to such interpersonal stressors than boys (Guyer et al., 2009; Rudolph, 2002), but also tend to rely more on their close friendships with others to help meet affiliative and coping needs (Spear, 2009; Steinberg, 2014). Thus, for girls, maltreatment may be accompanied by interpersonal sequelae to which they are more sensitive, and restrict access to close friendships that they rely upon for coping, thereby increasing the noxious toll maltreatment exerts on girls' inflammatory processes.

Neurocognitive Pathways

Numerous aspects of memory and executive functioning are thought to be requisite foundations for the development and successful utilization of more sophisticated forms of engagement coping (e.g., problem-solving, cognitive restructuring; Campbell et al., 2009; Compas et al., 2017). Among those implicated aspects are working memory, inhibitory control, and attentional set shifting (Blair & Razza, 2007; Diamond, 2013). These skills reflect the ability to recognize and recall learned information from previous experience (e.g., stressful encounters) as well as multiple top-down mental processes that assist in goal-directed behavior, that are requisite in facilitating successful coping with stress (Zelazo et al., 2008). Evidence increasingly suggests that early adversity exerts deleterious impacts on these neurocognitive processes that underlie complex coping (for review, see Su et al., 2019), which thereby make more rudimentary (e.g., avoidance) and involuntary forms of stress responding more likely in the face of stress (Polak et al., 2012).

Our earlier work was one of the first of its kind to demonstrate the deleterious effects maltreatment can exert on preadolescent memory processes. In Valentino and colleagues (2009), we tested whether the *overgeneral memory* (OGM) effect, commonly studied in adults struggling with trauma (for review, see Williams et al., 2007), could be observed in maltreated children who attended our research summer camp. Youth in our study completed the Autobiographical Memory Test (Williams & Broadbent, 1986) and their recalled memories to each of 10 emotional prompts were coded for OGMs (i.e., "memories that did not contain at least one specific detail that identifies an event as a distinct episode"; Johnson et al., 2005). Our results revealed that abused children's recalled memories were less specific and more overgeneralized relative to neglected and nonmaltreated youth. Importantly, the abuse to OGM link was mediated by youth's negative self-representations and depressive symptoms, suggesting that internalized aspects of abuse and related effects on poor self-image contribute to impaired recall function.

A subsequent study that focused on recognition memory similarly benefited from attending to additional levels of analysis peripheral to neurocognitive function. Cicchetti et al. (2010) explored the relationship between children's maltreatment status and their performance on the California Verbal Learning Test – Children (CVLT-C; Delis et al., 1994). While there was no main effect of maltreatment status on children's performance on various subtests of the CVLT-C, significant interactions emerged between children's morning cortisol levels and their maltreatment status. Specifically, physically neglected and emotionally maltreated youth with low morning cortisol had higher rates of false positive word recognition and were less able to discriminate target words from distractor words relative to physically and sexually abused as well as nonmaltreated children with low morning cortisol levels. Taken together, these studies suggest child maltreatment may restrict access to memory processes that are needed for coping and that the specific memory process disrupted may depend on whether the child was abused (e.g., overgeneralized memory recall) or neglected (e.g., false positive recognition, discriminability). For example, the ability to recall specific details from prior events is needed to help children adjust expectations and coping behaviors to meet the demands of current or upcoming acute stressors. Still further, being able to accurately recognize and discriminate between stimuli that are threatening or inconsequential is likely supported by hypervigilance (e.g., careful attention and monitoring of novel contexts)

stemming from distinct incidents of abuse (Pollak et al., 2005; Shackman et al., 2007; Teisl & Cicchetti, 2008), but impaired by the chronic nature of neglect and the lack of exposure to stimuli altogether from which skills in recognition and differentiation develop (Cicchetti et al., 2010). Inability to recognize and differentiate stimuli may comprise children's ability to identify stressors and, thus, their ability to utilize specific coping skills and resources to adjust to the demands of specific stressors. Importantly, the manner in which maltreatment impinges upon these neurocognitive abilities appears in part to be a function of and depend upon children's internalization of these experiences at the self-image and neuroendocrine levels of analysis, respectively.

More recently, our research has shown that child maltreatment as a specific form of early adversity is linked to such compromised aspects of executive functioning, aspects with well-documented links to self-regulation (for reviews, see Zelazo, 2020; Zelazo & Carlson, 2012). Using a sample of maltreated and nonmaltreated children aged 3–9, Cowell and colleagues (2015) examined temporal aspects (e.g., developmental timing, chronicity) of children's maltreatment history as predictors of their performance on 10 neurocognitive tasks tapping into three aspects of executive functioning: three inhibitory control/working memory tasks (e.g., Day–Night Stroop-like Task, Gerstadt et al., 1994; Tapping Task, Diamond & Taylor, 1996; Three Peg Task, Balamore & Wozniak, 1984), three memory tasks (e.g., Corsi-Milner Test of Temporal Order and Recognition Memory; Six Boxes Task, Boxes Scrambled after Each Reach; Six Boxes Task, Boxes Remain Stationary), and three motor/attention control tasks (e.g., Control Version of the Day–Night Stroop-like Task, Gerstadt et al., 1994; Global-Local Spatial Processing Task, Forced Choice Procedure; Line Bisection Task). Utilizing composites formed by standardizing and aggregating scores across tasks within each neurocognitive domain, results showed that maltreated children performed more poorly on inhibitory control/working memory tasks relative to their nonmaltreated counterparts. No significant differences emerged for maltreated and nonmaltreated children with respect to memory or motor/attention control. Still further, children who experienced maltreatment initially during infancy or during three or more developmental periods exhibited poorer inhibitory control/working memory skills relative to their counterparts who experienced maltreatment after infancy or during only one developmental period. Difficulties with managing impulses and flexibly shifting attention linked to early adverse experiences may shape how maltreated children respond cognitively and behaviorally to stressors they encounter, perhaps favoring involuntary stress reactivity over effortful forms of engagement coping.

A more recent longitudinal investigation illustrated how deficits in neurocognitive function associated with children's maltreatment experiences during infancy help to explain aspects of children's aggressive behavior during early childhood. Specifically, Demeusy and colleagues (2018) tested whether children's history of neglect prior to age 12 months predicted mothers' report of their child's aggressive behavior at age 38 months, but also whether children's working memory skills at age 24 months mediated the relationship between infant neglect and early childhood aggression. Results revealed that children who experienced neglect during infancy not only performed more poorly on *spatial* working memory tasks specifically (e.g., Three Boxes Stationary; Diamond et al., 1997) a year later, but also engaged in more aggressive behavior (e.g., easily frustrated, hits

others) at 38 months of age. Still further, neglected children's spatial working memory skills accounted for additional unique variance in their aggressive behavior above and beyond that explained by their maltreatment histories, illustrating a pathway by which infant neglect compromised spatial working memory skills a year later, which then led to increased aggressive behavior in early childhood. Of note, spatial (relative to nonspatial) working memory recruits resources from prefrontal brain regions (Smith et al., 1995), those that are adversely impacted by early neglect and linked to antisocial behavior (Edmiston et al., 2011; Raine, 2002). As such, disrupted spatial working memory and prefrontal cortical activation may be mechanisms specific to neglect that potentiate risk for aggression.

Taken together, these studies illustrate the pernicious effect early and chronic maltreatment experiences may have on children's neurocognitive functioning, with implications for how maltreated children respond to stress. During the first year of life, children's brains undergo rapid neuronal changes, with such growth thought to increase their sensitivity to environmental input and stimuli (Johnson, 2011). Because infancy presents as a time of neurocognitive plasticity and development, it is also a period of marked vulnerability to external perturbation. As a result, maltreatment experiences during this window and related impairments to neurocognitive processes may have implications for children's behavioral functioning in later development. Deficits in children's early neurocognitive processes resulting from exposure to maltreatment may cascade into compromised coping ability and behavioral maladjustment later on in a heterotypic continuous fashion (Masten & Cicchetti, 2010). For example, cognitive difficulty connecting cues to consequences early on due to an unpredictable and inconsistent home environment may constrain children's ability to successfully attend to and manage stressors they encounter later on, possibly promoting hypervigilance and avoidance instead. Maltreatment-related neurocognitive insult may also constrain children's flexibility to adapt to novel challenge with complex coping skills. Such maladaptation may involve limited ability to (a) identify and shift attention toward and away from appropriate threats, (b) cognitively or behaviorally respond with well thought-out strategies, (c) evaluate the effectiveness of the strategy, and (d) learn and deploy a new strategy if needed. A compounding incapacity to flexibly adapt to stressors may over time solidify old behavioral phenotypes (e.g., aggressive and disruptive behavior for managing frustrative nonreward; Cicchetti & Tucker, 1994). If so, then chronic exposure to maltreatment may further exacerbate this growth-restrictive process, with altered neurocognitive function and neural reorganization favoring strategies for survival (e.g., disengagement coping, fight or flight responses) in chaotic and deprived conditions at the expense of developing new skills (e.g., engagement coping) requisite for learning and exploration (Cicchetti, 2013; Cicchetti & Rogosch, 2009; Compas et al., 2017).

Importantly, this research also illustrated the differential contributions of abuse and neglect to children's neurocognitive function, with implications for coping-based intervention. Abusive caregiving environments appear to alter neurocognitive function in a way that supports hypervigilance and biased responding to threat (e.g., predispositions toward disengagement relative to engagement coping that ironically heightens or maintains ISRs). Alternatively, neglectful caregiving appears to alter neurocognitive function in such a way that it restricts the development of executive resources needed for cognitively complex coping, those requisite for effective management of ISRs. From a stress and coping

perspective, it is possible that exposure to abuse socializes children to favor disengagement relative engagement coping skills at the neurocognitive level, whereas neglect fails to socialize children toward the development of engagement coping skills for managing ISRs altogether. If so, coping-based intervention for abused youth may need to focus on helping children unlearn what is being taught at home, while intervention for neglected youth may need to focus on learning what is not being taught at home.

Neurobiological Function

Neurobiological disturbance at both the structural and functional levels has been previously linked to child maltreatment, particularly in and between regions of the brain involved in coping and emotion regulation. When comparing adults with and without childhood maltreatment histories, reduced frontal lobe (Andersen et al., 2008; Dannlowski et al., 2012; Hart & Rubia, 2012) and hippocampal (Teicher et al., 2012; Woon & Hedges, 2008) volumes have been noted. Such research has also pointed to altered frontlimbic activation (e.g., increased amygdala (Dannlowski et al., 2012; van Harmelen et al., 2013) and prefrontal cortex (Fonzo et al., 2013; van Harmelen et al., 2014) reactivity). Frontolimbic connectivity pattern differences have also been observed (Cisler & Herringa, 2020; van der Werff et al., 2013). Although this literature is nascent relative to the maltreatment structural neuroimaging literature, researchers have begun to utilize functional magnetic resonance imaging methods to see if activation in specific brain regions is associated with coping (Compas et al., 2017). This work has primarily focused on more cognitively sophisticated coping (e.g., secondary control) and found that use of such strategies (e.g., cognitive reappraisal) requires greater activation and access to the prefrontal cortex (Robinson et al., 2015). Still further, this activation also appears to explain the effect of early uncontrollable stressor exposure on coping behavior in adolescence (Reising et al., 2018), highlighting a neurobiological mechanism and possible target of coping-based intervention.

Our own studies have attempted to demonstrate the far-reaching effects that early maltreatment can have on later neurobiological function. To do so, we followed our original sample of maltreated and nonmaltreated, low-SES youth who attended our research summer camp into adulthood. We then invited a subset of those adult participants to be interviewed and undergo a magnetic resonance imaging scan. Our design has helped circumvent limitations of the extant maltreatment imaging literature. Namely, our maltreated and nonmaltreated groups were matched on SES and risk at the outset, allowing us to isolate specific effects of early maltreatment on adult neurobiological functioning without the confounding group differences in stressors often present in the early maltreating context (e.g., poverty, poor school quality, community violence). Additionally, reports of maltreatment were prospectively obtained and, thus, not subject to recall bias as with retrospective self-reporting (Hardt & Rutter, 2004).

In Demers and colleagues (2019), we examined the neuroanatomical consequences of participants' early maltreatment experiences, with particular interest in brain regions implicated in efficacious coping utilization (e.g., prefrontal cortex; Compas et al., 2017). Specifically, we tested for structural differences in overall frontal lobe volume (e.g., superior frontal, rostral, and caudal middle frontal; lateral and medial orbitofrontal; Desikan et al., 2006) between our two groups when they were in their early 30s. Analyses controlling for individual differences in overall cranial volume

revealed that maltreated adult participants exhibited significantly lower frontal lobe volumes compared to their adult nonmaltreated counterparts. We also examined the role frontal lobe volumes played in maltreated and nonmaltreated participants' developmental pathways toward psychosocial competence in adulthood. Frontal lobe volumes may index self-regulatory capacity and biological coping resources (Yuan & Raz, 2014). As such, we tested whether these volumes mediated the link between early mother–child relationship quality to adult symptomatology (e.g., internalizing, externalizing) and adaptive functioning (e.g., education, work) linkages. For nonmaltreated participants, mother–child relationships characterized by trust and communication predicted increased frontal lobe volumes, which went on to buffer symptoms and promote adaptive functioning during adulthood. For maltreated participants, however, no evidence of such a pathway emerged. These results suggest that maternal caregiving quality has the potential to help develop children's frontal lobes, foster neurobiological self-regulatory and coping capacity, and thereby mitigate emotional maladjustment as children age into adulthood. Yet, maternal caregiving quality could not compensate for the negative effects of child maltreatment, further suggesting that child maltreatment has the potential to thwart this neurobiologically mediated self-regulatory pathway toward psychosocial competence.

The far-reaching consequences of early maltreatment experiences also are evident in participants' neural activation and circuitry. In Jedd and colleagues (2015), we showed that our maltreated (relative to nonmaltreated) participants exhibited more pronounced activation in the prefrontal cortex and basal ganglia (e.g., caudate, putamen) during an emotion-processing task (i.e., emotional face and shape matching; Hariri et al., 2000). Still further, and consonant with findings from a recent investigation of ours (Demers et al., 2018), maltreated participants exhibited stronger frontolimbic connectivity (i.e., amygdala to various prefrontal cortical regions including dorsomedial and dorsolateral) as well as intralimbic connectivity (i.e., amygdala to hippocampus) relative to nonmaltreated participants during this task. These findings may suggest that the task was more emotionally disturbing or stressful for maltreated participants. Their greater upregulation of cognitive control regions when the amygdala was activated during the task could indicate an elevated neural response to threat and possible hypervigilance to the angry and fearful face stimuli presented during the task. That upregulation of the hippocampus during amygdala activation also was observed perhaps suggests that maltreated participants were linking threatening stimuli to reactivation of negative memory traces.

Importantly, Demers et al. (2018) also illustrated the power of positive adaptation during adulthood for early-adversity-exposed individuals, given that group differences in frontolimbic connectivity patterns diminished after controlling for adult adaptive functioning levels. Similar positive effects for adult adaptive functioning among those who had experienced child maltreatment were observed in a new study that examined differences in inhibitory control between our maltreated and nonmaltreated adult sample. In Demers et al. (2021), adults underwent the International Affective Picture Go/No-Go task (Cohen & Thomas, 2013), which measures ability to inhibit a dominant response in the context of visual distractors (e.g., negative emotional valence background images). Results showed that adults with a substantiated history of maltreatment actually exhibited great inhibitory control, were more accurate in their identification of target stimuli, and evinced lower

prefrontal cortex activation when stimuli were presented with negative emotionally charged images in the background. It is possible that our findings point to the resilience of our maltreated adults. Over time, they may have learned based on their early experiences to exert greater inhibitory control particularly in negative emotion eliciting contexts. Still further, they did so and with greater task accuracy all the while exhibiting less recruitment of prefrontal cortex, perhaps suggesting more experience (e.g., desensitization) with negative valence content via their early experiences but also more efficient use of more moderate prefrontal cortical activation. For some high-functioning adults, maltreatment-related foundations for accurately perceiving and dealing with emotionally upsetting events may be available. This may suggest that (a) adults who go on to evince adaptive functioning may have intact/recovered coping capacities, or (b) improved coping capacities in the face of adversity support the emergence of adaptive functioning in adulthood. In sum, these studies point to the power of postmaltreatment adaptive functioning in fostering resilience, illustrating how early exposure to anger-laden interpersonal contexts may foster both a familiarity and readiness to cope with stress at the behavioral and neural levels as maltreated individuals age into adulthood.

Translational Implications

The conceptual models and empirical evidence reviewed thus far have illustrated numerous mechanisms by which experiences with early adversity, specifically child maltreatment, confer risk for maladjustment over the course of development. Maltreatment exerts a deleterious influence on children's developing brains and bodies. These neuroendocrine, inflammatory, neurocognitive, and neurobiological alterations have long-term consequences for how children develop skills for flexibly navigating and meeting the demands of the ever-expanding array of stressors they encounter over the course of ontogenesis. However, as illustrated in Demers et al. (2018) and more comprehensively outlined elsewhere (Cicchetti, 2013; Cicchetti & Rogosch, 2009), not all early-adversity-exposed children succumb to these experiences. Indeed, subsequent functional adaptation is possible for many maltreated children. As the research reviewed herein has pointed to sensitive developmental periods during which the multilevel roots of maladaptation take hold, these periods also present as opportune times for prevention and intervention efforts to capitalize on biological plasticity and reverse maltreatment effects (e.g., repair and recovery of immune-endocrine functioning for preadolescents contending with more proximal maltreatment exposure) (Steinberg, 2014). An important avenue for future research is, thus, to understand how therapeutic instruction in the development of a more complex coping repertoire at the child level might help to remediate maltreatment-affected psychobiological rhythms and, importantly, how targeting specific developmental windows may serve to maximize gains. Studying therapeutic efforts to foster caregiver relationships in which those skills might be adaptive appears equally important.

Preliminary evidence points to the promise of targeting biological substrates with interventions designed to enrich the early caregiving environment for early-adversity-exposed youth (i.e., relational interventions – see Toth et al., 2013, 2015). The Attachment and Biobehavioral Catch-Up (ABC) intervention has proved particularly influential in this regard (Bernard, Dozier, et al., 2015; Bernard, Hostinar, & Dozier, 2015). Focusing on infants living with a parent who had been referred to Child Protective Services,

children assigned to ABC relative to control treatment (e.g., Developmental Education for Families) exhibited higher waking cortisol values and steeper diurnal slopes over the course of the day following the intervention. Importantly, when assessed 3 years postintervention, children who received ABC relative to control treatment continued to exhibit this healthier profile of daily neuroendocrine regulation.

Our own research has shown that working to change the early maltreating environment has the potential to not only alter children's psychological states and biological rhythms for the better, but also those of caregivers as well (Toth et al., 2015). Our lab utilized the Child–Parent Psychotherapy (CPP) (Cicchetti et al., 2006), an attachment-based preventive intervention that focuses on enhancing the quality of the mother–child relationship by helping mothers come to understand their own experiences of being cared for in their childhood. Findings from Toth and colleagues (2015) suggested that neglectful mothers randomized to CPP, relative to their counterparts assigned to a psychoeducational control treatment (e.g., Psychoeducational Parenting), experienced decreases in child-related stress (e.g., stress stemming from child behavior) relative to parent-related stress (e.g., stress stemming from the parental role). Still further, their child-related stress specific decreases were associated with lower maternal basal cortisol levels (i.e., less physiologic stress) at 1 year postintervention. Taken together, relational interventions may operate across multiple levels of analysis to enrich the early caregiving environment, with improvement of mother and child psychobiological function perhaps priming the early relational context for the socialization and development of successful coping skills.

Interventions geared toward helping older (e.g., middle childhood to adolescence) maltreated youth intentionally change the ways in which they effortfully respond to stressors (i.e., coping) and manage involuntary responses to them (i.e., fight, flight, freeze) may have the potential to mitigate against the emergence of psychopathology (Gruhn & Compas, 2020). Indeed, our own recent work points to preadolescent engagement coping (e.g., problem-focused coping) and involuntary stress reactivity (e.g., emotion-focused coping) as risk-protective and risk-potentiating mechanisms, respectively, in the longitudinal linkages between early maltreatment exposure and later symptomatic functioning, and they thus represent viable targets of intervention (VanMeter et al., 2020). However, whether coping-based intervention improves maltreated youths' dysregulated biological rhythms for the better and, thus, buffers risk for psychopathology remains to be seen.

The closest promise of such therapeutic work, however, can be gleaned from new evidence of the efficacy of coping-based interventions for economically disadvantaged preadolescents afflicted by poverty-related stress (e.g., crime, trauma, violence exposure). Relative to assessment-only control, preadolescents who received the Building a Strong Identity and Coping Skills (BaSICS) intervention reported an increase in their utilization of engagement coping (e.g., problem-solving), a decrease in their reliance on disengagement coping (e.g., avoidance), and reductions in internalizing symptoms following intervention (Wadsworth et al., 2020). Importantly, preadolescents assigned to BaSICS also exhibited concomitant reductions in HPA hyperreactivity from pre- to postintervention, perhaps suggesting that the acquisition of coping skills for adversity-exposed youth helps to modulate HPA axis function and contributes to improvements in psychopathology symptoms.

Of note, certain aspects of the BaSICS intervention are consistent with tenets we have long

held about the promise of relational interventions, specifically, for older maltreated youth (e.g., Interpersonal Psychotherapy; Toth et al., 2013). Namely, in order for intervention to be effective with maltreated youth, it must be done either in communion with the offending agent or work on youth internalized representations of the self in relation to the offender. Because BaSICS is a group intervention that seeks to reform the offending agent (e.g., commonly identified source of community strain), it fosters a group identity (e.g., self-image) committed to evincing positive change in disadvantaged youth's environments (e.g., offending agent). If the means by which coping skills improved and took hold in BaSICS-assigned youth's biology involved changing their context so that coping was permissible and possibly well-received (Cicchetti & Rogosch, 2009), then it is possible that coping-based intervention for maltreated children that attends to these aspects (Toth et al., 2013) may also be successful in this regard.

In sum, as knowledge improves about the varied ways maltreatment gets "underneath the skin" and perniciously impacts biological substrates of coping development, incorporating assessments of psychobiological system activation in coping-based intervention efforts will become imperative (Cicchetti & Gunnar, 2008). With much more known about neuroendocrine dysregulation and its relationship with maltreatment, many interventions have recently begun to incorporate pre-post assessments of cortisol as a means of establishing efficacy across levels. Relatively speaking, we suspect that in the coming years, assessment of inflammation and neural processes will also make their way into pre-post interventions. Such work is imperative, as determining the levels and systems at which change is engendered through coping-based treatments not only will help to identify appropriate mechanisms of change, but also the extent to which plasticity at the neuroendocrine, inflammatory, neurocognitive, and neurobiological levels can be expected and thus promoted through intervention.

Summary and Future Directions

The study of child maltreatment and the development of coping are two mutually informative traditions that when combined have the potential to further elucidate the manner in which stressful life events shape children's developmental pathways toward and away from competence and psychopathology, respectively. We summarize the literature reviewed in Table 10.1, providing take-home messages to coping researchers for each mechanism discussed as well as translational implications therein. Considering the function of effortful coping (e.g., engagement, disengagement) and involuntary stress responses in both basic research and studies of prevention and intervention efforts with maltreated youth should help to advance the field toward this goal. Thus, an important direction for future research is developing coping measures that are sensitive to maltreated youth's age (e.g., observational coding measures for early childhood youth, self-report measures for middle childhood youth and older) and circumstance (e.g., assessing responses to stressors that occur across various domains). Such improvements in measurement may reveal certain skills to be more or less advantageous to maltreated youth depending on their developmental stage and situation. For example, sophisticated forms of engagement coping (e.g., problem-solving) may not be appropriate for younger maltreated youth in the face of ongoing uncontrollable stress (e.g., abusive parent–child interactions, interparental conflict), while behavioral distraction may be more efficacious in this regard. Similarly, while avoidance may provide temporary benefits (e.g., alleviate

Table 10.1 *Take-home messages for coping researchers organized by mechanism involved in maltreatment-coping pathways*

Mechanisms of risk	Essential message
Psychosocial processes	Early caregiving relationships are one of the first contexts in which children are socialized to effortful coping (e.g., problem-solving, support-seeking, avoidance) and involuntary stress responses (ISRs; e.g., fight or flight, automatic physiologic and emotional reactivity). Abuse promotes insecure attachment and socializes children to favor the use of disengagement (e.g., suppression of negative emotion expression, avoidance of caregivers when negative emotion is experienced) over engagement (e.g., expressing negative emotion to caregivers, approaching caregivers for support when negative emotions are experienced) coping, which ironically maintains or heightens ISRs. Neglect also promotes insecure attachment and fails to socialize children toward effortful coping strategies altogether and emotional self- and other-awareness requisite for developing intrapersonal and interpersonal strategies for managing ISRs. Offending home environments may have a particularly deleterious impact on girls, given that they rely on support from social others more than boys to meet coping and affiliative needs.
Neuroendocrine function	Maltreatment experienced during early childhood, middle childhood, and pervasively over the course of early and middle childhood can contribute to HPA axis dysregulation during preadolescence (e.g., hypocortisolism in girls, hypercortisolism in boys). These aberrant HPA processes reflect the underproduction and overproduction of stress hormones needed to efficiently mobilize physiologic resources for coping with stress. Cortisol underproduction is accompanied by spillover effects onto peripheral stress-sensitive systems (e.g., sympathetic nervous system) that potentially damage the central nervous system and contribute to heightened threat monitoring and automatic responses to stress. Cortisol overproduction has neurotoxic effects on higher-order brain regions that support sophisticated coping strategies (e.g., problem-solving). Importantly, DHEA production can oppose the effects of aberrant HPA patterns on psychopathological functioning, suggesting that studies of multihormone function are needed to further understand its contribution to the development of effortful coping and ISRs.
Inflammatory processes	Maltreatment experienced during middle childhood and pervasively over the course of early and middle childhood can contribute to low-grade inflammation in preadolescence (e.g., elevated C-reactive protein and inflammatory cytokine levels). The deleterious effects of low-grade inflammation and their contribution to the self-regulatory failure are best understood in the context of the peripheral HPA and the SAM systems. The HPA and SAM systems are important up- and downregulators of inflammatory processes. Maltreatment exposure may contribute insufficient cortisol production in the face of stress, which fails to downregulate the SAM system and, thus, indirectly upregulates inflammatory processes. Maltreatment can also contribute to *glucocorticoid resistance*, whereby immune cells responsible for downregulating proinflammatory processes

Table 10.1 (*cont.*)

Mechanisms of risk	Essential message
	become less sensitive to cortisol's anti-inflammatory signaling properties. Resulting low-grade inflammation directly and indirectly influences neuronal activity that contributes to structural and functional changes in brain regions and circuitry implicated in the development of engagement coping skills for managing ISRs. Notably, hypocortisolism accompanied by low-grade inflammation is most apparent in maltreated preadolescent girls, which some believe explains gender differences in rates of internalizing psychopathology as children age into adolescence. Disruptions in interpersonal relationships, shame, and self-blaming affect observed more in maltreated girls relative to boys may be relevant psychosocial factors that strengthen low-grade inflammation effects on coping and ISR-related maladjustment (e.g., social isolation and escape for safety).
Neurocognitive pathways	Maltreatment experienced during early childhood and pervasively over the course of early and middle childhood can contribute to specific neurocognitive deficits (e.g., poor inhibitory control/working memory) that impinge upon the development of effortful coping for managing ISRs. Deficits in memory function appear to be specific to the subtype of maltreatment experienced (e.g., abuse contributes to overgeneralized memory *recall*, neglect in the context of low-cortisol production contributes to false positive word *recognition* and lower *discrimination* of target words from distractor words). Inaccurate recall of specific details from prior events may hamper abused children's ability to adjust expectations and coping behaviors to meet the demands of current or upcoming acute stressors. Inability to recognize and differentiate stimuli may comprise neglected children's ability to identify stressors and, thus, utilization of specific coping skills and resources to adjust to the demands of specific stressors.
Neurobiological function	Early maltreatment experiences contribute to adult structural (e.g., lower frontal lobe volumes) and functional (e.g., more pronounced activation in the prefrontal cortex and basal ganglia, stronger frontolimbic and intralimbic connectivity) brain insults. Reduced frontal lobe volumes may index maltreated adults' impaired self-regulatory capacity and limited biological coping resources. Greater upregulation of prefrontal cortical regions when the limbic system is activated could reflect maltreated adults' elevated neural response to threat and possible hypervigilance. Upregulation of the hippocampus during limbic system activation may suggest that maltreated participants link threatening stimuli to reactivation of negative memory traces. Importantly, the benefits of early mother–child relationship quality on increased frontal lobe volume appears to be isolated to nonmaltreated adults, suggesting the maternal caregiving quality may not compensate for the negative effects of child maltreatment. However, adult adaptive functioning in early maltreatment-exposed adults appears to buffer against aberrant frontolimbic connectivity patterns, suggesting that high-functioning maltreated adults may have intact and/or enhanced coping capacities that favor resilience in the face of adversity.

Table 10.1 (*cont.*)

Mechanisms of risk	Essential message
Translational implications	The multilevel roots of maltreatment take hold at various sensitive developmental windows. As such, future coping-based prevention and intervention research is needed to better understand how targeting specific developmental windows with the aim of improving caregiver–child relationships and therapeutic instruction of coping skills for managing ISRs may maximize gains. Such research may be enhanced by attending to changes in both putative psychosocial and biological mechanistic functioning over the course of treatment.

distress, preserve physical safety) in inhospitable child-rearing environments, its ongoing use into middle childhood and adolescence in the face of more controllable stressors outside the home (e.g., academic tasks, peer interactions) may potentiate risk for psychosocial maladjustment.

To this end, a more nuanced understanding of how child maltreatment contributes to the development of coping and probabilistic pathways toward psychopathology also might be achieved with person-centered research attempting to elucidate maltreated youth's cross-context profiles of coping. For example, maltreated youth with coping repertoires predominantly characterized by disengagement and involuntary stress responsivity across contexts (e.g., family, academic, peer) may be at risk for the development of psychopathology, while those who maintain hypervigilance and avoidance at home but problem-solve and express themselves at school or with friends may evince adaptive psychosocial function. Indeed, such has been the focus of family interaction programs that work with children and adolescents living in residential care (e.g., practice with emotional awareness and regulation for managing uncontrollable home stressors, developing skills for identifying social others in less stressful, more controllable contexts that may provide support and further socialize engagement coping skills; Skinner & Zimmer-Gembeck, 2009). One additional postulation worth further consideration is whether a more predominant engagement coping repertoire across contexts, including the offending home environment, might still be linked with maladjustment for maltreated youth (i.e., threats to physical and emotional security at home that thwart potential benefits of engagement coping in low-risk contexts). To this point, a more comprehensive picture of how child maltreatment intersects with coping development must consider the functioning of other social partners and contexts with which maltreated youth interact, particularly if trust can be established with social others who can support, coach, and/or respond positively to engagement coping skill utilization.

Lastly, while both the maltreatment and coping literatures have been working in parallel to identify psychobiological mechanisms and concomitants, little empirical research has illustrated that alterations in stress-sensitive biological systems following maltreatment exposure actually modify developmental trajectories of coping. Establishing such relations is important, given that pathological disturbance of the neuroendocrine, inflammation, neurocognitive, and neurobiological systems may place constraints on the types of coping maltreated children may successfully enact and may shape the patterns of coping they eventually come to utilize as they

age into adulthood. An equally important endeavor is to understand whether specific skills or coping profiles have the potential to buffer against the probable noxious toll maltreatment exposure exerts on such biological systems, and whether these buffering effects might increase children's opportunity to engage with their social environments and, thus, develop a more variegated and flexible coping repertoire for managing stress. Such information could be leveraged in the design of more effective coping-based interventions efforts for maltreated youth.

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11 Adolescence, Physiological Adaptation, and the Development of Stress Responses

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Introduction

Adolescence is characterized by significant biological, psychological, and social reorganization and change. Puberty brings extensive maturation and remodeling of the brain (Ladouceur, 2012; Somerville, 2013; Spear, 2011) and alterations in the physiological systems involved in stress reactivity and emotion regulation (Dahl & Gunnar, 2009). Moreover, adolescents experience changing self-perceptions as they strive to develop increasingly complex identities. These transformations are complemented by novel experiences and restructuring of social systems (Rudolph, 2014). The challenges inherent in the adolescent transition paired with physiological and psychological growth generate enhanced regulatory demands along with opportunities to develop effective responses to stress. Mapping normative patterns of change and the development of individual differences in stress response processes is therefore integral to understanding how youth negotiate this critical transition and enter upon healthy or unhealthy developmental trajectories.

To address this need, we begin with an overview of some of the most prominent frameworks for conceptualizing responses to stress. We then delve into research examining changes in psychological and behavioral components of stress responses across adolescence, considering both chronological age and stage of puberty as markers of development. We then discuss patterns of maturation and reorganization in the physiological systems that undergird these stress responses and review research examining links between biological markers of stress responses and responses at the psychological and behavioral levels. Highlighted are the advances made in adolescents' stress responses, as well as the ways in which stress responses can be compromised, with particular risks emerging for girls.

Conceptualization of Responses to Stress

Responses to stress are multifaceted, encompassing cognitive, emotional, behavioral, and physiological changes that can be immediate or sustained and can include automatic reactions as well as volitional coping (Compas et al., 2001; Skinner & Wellborn, 1994). A long history of theory and research has yielded many frameworks for conceptualizing stress responses (for a review, see Skinner et al., 2003). Pioneering conceptualizations of psychological and behavioral responses to stress distinguished problem-focused coping, aimed at minimizing the impact of stressors, versus emotion-focused coping, aimed at reducing stress-induced negative affect (Lazarus & Folkman, 1984). Control-based models similarly distinguish between primary control coping, or efforts to change controllable situations, versus secondary control coping, or

efforts to adapt to uncontrollable circumstances to reduce distress (Weisz et al., 1984). Stress responses also can be differentiated based on whether they involve engagement with, or disengagement from, stressors and related emotions (Moos & Schaefer, 1993) and whether they engage intrapersonal (intrapsychic regulatory systems) or interpersonal (reliance on others) processes (Zimmer-Gembeck & Skinner, 2016). Compas et al. (2001) proposed a framework of stress responses organized by two orthogonal dimensions – voluntary versus involuntary and engagement versus disengagement – yielding four categories: (a) effortful engagement, (e.g., problem-solving, cognitive appraisal); (b) effortful disengagement (e.g., behavioral or cognitive avoidance); (c) involuntary engagement (e.g., rumination, emotional arousal); and (d) involuntary disengagement (e.g., inaction, emotional numbing). Organizing specific stress responses, Skinner and colleagues (Skinner et al., 2003) classified 400 types of coping into 12 categories.

Further complicating the study of stress responses is the substantial overlap between the processes involved in volitional coping and those involved in broader aspects of self-regulation, particularly regulation of emotions. Stress is a phenomenological experience in which individuals feel challenged, if not overtaxed. Emotion regulation, therefore, is an integral part of the stress response process (Compas et al., 2014) and itself is multifaceted, including modulation of the nature, intensity, and display of affective states (Gross & Thompson, 2007). These efforts can be either implicit, such as automatic reliance on habitual regulatory strategies or engagement in behaviors without regulatory intent (e.g., labeling emotions), or explicit, such as volitional efforts to employ regulatory tactics (Gyurak et al., 2011; Torre & Lieberman, 2018).

In a separate line of inquiry, theoretical models and empirical investigations consider how key biological systems respond to stress and challenge. Three major systems involved in responding to stress include the central nervous system (brain structure and function), the hypothalamic-pituitary-adrenal (HPA) axis, and the autonomic nervous system. Research in this area considers both indexes of everyday tonic function as well as acute responses to naturally occurring and laboratory stressors. Although most often studied independently, these biological systems are interconnected and, therefore, a complex concert of physiological changes contribute to the manifestation of psychological and behavioral responses to stress.

Given these complicated, interconnected ways in which individuals respond to stress, a comprehensive understanding of both normative changes and individual differences in stress responses across adolescence needs to build upon a theoretical framework that integrates the multilevel, multifaceted nature of stress responses as part of a broader regulatory system. Throughout the chapter, we use the umbrella term "stress responses" to refer to a broad category of both volitional (coping) and involuntary (automatic) responses to stress, incorporating relevant theory and research on emotion reactivity and regulation. Where applicable, we also use more specific terms (e.g., volitional coping, emotion regulation, physiological stress responses) when referring to more specific aspects of responses to stress.

Development of Psychological and Behavioral Responses to Stress

Developing resources to effectively manage stress is a protracted process in which external regulation increasingly comes under the control of internal mechanisms (Skinner & Zimmer-Gembeck, 2007). Although this

maturation begins in infancy, changes in stress responses continue throughout adolescence. These transformations during adolescence afford increasing flexibility, sophistication, and diversity of available responses. However, gains are often offset by heightened emotional reactivity and engagement in maladaptive stress responses. Thus, the adolescent years present opportunities for both positive growth and the emergence of unhealthy stress responses.

Changes in Psychological and Behavioral Responses to Stress across Adolescence

One of the most prominent shifts during adolescence is engagement of increasingly more sophisticated cognitive regulatory systems. By late childhood, children begin to utilize a range of volitional cognitive coping strategies, including problem-solving, cognitive distraction, and acceptance (Zimmer-Gembeck & Skinner, 2011). During adolescence, advances in cognition, including increases in abstract thought (Dumontheil & Blakemore, 2012) and executive functions (Zelazo & Carlson, 2012), allow for further refinement of these strategies. Specifically, developing cognitive skills underlie parallel growth of more cognitively complex volitional coping responses (Compas et al., 2014), such as cognitive distraction and restructuring (Williams & McGillicuddy-De Lisi, 1999; Zimmer-Gembeck & Skinner, 2011). Furthermore, cognitive development can generate advances in primary control strategies, including more complex decision-making, planning, and reflection (Skinner & Zimmer-Gembeck, 2007; Williams & McGillicuddy-De Lisi, 1999).

Overall, adolescence is characterized by increases in self-reliance and concomitant decreases in seeking others' help (Crystal et al., 2008; Frydenberg & Lewis, 2000; for a review, see Zimmer-Gembeck & Skinner, 2011); when adolescents do seek support for managing stress, they are more likely to turn to peers than parents (Skinner & Zimmer-Gembeck, 2007). Moreover, during adolescence, youth become better at taking into account situational factors (e.g., nature of the stressor, type of support sought) when choosing from whom to request support (Zimmer-Gembeck & Skinner, 2016). Interestingly, support-seeking increases in early adulthood (Zimmermann & Iwanski, 2014), suggesting that greater self-reliance in stress responses during adolescence may reflect, in part, a need for individuation and assertion of autonomy (Lefkowitz, 2005).

Another change during adolescence is the more flexible application of stress responses. For example, although adolescents continue to engage in behavioral avoidance, they do so specifically in response to uncontrollable stressors (Compas et al., 1991; Zimmer-Gembeck & Skinner, 2016), reflecting a more adaptive use of this strategy. Adolescents also increasingly use combinations of stress responses to maximize their efficacy. To illustrate, emotional suppression is generally associated with maladaptation (Compas et al., 2014) and decreases through adolescence (Gullone et al., 2010). However, this strategy can be effective when used in conjunction with problem-solving, a combination that becomes more common in adolescence (Compas et al., 2014).

The increased cognitive sophistication of stress responses can be attributed, in part, to gains in executive functions relevant to emotion regulation (Ahmed et al., 2015). However, adolescence also is marked by heightened emotional reactivity (Pfeifer & Blakemore, 2012), particularly to interpersonal stress (Somerville, 2013), and the development of emotion regulatory systems lags behind the emergence of heightened affective responses (Nelson et al., 2005). Research shows, for example, that

adolescents have difficulty inhibiting attention to emotionally salient information (Gyurak et al., 2011). Such attentional capture of emotional targets is believed to interfere with effective emotion regulation (Ahmed et al., 2015). Furthermore, although from early-to-mid adolescence youth increasingly employ complex emotions regulation strategies, such as cognitive restructuring, when instructed, these gains do not translate into implementation of these strategies on a daily basis (Silvers et al., 2012; Theurel & Gentaz, 2018).

Consequently, some aspects of stress responses may regress in early adolescence, when reactivity increases but use of more sophisticated regulatory skills in everyday life has yet to fully develop. Recent research bears this out. Cracco et al. (2017) documented temporary decreases between the ages of 12 and 15 in some adaptive emotion regulation strategies, including problem-solving, distraction, and acceptance. In contrast, giving up, withdrawal, and aggressive actions increased. Moreover, some maladaptive stress responses (e.g., rumination, emotional suppression) increase during adolescence (De France & Hollenstein, 2017; Lougheed & Hollenstein, 2012), suggesting that the development of stress responses during this time encompasses both greater adaptation and maladaptation.

Numerous gender differences also are worth noting. Cracco et al. (2017) found that girls show greater declines than boys in the use of humor to regulate emotions during early adolescence, and, whereas boys report temporary increases in rumination during early adolescence, girls report sustained increases throughout adolescence. Girls also more often exhibit emotion-focused responses to stress (Renk & Creasey, 2003) and resignation (Donaldson et al., 2000), as well as less acceptance (Connor-Smith et al., 2000), than boys. Although boys evidence disproportionate gains in some adaptive stress responses, girls show gains in others. Girls are more likely than boys to seek support (Roecker et al., 1996), a difference that may grow stronger during adolescence (Eschenbeck et al., 2007). Girls also engage in less cognitive avoidance and more problem-solving and emotional expression than boys (Chapman & Mullis, 1999; Eschenbeck et al., 2007; Pascual et al., 2016).

The overall pattern that emerges is one of gradual gains in adaptive stress responses; however, delays in this growth can foster heightened emotional dysregulation, particularly in early adolescence, as emotional reactivity increases. This "mismatch" between reactivity and regulatory growth has been implicated in the development of psychopathology (e.g., depression, social phobia) during adolescence (Nelson et al., 2005). At the same time, cognitive maturity and increasing regulatory skills provide opportunities for the development of adaptive stress responses.

Puberty as a Predictor of Psychological and Behavioral Responses to Stress

Although chronological age is a common metric with which to examine developmental changes in stress responses, the biological foundation for these changes often tracks more closely with pubertal maturation. Puberty is a prolonged process that begins when the hypothalamic-pituitary-gonadal axis increases production of gonadotropin-releasing hormone (GnRH). In turn, GnRH stimulates release of gonadal hormones, resulting in gonadal maturation and observable morphological changes (secondary sex characteristics; Dorn & Biro, 2011) as well as changes in biological systems involved in processing emotionally laden stimuli, providing a fertile ground for changes in stress

reactivity. Indeed, comparisons of youth who are in the pre/early stages and those in mid/late stages of puberty reveal increasing emotional reactivity (Quevedo et al., 2009; Vijayakumar et al., 2019), as well as greater attentional bias toward negative stimuli in girls (Yang et al., 2018). This heightened reactivity may contribute to dysregulated stress responses, particularly in girls. For example, girls' more advanced pubertal development correlates with heightened rumination and co-rumination (Mendle et al., 2020).

Heightened emotional reactivity spurred by pubertal changes may be further exacerbated when pubertal onset occurs at an earlier chronological age, as regulatory systems are still immature (Smith et al., 2013) and social-contextual demands are intensifying (e.g., Rudolph, 2014). Considering girls enter puberty approximately 2 years earlier than boys (Tanner, 1971) and evidence greater emotional reactivity associated with pubertal status (Quevedo et al., 2009; Vijayakumar et al., 2019), it is not surprising that earlier pubertal timing is associated with more maladaptive stress responses for girls than for boys. Rudolph and Troop-Gordon (2010) documented that, for girls but not boys, early pubertal timing correlates with lower levels of effortful engagement and more effortful disengagement and involuntary disengagement responses, consistent with earlier research showing that early pubertal timing is associated with using fewer primary control coping strategies among girls (Sontag et al., 2008). Involuntary engagement with stressors, particularly rumination, may be of particular importance for understanding dysregulated stress reactivity among early-maturing girls. For example, earlier pubertal timing in girls is associated with greater involuntary stress responses, such as intrusive thoughts and rumination (Alloy et al., 2016; Mendle et al., 2020).

Development of Physiological Systems Involved in Stress Responses

Multiple interconnected physiological systems are involved in regulating emotions and stress responses. These systems undergo rapid growth during adolescence (Spear, 2009). On the one hand, this maturation provides increasing support for independent self-regulation, allowing for more sophisticated coping strategies. On the other hand, increasing sensitivity in these physiological systems lays the groundwork for heightened emotion dysregulation and ineffective responses to stress. Understanding how adolescents traverse this transition requires appreciating the complex dance that emerges between opportunities for optimal maturation in volitional coping versus risks for the emergence of maladaptive stress responses. The following sections review changes that occur during adolescence in physiological systems involved in responding to stress and challenge. Within each section, we first describe the basic function of each system and relevant indexes of physiological stress responses, discuss how they develop across adolescence, and then summarize research examining links between individual differences in these systems and psychological and behavioral responses to stress.

Neural Structure and Function

Recent developments in structural and functional neuroimaging shed light on brain regions involved in stress reactivity, although fewer studies examine neural systems involved in specific volitional coping efforts. In our review, we therefore draw primarily from research investigating brain structure and function associated with related processes, such as emotion regulation, which, as discussed earlier, can be viewed as part of a broader self-regulation framework that guides

stress responses. Increasing evidence points to significant maturational changes in relevant neural systems during adolescence (for reviews, see Ladouceur, 2012; Nelson et al., 2005; Somerville, 2013), highlighting this stage as a critical window for the development of both normative changes and individual differences in brain structure, patterns of activation within particular regions, and connectivity within and among neural networks involved in responding to stress.

Brain Regions Involved in Stress Responses

How individuals respond to negative emotions and stress is guided by several brain networks. The amygdala and ventral striatum are part of an affective network implicated in detecting emotionally salient cues (Ernst et al., 2006; Guyer et al., 2009). The frontoparietal control network, which includes dorsolateral (DLPFC) and ventrolateral (VLPFC) prefrontal cortex and inferior parietal cortex (IPC), guides top-down modulation of emotions and refocuses attention in the face of emotional distraction (Ochsner et al., 2012). The anterior salience network, which includes dorsal anterior cingulate (ACC), anterior insula, and anterior prefrontal cortices, is activated in response to both emotional salience and regulatory demands (Seeley et al., 2007).

Effective stress responses likely depend on the ability of top-down control regions to modulate activity in subcortical regions (Ochsner et al., 2012). Meta-analyses of neural activation during emotion regulation reveal complementary activation in the prefrontal regions and the amygdala, supporting the notion that frontal cortical regions modulate amygdala activity (Buhle et al., 2014). Analyses that directly examine frontal-amygdala connectivity reveal stronger functional coupling between prefrontal and parietal regions and the amygdala during emotion regulation (cognitive reappraisal) relative to emotion maintenance. Moreover, the strength of functional coupling predicts the success of emotion regulation efforts (Banks et al., 2007). Implicit emotion regulation also elicits negative amygdala-right VLPFC connectivity, and explicit and implicit emotion regulation activate overlapping regions of the VLPFC (Payer et al., 2012), suggesting that parallel frontal cortical and subcortical neural systems may be involved not only in volitional coping but also involuntary regulatory responses. Studies of active coping in adults implicate similar networks (Collins et al., 2014; Santarnecchi et al., 2018; Sinha et al., 2016).

Changes in Brain Structure and Function across Adolescence

Understanding how stress responses change across adolescence can be informed by considering patterns of maturation within brain regions involved in these processes. Adolescence is marked by rapid growth and reorganization of the brain, with significant remodeling of neural systems involved in shaping stress responses (Spear, 2011). Specifically, neuroimaging studies reveal age- and puberty-related changes in neural systems implicated in both reacting to salient emotional information and regulating these responses (Ladouceur, 2012; Somerville, 2013).

Neural regions comprising the affective salience network show nonlinear developmental trajectories, with acute increases in functional reactivity to emotions, reward, and risk-taking during adolescence (Chein et al., 2011; Ernst et al., 2005; Guyer et al., 2008). Relative to adults, adolescents show heightened activation in several regions involved in detecting emotional salience (e.g., ACC, bilateral orbitofrontal cortex, and amygdala) when viewing

fearful relative to neutral faces (Monk et al., 2003). Moreover, relative to children and adults, adolescents show elevated amygdala activation to emotional cues (Hare et al., 2008). Directly examining puberty-related brain function, one study revealed that more advanced pubertal status predicted heightened subgenual ACC activation in response to peer rejection (Silk et al., 2014). Another study revealed that more advanced pubertal status was associated with more amygdala activation to facial expressions of emotions during early adolescence (Moore et al., 2012), and, for girls, pubertal development is associated with increases in high-frequency gamma oscillations, a neural indicator of emotional arousal, in response to highly negative pictures (Yuan et al., 2014).

Significant structural and functional changes also occur in regions subserving self-regulation. For example, regions involved in executive functions and social cognition (frontal and parietal cortices) show decreases in gray matter and increases in white matter (which facilitates communication between neural regions) density across adolescence (Blakemore & Choudhury, 2006). These changes are thought to be mediated by alterations in levels of sex hormones during puberty (Ladouceur, 2012). Mapping onto these structural changes are age-related increases in activation within various frontal regions, including the VLPFC (Giuliani & Pfeifer, 2015), the dorsal ACC (Pitskel et al., 2011), and the medial and middle frontal gyri (Pitskel et al., 2011), regions that likely support effective volitional coping. Supporting the role of puberty in these changes, by early adolescence, more advanced pubertal status is associated with more activation in prefrontal regions in response to emotional expressions (Moore et al., 2012). Although these developments likely facilitate communication between frontal and limbic regions and support more sophisticated regulatory abilities during early and mid-adolescence, maturation of these regions continues through late adolescence and early adulthood (Sowell et al., 2003).

Early theories of adolescent brain development proposed that maturational asynchrony between neural regions subserving emotion/stress reactivity (which show acute increases in sensitivity) versus regulation (which show more gradual and protracted development) results in heightened emotion dysregulation and stress sensitivity during adolescence relative to childhood and adulthood (e.g., Casey et al., 2008; Ernst et al., 2006). Consistent with this idea, research examining cognitive control in the context of emotionally salient cues suggests that relevant neural systems undergo puberty-driven changes that challenge adolescents' ability to exert top-down control in ways that would maximize their ability to respond effectively to stress (Ladouceur, 2012). Moreover, sex-related hormones (e.g., testosterone, estradiol), which increase during puberty, seem to play a role in levels of activation and connectivity within frontal-limbic circuitry involved in emotion regulation and cognitive control.

However, contemporary theories highlight a more nuanced pattern of development, viewing adolescence as a time of enhanced cognitive flexibility (Crone & Dahl, 2012; Schriber & Guyer, 2016) that may provide a window of opportunity for either increasing dysregulation or positive growth (Ernst et al., 2006; Spear, 2009). Indeed, amygdala-PFC connectivity when viewing fearful faces shifts from more positive in childhood to more negative by mid-adolescence (Gee et al., 2013) to young adulthood (Silvers et al., 2015). This shift likely reflects more effective downregulation of the amygdala by the PFC (Gee et al., 2013; Hare et al., 2008), a sign of neural maturity that may support more effective stress responses. Consistent with this idea,

resting state negative connectivity between the ventrolateral PFC and subcortical regions predicts better self-control (Lee & Telzer, 2016), whereas positive amygdala-ventral PFC connectivity during emotion regulation in adolescence is linked to less effective neural regulation of emotion (Hare et al., 2008). Thus, neural remodeling that includes more gradual maturation of prefrontal regions and their connections may support the development of more sophisticated coping skills that emerge across adolescence, such as an increasing ability to engage in problem-solving, cognitive reappraisal, and other adaptive volitional coping strategies.

Links between Neural Function and Psychological and Behavioral Responses to Stress during Adolescence

Given that neural reorganization during adolescence creates flexibility that may foster increasingly dysregulated responses to stress or may allow for increasingly effective volitional coping, a critical question concerns how individual differences in adolescent neural function are linked to certain stress responses. Although few studies directly investigate the neural correlates of volitional coping in adolescence, preliminary evidence links patterns of neural activation and functional connectivity with individual differences in emotion regulation and involuntary stress responses (for relevant studies of coping in adults, see Collins et al., 2014; Santarnecchi et al., 2018; Sinha et al., 2016).

In one study of adolescent girls, more positive amygdala-VLPFC connectivity during implicit emotion regulation (affect labeling) was associated with more stress-reactive rumination in response to an in vivo social stressor, suggesting that adolescents with this pattern of neural processing were less able to effectively regulate their stress responses (Fowler et al., 2017). In a small sample of adolescents, heightened DLPFC, dorsal ACC, and anterior PFC activation during a working memory task was associated with lower levels of secondary control coping. The authors interpreted this finding in terms of a compensatory effect, such that adolescents who required greater cognitive effort were less effective at engaging in strategies such as cognitive reappraisal and positive thinking (Reising et al., 2018). More generally, positive amygdala-ventral PFC connectivity is associated with higher levels of emotional distress (Davis et al., 2019; Fowler et al., 2017; Hare et al., 2008), suggesting adolescents showing this less mature pattern of neural function are prone to emotion dysregulation.

Two studies of late adolescents (college students) also examined patterns of neural processing associated with volitional coping and related constructs. Rauch et al. (2007) found that sensitizers (who engage in extensive monitoring and analyzing of the environment) relative to repressors (who minimize the emotional impact of threatening stimuli) show more amygdala activation and less frontal-cortical activation in response to ambiguously threatening stimuli (fearful faces); activation in frontal regions and the amygdala were also less closely temporally related in sensitizers, suggesting that they may engage in less top-down regulatory responses to threat (Rauch et al., 2007). However, sensitizers showed a stronger prefrontal response than repressors to unambiguously threatening stimuli (angry faces), suggesting that they allocate more cognitive resources to identifying threats that may indicate direct risk for health or safety (Rauch et al., 2007). Creswell et al. (2007) found strong inverse associations between activation in several PFC regions and in the amygdala during implicit emotion regulation (affect labeling) in individuals with high but not low dispositional mindfulness, a trait linked to

more adaptive stress responses. Thus, activation in these prefrontal regions may facilitate adaptive coping by downregulating amygdala activation.

Summary and Future Directions

Structural remodeling and functional changes in the brain during adolescence may create enhanced flexibility that can promote healthy or unhealthy psychological and behavioral stress responses. Whereas growth in frontal executive networks and their subcortical connections may bolster the development of effective volitional coping strategies, such as problem-solving, emotion regulation, and cognitive reappraisal, a lag between the development of cognitive control networks versus stress-reactive regions may create a fertile ground for dysregulated stress responses. More research is needed directly investigating the neural correlates of individual differences in volitional coping during adolescence. Moreover, the juxtaposition of opportunities for healthy versus unhealthy growth highlights the importance of identifying individual differences that predict divergent developmental trajectories of neural structure and function involved in stress responses across adolescence. Variability in patterns of neural regulation and the extent to which neural reorganization translates into enhanced or disrupted coping likely stems from a complex combination of personal attributes and environmental contexts in which youth develop. Although research identifies some earlier predictors of neural regulation of emotion (e.g., Davis et al., 2019; Modi et al., 2020; Rudolph, Skymba, et al., 2021) and neural activation in the face of social stressors (Rudolph, Davis, et al., 2021; Will et al., 2016) during adolescence, longitudinal studies will need to examine when and how neural networks involved in specific coping strategies develop. Future research also will need to investigate gender differences in neural processes that may account for emerging gender differences in stress responses. Compared to adolescent boys, girls show less amygdala habituation to emotional faces (Thomas et al., 2001) and heightened neural sensitivity to social evaluation (Guyer et al., 2009, 2012). It is therefore possible that adolescent girls experience more disruption in neural connections supporting stress responses than boys.

Hypothalamic-Pituitary-Adrenal Axis

The hypothalamic-pituitary-adrenal (HPA) axis is one of the key systems involved in mediating stress responses and promoting homeostasis (for a review, see Tsigos & Chrousos, 2002). To cope with physical or psychosocial stressors, the HPA axis works synergistically with a group of organs and achieves its core functions through a cascade of hormone secretions. The HPA axis carries out functions that facilitate effective stress responses, such as enhancing cognition and increasing cardiovascular tone. Nonetheless, excessive or extended activation of the HPA axis is neither adaptive nor sustainable. Given this central role of the HPA axis in orchestrating how individuals adapt to stressors, understanding maturational changes in this system across adolescence can shed light on both normative and individual differences in the development of stress responses.

HPA Axis and Stress Responses

Activation and recovery of the HPA axis are coordinated by a complex interplay of neural and hormonal processes. Activation initiates in the hypothalamus, where the paraventricular nucleus secretes corticotropin-releasing hormone (CRH) into the bloodstream (Herman et al., 2005). Binding of CRH to the

anterior pituitary induces the secretion of adrenocorticotropic hormone (ACTH), which, in turn, stimulates the secretion of cortisol and dehydroepiandrosterone (DHEA). Finally, cortisol and DHEA are carried by the bloodstream to various targets. After the stressor has ended, cortisol participates in a negative feedback loop (Tsigos & Chrousos, 2002), in which it downregulates CRH production, leading to a reduction in ACTH production.

Basal HPA activity follows a predictable diurnal rhythm (Saxbe, 2008). Specifically, circulating cortisol levels show a sharp increase before awakening with a peak around 30–45 minutes post-awakening (cortisol awakening response; CAR), a sharp drop across the morning, and then a slower, steady drop across the afternoon, reaching a nadir in the evening. Significant variations in diurnal cortisol patterning (e.g., elevated, flatter slopes) can mark HPA dysregulation. Beyond this basal activity, the HPA axis regulates responses to stressors. Cortisol levels begin increasing about 5 minutes after the onset of an acute stressor and peak around 10–30 minutes post stressor (Del Giudice et al., 2011). The period where cortisol levels taper off from peak reactivity and return to baseline is referred to as the recovery phase. Volitional coping may be particularly pertinent to this period and may modulate the rate and effectiveness of poststressor cortisol recovery.

Changes in HPA Axis Function across Adolescence

With increasing social demands as children enter adolescence, the HPA axis undergoes changes that may either facilitate or disrupt the development of effective stress responses. Research reveals age-related changes in diurnal cortisol secretion, with some evidence that overall daily cortisol levels may follow a U-shaped pattern in which they decrease in late childhood (Schreiber et al., 2006; Shirtcliff et al., 2012) and then increase during adolescence (Elmlinger et al., 2002; Walker et al., 2001). Studies also suggest increases in CAR during adolescence (Platje et al., 2013), and, compared to children, adolescents demonstrate higher cortisol levels during both HPA axis activation and recovery in response to stress. In one study, mid-adolescents (age 13 and 15) showed higher cortisol responses to a social performance stressor (Trier Social Stressor Test for Children; TSST-C) than children and early adolescents (age 9 and 11; Gunnar et al., 2009). Similarly, adolescents (age 13–17) showed elevated levels of cortisol compared to children (age 7–12) when exposed to a modified TSST-C (Stroud et al., 2009). Using ecological momentary assessments, another study revealed that associations between daily levels of worry/stress and cortisol increased with age in 13–19 year-olds (Adam, 2006). Less research investigates age differences in cortisol recovery following stress. Limited evidence shows that mid-adolescents (age 15) maintained higher levels of cortisol during a recovery period following the TSST-C compared to younger adolescents (age 9 and 11; Gunnar et al., 2009). Moreover, cortisol levels in response to a modified TSST-C remained elevated longer in older adolescents, suggesting they recover more slowly (Ji et al., 2016). However, two studies found an increase with age in anticipatory cortisol activation but no age differences during the speech or recovery phase (Hostinar et al., 2014; Sumter et al., 2010). As already discussed, increases in daily cortisol and cortisol activation in response to stress may correspond with heightened resources to cope with the stressors of adolescence, but excessive elevations or prolonged persistence of high levels may reflect overtaxed resources that forebode maladaptive stress responses.

Similar to age-related patterns, studies examining puberty reveal an increase in basal cortisol levels (Elmlinger et al., 2002), particularly around mid-puberty (i.e., Tanner stage 3) in girls (Netherton et al., 2004). Adolescents with more advanced pubertal maturation show more elevated daytime curves along with a lower CAR and a steeper decline from morning to bedtime, with some evidence that puberty accounts for age-related differences in daily cortisol (Adam, 2006). Conversely, Shirtcliff et al. (2012) found more mature adolescents show a more elevated but flatter diurnal rhythm, although this pattern differed depending on whether the models were adjusted for age. Relative to prepubertal children, postpubertal adolescents also show a stronger response to social performance stressors, suggesting HPA reactivity increases across puberty (Gunnar et al., 2009, TSST-C; Stroud et al., 2009, modified TSST-C; Sumter et al., 2010, public speaking task). One study revealed that increasing cortisol reactivity to a social performance stressor with age is accounted for by pubertal development (van den Bos et al., 2014). Specifically, more physically mature adolescents reached higher levels of cortisol at an earlier time (during anticipation of the speech) and then maintained this heightened response during the speech.

Gender differences in cortisol responses become more pronounced during adolescence. Several studies suggest changes in cortisol responses emerge earlier and more strongly in girls than boys (Netherton et al., 2004; Törnhage, 2002). Girls generally show higher cortisol (Shirtcliff et al., 2012) and steeper declines in cortisol across the day (Fransson et al., 2014) than boys, with the circadian rhythm becoming flatter as girls progress through puberty, leading adolescent girls to have higher levels of evening cortisol (Shirtcliff et al., 2012). Adolescent girls also demonstrate a higher CAR than adolescent boys (Fransson et al., 2014). The timing of these gender differences may be explained by differences in the timing of puberty onset (Gunnar et al., 2009; Stroud et al., 2011). Girls typically begin puberty 1–2 years earlier than boys, so increases in activity are expected to manifest earlier in girls. Yet, Shirtcliff et al. (2012) contend that gender differences are primarily driven by age – instead of puberty-related processes – after examining both independent and joint effects of age and puberty.

Regarding gender differences in cortisol reactivity to stressors, findings are more equivocal (for a review, see Hollanders et al., 2017). Whereas some studies did not detect gender differences (e.g., Hostinar et al., 2014), one study found that girls younger than 12 years demonstrated higher cortisol reactivity to a combined social performance (public speaking) and cognitive stressor relative to boys, although gender differences were not detected in 13–20 year-olds (Evans et al., 2013). Similarly, Hostinar et al. (2015) found a stronger cortisol response in girls at ages 9–10, and no gender differences among adolescents. Van den Bos et al. (2014) found girls (ages 8–17), relative to boys, demonstrated a higher cortisol response over the course of a public speaking task as well as higher anticipatory activation, but these gender differences disappeared when pubertal development was controlled. However, boys showed more cortisol reactivity than girls during the speech delivery. Similarly, two studies found boys tend to have higher HPA responses to both a social performance stressor (public speaking and unpleasant interaction; Klimes-Dougan et al., 2001) and a combined social performance (public speaking) and cognitive performance stressor (Bouma et al., 2009) than girls, especially later in puberty. Overall, these findings indicate inconsistent gender differences, with some suggestion that greater reactivity to psychosocial stressors emerges earlier in girls and later in boys (for a review, Ordaz & Luna, 2012).

Links between HPA Axis Function and Psychological and Behavioral Responses to Stress during Adolescence

Changes in the diurnal rhythm and reactivity of the HPA axis across adolescence and puberty may be linked to normative changes and emerging individual differences in psychological and behavioral responses to stress. As with neural function, a more responsive HPA axis during adolescence may prepare youth for facing increasing demands but also may heighten sensitivity to stressors that present challenges for well-being. Only a few studies directly examine patterns of HPA axis function associated with engagement in, or effectiveness of, specific stress responses, but these studies provide preliminary evidence for a link between better HPA regulation and more effective volitional coping.

In adolescents, adaptive volitional coping is linked to well-regulated patterns of daily HPA function. Early adolescent girls who use more voluntary engagement to manage interpersonal stressors demonstrate steeper diurnal cortisol slopes, lower total diurnal output, and lower CAR (Sladek et al., 2017). An investigation of intraindividual differences revealed that using a higher than typical level of active coping throughout the day was associated with higher waking cortisol the following morning. This increase might signal physical preparation for more taxing daily demands (Sladek et al., 2017). In a sample of older adolescents, only those whose use of engagement coping or whose self-reported coping efficacy was lower than their own average demonstrated elevated cortisol in response to perceived stress during the past hour (Sladek et al., 2016). Further, in the context of real-life situations that late adolescents perceived as more stressful than usual, responding with higher than typical levels of engagement coping was associated with higher cortisol.

These findings are paralleled by studies revealing that involuntary stress responses are associated with HPA axis dysregulation. Among adolescent girls at familial risk for depression, those who show more involuntary responses experienced greater elevations in diurnal cortisol than girls who more frequently used voluntary coping (Foland-Ross et al., 2014). Sontag et al. (2008) found that involuntary engagement (which included self-reported physiological arousal) was associated with higher levels of cortisol reactivity to a battery of cognitive, physical, and social challenges in young adolescent girls. Tendency to ruminate, specifically, is associated with flatter diurnal slopes and lower average morning cortisol levels in early adolescent girls (Hilt et al., 2017) and with delayed cortisol recovery following the TSST among depressed adolescent girls (Stewart et al., 2013).

Given the scarcity of research examining direct links between coping and HPA axis function, we also summarize studies investigating preadolescents. In one study of preadolescents (Wadsworth et al., 2018), children were behaviorally primed with either behavioral distraction or cognitive avoidance coping following exposure to the TSST-C. Interestingly, different patterns of HPA axis recovery emerged based on children's self-reported characteristic stress responses. Children who usually used more primary control engagement were better at downregulating cortisol across the recovery period when they were primed to distract themselves compared to when they were primed to avoid thinking about their performances, whereas children who usually disengaged from stressors had more efficient cortisol regulation when primed to avoid stressors. In the same sample, children who typically showed low involuntary responses benefited from behavioral distraction while those who typically showed high involuntary responses benefited from cognitive

avoidance (Bendezú et al., 2016). These findings suggest that the effectiveness of coping strategies for regulating HPA axis function may depend on the match between children's typical stress responses and the resources available in their coping environment (Bendezú et al., 2016; Wadsworth et al., 2018).

Summary and Future Directions

Age and pubertal maturation are associated with meaningful changes in basal HPA activation and stress reactivity. Although increases in diurnal activation and stress reactivity may be a part of an adaptive developmental process indicative of enhanced preparedness to tackle novel challenges, sustained activation and protracted recovery may expose adolescents to risks for developing aberrant stress susceptibility, leading to adverse outcomes such as physical and mental illnesses.

Research suggests that patterns of HPA axis activation and reactivity are linked to how adolescents respond to stressors in their environment. However, the nature of these associations is complex. Although further research is needed, an emerging pattern suggests that higher levels of adaptive volitional coping (and lower levels of involuntary stress responses) often are associated with lower diurnal cortisol, less HPA axis reactivity to stress, and faster recovery, albeit heightened cortisol the day following stressful events (Foland-Ross et al., 2014; Sladek et al., 2016, 2017; Sontag et al., 2008; Stewart et al., 2013). These patterns are consistent with the idea that a certain amount of HPA axis activation may provide necessary resources to enhance volitional coping, but excessive or prolonged activation eventually may undermine stress responses. Moreover, experimental research suggests that the most effective type of volitional coping may differ across individuals (Bendezú et al., 2016; Wadsworth et al., 2018).

Future research will need to determine which levels and timing of HPA axis activation are optimal for effective stress responses. Moreover, the implications of different patterns of activation may depend on other characteristics of adolescents. For instance, HPA underactivation along with low approach motivation or high avoidance motivation may reflect excessive, dysregulated disengagement from stressors (e.g., decreased energy, lack of motivation), causing youth to mount an insufficient response to stress (Rudolph et al., 2018). In contrast, HPA overactivation along with high approach motivation may reflect excessive, dysregulated engagement with stressors (e.g., cognitive perseveration, negative emotional arousal), causing youth to mount too intensive a response to stress (Rudolph et al., 2018). Whether heightened or dampened HPA activation predicts adaptive or maladaptive stress responses also may depend on adolescents' self-regulatory capacity, such that those with high levels of self-control can leverage physiological arousal in ways that energize adaptive coping but those with low levels of self-control become overwhelmed. An important direction for future research will be to identify potential moderators of the link between HPA function and psychological or behavioral stress responses.

Finally, the scarcity of longitudinal studies in this area makes it difficult to determine whether adolescents who learn to cope in more effective ways are able to maintain more regulated HPA axis function, or whether adolescents with more regulated biological stress responses are able to garner the resources necessary to engage in effective coping. Longitudinal designs will be critical for disentangling the direction of effects between biological and psychological or behavioral aspects of coping.

Autonomic Nervous System

Recruitment of the physiological resources needed to manage stress relies on the effective functioning of the autonomic nervous system (ANS). The ANS is a fast-acting system (Chrousos & Gold, 1992) that regulates most of the organs and tissue in the body (e.g., innervation of cardiac and smooth muscle, dilation of the pupils; McCorry, 2007). Consequently, the ANS provides a window into the precise physiological changes that occur when stressors are perceived and responded to. Moreover, it can be assessed using a variety of fairly noninvasive measures (Obradović & Boyce, 2012). Measures of ANS are therefore useful for examining stress responses in adolescence, with much of the relevant work focusing on emotion regulation.

Sympathetic and Parasympathetic Nervous Systems and Stress Responses

The ANS is comprised of two anatomically distinct, continuously active systems. The sympathetic nervous system (SNS) activates the "fight or flight" response, including diverting oxygenized blood to skeletal muscles, increasing production of glucose, and innervating pupillary responses, salivary glands, the heart, and the lungs (McCorry, 2007). Some common "tell-tale" signs of heightened SNS activity are increased heart rate, blood pressure, sweating, and pupil dilation. The parasympathetic nervous system (PNS) allows the body to "rest and digest." Heightened PNS activity results in decreased heart rate and increased salivary secretions, insulin levels, digestion, and constriction of the pupils. A delicate balance between the SNS and PNS allows for rapid bodily changes in response to challenge or threat (McCorry, 2007). One commonly used measure of ANS activation is respiratory sinus arrhythmia (RSA), which refers to naturally occurring variation in heart-rate from inhalation to exhalation, with greater variation (higher RSA) indicative of heightened PNS activity (Porges, 2007). Because RSA is controlled by the effects of the vagus nerve on the heart, it is considered a measure of vagal tone (Grossman & Taylor, 2007), and withdrawal of RSA (reduced vagal tone) is indicative of lowered PNS activity.

To understand the association between ANS functioning and psychological or behavioral stress responses, investigators have examined: (a) basal (tonal) levels of SNS and PNS activation, (b) reactivity of these systems to emotion- or stress-inducing stimuli, and (c) recovery of these systems following stress or challenge (Balzarotti et al., 2017). Much of this work relies on polyvagal theory (Porges, 2007) and neurovisceral integration theory (Thayer & Lane, 2009), which propose that self-regulation and social engagement are enhanced by higher baseline PNS, adequate PNS withdrawal in response to stress, and quick PNS recovery. The positive effects of higher PNS have received the most support, including evidence linking high basal RSA with attentive control to emotional stimuli and adaptive self-reported coping (Balzarotti et al., 2017). There also is accumulating evidence that slower ANS recovery is associated with less adaptive stress responses, including rumination and less use of distraction (Key et al., 2008; Neumann et al., 2004), potentially indicating persistent dysregulated cognitive engagement with stressors. However, studies are equivocal as to whether more extensive RSA withdrawal, or in some cases augmentation, during stress is associated with adaptive emotion regulation and stress responses (Balzarotti et al., 2017). Consequently, some researchers have begun to test, and find evidence for, the proposition that whether PNS reactivity is associated with more adaptive stress responses depends on tonal PNS, with

greater reactivity being adaptive among those with high resting PNS (Cribbet et al., 2011; Yaroslavsky et al., 2013).

Changes in ANS Function across Adolescence

Although the development of the ANS is less pronounced in adolescence than in infancy and middle childhood (Eyre et al., 2014), research documents declining SNS activity in adolescence and a gradual concomitant increase in PNS activity (Eyre et al., 2014; Kazuma et al., 2002; Lenard et al., 2004). Thus, advances in stress responses during adolescence may be partly attributable to improved ANS functioning. However, improved tonal ANS functioning during adolescence may be offset by heightened ANS reactivity (Stroud et al., 2009). Moreover, differences in the ANS development of adolescent boys and girls may contribute to emerging gender differences in stress responses. In a study of adolescents aged 12–22, de Zambotti et al. (2018) documented age and puberty-related differences in nighttime heartrate (HR), a marker of SNS activity, and heart rate variability (RSA). Older, more physically mature boys had lower HR than younger, less physically mature boys, but a similar decline was not observed for girls. By late adolescence, boys had significantly lower HR than did girls. Furthermore, girls, but not boys, evidenced declines in nighttime heart rate variability. Such findings are consistent with other research documenting greater SNS activity and lower basal PNS among adolescent girls compared to boys (Koenig et al., 2017; Yuksel et al., 2021).

Links between ANS Function and Psychological and Behavioral Responses to Stress during Adolescence

There is growing evidence that ANS function is correlated with emotion regulation during adolescence. Vasilev et al. (2009) found that better emotion regulation during early adolescence is predicted by increases over the course of childhood in resting RSA and RSA reactivity (suppression) while watching a sad video. Adolescents with greater RSA reactivity (suppression) and then recovery (augmentation) when recalling an anger-inducing event report greater ability to regulate their anger and sadness (Cui et al., 2015). Research also supports the role of atypical RSA patterns in emotion regulation (Kovacs et al., 2016). Among a group of clinically depressed and nondepressed middle-to-late adolescents, Yaroslavsky et al. (2016) found greater reliance on maladaptive mood repair strategies among youth with higher resting RSA and augmented RSA when watching a sad video. In contrast, those with high resting RSA and RSA withdrawal reported more effective mood repair. Similarly, Vögele et al. (2010) found that during an anger-induction task, adolescents with higher resting vagal tone reported more cognitive reappraisal strategies, but those with lower resting vagal tone and subsequent vagal withdrawal reported more rumination.

Summary and Future Directions

Accumulating evidence suggests healthy ANS functioning subserves effective stress responses during adolescence. Specifically, adaptive stress responses are facilitated by higher basal PNS and faster PNS recovery after a stressor. Evidence further indicates that SNS reactivity aids recruitment of volitional coping resources but can create iatrogenic effects for those with lower tonal PNS levels. A parallel line of research documents developmental shifts and emerging gender differences in the ANS during adolescence. Looking ahead, in addition to further studies in each of these areas, integration of the developmental, biomedical, and clinical literatures driving this research is needed.

Investigations of normative ANS development during adolescence are still scant, relying heavily on cross-sectional designs (e.g., Kazuma et al., 2002; Lenard et al., 2004) and varying substantially in the ANS markers and paradigms employed. Longitudinal studies covering late childhood to early adulthood and utilizing comprehensive assessments of ANS basal and diurnal levels, reactivity, and recovery would provide insight into how specific developmental changes contribute to healthy or unhealthy stress responses. Furthermore, investigations often focus on clinical symptoms (e.g., Lucas-Thompson et al., 2018; McKernan & Lucas-Thompson, 2018), rather than stress responses more directly. Thus, studies are needed that examine ANS activity in relation to a range of stress responses. Moreover, gender differences in ANS activity that emerge over the course of adolescence (Koenig et al., 2017; Yuksel et al., 2021) suggest a basis for developing gender differences in psychological and behavioral responses to stress; studies directly investigating such a link are needed. Activity and development of the ANS also need to be understood in light of connections to other psychobiological systems. For example, Yuksel et al. (2021) documented greater ANS dysregulation during sleep in adolescent girls than boys. Although evidence of gender differences in sleep quality is mixed, differences have been reported (Franco et al., 2020), and sleep quality is associated with emotion regulation and stress responses (Wang & Yip, 2020). Thus, potential indirect effects (e.g., through sleep disruptions) of ANS patterns on stress responses should be studied. Moreover, the ANS is under the control of the prefrontal cortex and subcortical structures (Thayer & Lane, 2009) and, therefore, co-development of ANS and CNS function should be examined in the study of adolescents' responses to stress.

Conclusion

Theory and research suggest that adolescence, and specifically the pubertal transition, can serve as a stage of opportunity for advances in stress responses, as well as for increasing risk due to heightened emotional sensitivity and insufficient regulatory resources, with some gender-specific effects. On the one hand, adolescents experience changes in physiological systems that support more sophisticated strategies for managing challenges, which may help them prepare for increasing contextual demands. On the other hand, acute increases in sensitivity of physiological stress response systems may disrupt psychological and behavioral efforts to cope with negative emotions and stressors. These two developmental pathways are reflected in improvements in volitional coping efforts across adolescence, such as increasing use of cognitive engagement and greater flexibility in responses to stress, as well as some increases in maladaptive stress responses, such as rumination. Future research will need to explore how gender differences in developing physiological systems map onto emerging stress responses in girls and boys, as well as identify individual differences that predict diverging pathways toward healthy versus dysregulated stress responses.

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Part IV
Psychological Foundations of the Development of Coping

12 Attention, Temperament, Self-Regulation, and the Development of Coping

Ángela Hoyo, Ángela Conejero, and M. Rosario Rueda

Introduction

Most people will face adverse and difficult life situations of diverse nature along their lives. Although difficulties may be objectively different and vary in how much impact they may cause in people's lives (e.g., the death of a loved one in comparison with losing a job, or in childhood losing a parental figure in comparison to moving to a different city), there is an enormous variety of ways in which people face adversity. In fact, the subjective impact of adversity is often unrelated to the objective dimension that situations appear to entail, and it is the way people cope with difficulties what really makes the difference. Therefore, understanding individual differences in the way people face stress and adversity is key to the field of coping. The current chapter intends to discuss the importance of cognitive and temperamental systems of self-regulation during development in an effort to understand how these systems contribute to the development of coping.

We begin the chapter with definitions of attention, self-regulation, and temperament constructs. Then, we present empirical evidence about the relationship between attention and self-regulation development. In the third section, we address the links between coping responses and individual differences in attention, self-regulation, and temperament. Finally, in the fourth section, we focus on the role that environmental factors and education play in attention and coping development and discuss whether diverse strategies designed to improve attention may foster more adaptive coping responses. Chapter highlights are summarized in Table 12.1.

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Attention, Self-Regulation, and Temperament

Attention is involved in most of our daily life activities. Just as the structure of our body imposes limits to the number of things we can interact with at a given time, our mind is limited in the amount of information it can consciously process at a time. Therefore, a mechanism has evolved to help us regulate the information we process and decide how we want to respond to it. This mechanism is attention.

Attention has been largely linked to the voluntary and effortful control of action, as opposed to well-learned automatic behavior. Most actions we do daily are effortless and unfold in an automatic nonsupervised way. However, an efficacious and adaptive organism is one that is able to not only learn the regularities of the context and develop automatic, effortless courses of action, but also able to take control of actions when the context is changing and requires adjustments in order to accomplish goals, or when it wants to explore alternative courses of actions. The

Table 12.1 *Summary of chapter highlights*

Attention is a domain-general cognitive function that enables a form of conscious processing of information and supports the voluntary regulation of emotions and actions.
The temperamental system of effortful control is supported by executive attention mechanisms that enable the regulation of reactive systems of negative affectivity and extraversion/surgency.
By means of the progressive development of voluntary control mechanisms of attentional nature children become more able to self-regulate behavior.
In children as in adults, self-regulation of emotions and actions is associated with more strategic (planned with a long-term perspective) and effective coping responses.

deep (conscious) and slow (expanded in terms of both time and space within the intricate circuit of neurons that comprises the brain) mode of processing information that is necessary to supervise goal-directed action is what we colloquially refer to as "paying attention." The attentive mode takes control of our interactions with the environment in situations that involve overcoming an automatic course of action and detecting the need to do so. Also, attention is necessary for detecting errors, and controlling behavior in dangerous, novel, or unpracticed conditions (Norman & Shallice, 1986). Thus, the neural mechanisms that enable attention are central to the generation of voluntary behavior. Generally, attention can be defined as a multidimensional construct that refers to a state in which we have an optimal level of activation that allows selecting the information we want to prioritize in order to control the course of our actions (Rueda et al., 2021). In fact, aspects of activation, selection, and control are involved in the construct of attention in Posner's theoretical model, which are respectively referred to as alerting, orienting, and executive attention (Petersen & Posner, 2012).

Within Posner's theory of attention, *executive attention* refers to a set of mechanisms that are involved in self-regulated behavior, including inhibition of dominant but inappropriate response tendencies, detecting targets and resolving conflict between alternative courses of action, and detecting errors and adjusting responses according to goals or instructions in interference-rich contexts (Petersen & Posner, 2012; Rueda et al., 2011). Executive attention is a function enabled by the action of a circuit of brain regions of the parietal and frontal lobes, with a main node in the anterior cingulate cortex (ACC; see Rueda et al. (2015) for a review). The executive attention network has been proposed as the neurocognitive system underlying *effortful control*, the temperament factor associated with self-regulation of thoughts, emotions, and actions (Rothbart & Rueda, 2005).

Temperament is defined as constitutionally based individual differences in emotional, motor, and attentional reactivity, as measured by the latency, intensity, and recovery of response; and self-regulation processes that modulate reactivity (Rothbart & Bates, 2006). Psychometric studies in the field of temperament have consistently identified three main dimensions of temperament, which include (1) defensive reactions of fear and anger, (2) approach reactions of activity and pleasure to high-intensity stimulation, and (3) attention-based sensory and self-regulatory processes that help modulate emotional reactivity (Rothbart, 2007). The *reactivity-regulation* framework for temperament has been used to develop differentiated scales measuring temperament across the lifespan. Positive and negative emotionality are assessed in these measures, as well as attentional variables, including consciously driven attention shifting and effortful control. Within this

cognitive-temperament framework, the development of attention serves the child with mechanisms that allow an increased voluntary control of behavior, and is tightly linked to self-regulation (Rothbart & Rueda, 2005; Rueda, 2012).

According to Baumeister and Vohs (2004), *self-regulation* entails the control of behavior, thoughts, and feelings in order to successfully adapt to the environment and achieve our goals. Thus, self-regulation comprises the control of impulses making it possible to behave according to rules and to adjust to social demands (Lengua, 2003; Li-Grining et al., 2019). In fact, self-regulation is applied to different spheres in our lives such as learning or our daily routines. Likewise, the development of coping strategies that help to deal with stressful situations in daily life has been considered to reflect self-regulatory abilities (Boekaerts, 2010). Poor self-regulation skills have indeed been found to be extensively associated with different psychological conditions also characterized by dysregulated coping – such as attention deficit hyperactivity disorder (ADHD; Al Yagon et al., 2020), or anxiety disorders and depression (Banich et al., 2009). Moreover, in light of evidence from neuroimaging research in the last decades, self-regulatory capacities have been proposed to be strongly related to the development and functioning of prefrontal structures involved in executive attention, being particularly relevant for the modulation of thoughts and emotional responses (Öner, 2018). Taken together, it becomes indispensable to consider the contribution of executive attention to self-regulation, which in turn may explain individual differences in coping responses along development.

Therefore, taking together different branches of literature in the development of self-regulation (i.e., temperament, neurocognitive development, self-regulation), we propose a model by which the development of executive attention provides the child with cognitive and behavioral tools to regulate responses tendencies based on temperamental systems of negative affect (fear-related avoiding behaviors or anger-related aggression) and extraversion/surgency (approaching behaviors such as risk-taking, activity level, social affiliation, etc.). The effortful and voluntary control of behavior supported by executive mechanisms of inhibitory control, cognitive flexibility, and conflict resolution is associated with more strategic (goal-oriented) behavior. Executive attention provides the child with mechanisms to regulate behavior to decide when and how would be best to respond to difficulties, and to downregulate emotional reactions that might reduce stress in the short term but might not be optimal to solve the problem in the mid/long term. This model is depicted in Figure 12.1.

In the next sections, we intend to describe the entrenched developmental trajectories of attention and self-regulation and their contribution to the use of more strategic coping responses.

Development of Attention and Self-Regulation

As argued in the previous section, executive mechanisms such as inhibitory control have been theoretically and empirically linked to self-regulation. Some authors argue that self-regulation should be considered just another form of inhibition (Diamond, 2013) and others consider that self-regulation is one aspect of executive functioning more specifically related to inhibition in "hot" contexts, where emotions are elicited (Zelazo & Carlson, 2012). In the model presented in Figure 12.1, linking temperament and executive attention, self-regulation results from the effortful control of emotional reactivity and the modulation of behavior by means of executive processes such as inhibition, conflict detection and resolution, and planning. Executive attention is also

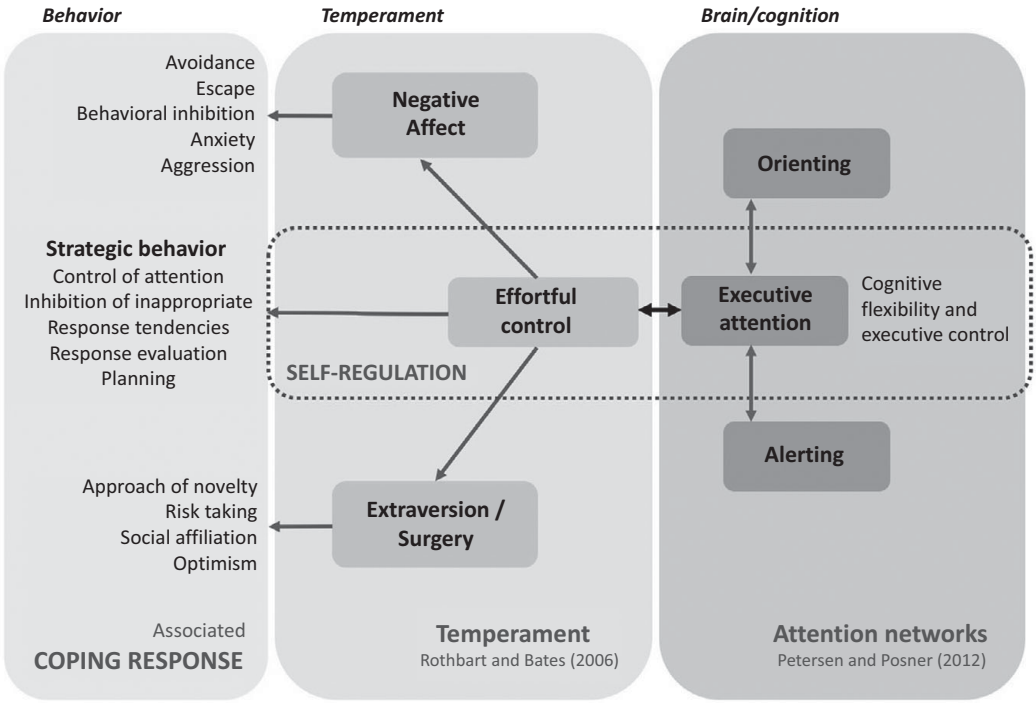

Figure 12.1 Associations between attention, temperament, and self-regulation in relation to coping responses.

necessary to sustain goal-directed behavior and to avoid being automatically attracted by salient but irrelevant stimuli (Hofmann et al., 2012). This model is supported by studies that show a close relationship between individual differences in performing executive attention tasks and self-regulation skills (Khosravi et al., 2020; Schmeichel & Tang, 2014, 2015).

Given their empirical link, attention and self-regulation have been considered interdependent constructs (Kaplan & Berman, 2010; Rueda et al., 2011). It is argued that attention constitutes one of the main building blocks of self-regulation, based on their shared developmental trajectories and neural pathways. According to Posner and colleagues (2013), self-regulation primarily relies on the development of attentional orientation in the early years, such as disengagement and shifting attention according to goals and expectations (i.e., endogenous or top-down attention). About the third to fourth month of life infants start to be capable of voluntarily shifting their sight away from stimuli that had captured their attention (Johnson et al., 1991). Before that time, they have difficulty reorienting their attention without some sort of external help, usually stimulation provided by caregivers. This limitation has consequences in their ability to self-regulate. For instance, infants as young as 3 months of age have difficulties disengaging from distressful stimuli (e.g., an annoying flashlight) by themselves; however, an effective strategy frequently used by caregivers to calm infants consists of using an attractive object or event (e.g., singing, talking, or making different facial expressions) to reorient babies' attention away from the distressing event (Harman et al., 1997).

Along the second half of the first year of age infants can actively look away from stimuli that cause them discomfort, regulating their emotional reaction in that way (Rothbart et al., 1992). Recent research shows that 6-month-olds in typical frustrating situations (e.g., a desired toy is taken away from them) try to manage distress not only by averting the gaze from the toy, but also by orienting to alternative sources of stimulation in the environment such as the mother face or other objects (Thomas et al., 2017). Prior longitudinal research investigating infants' ability to self-regulate frustration elicited by arm restraint suggest that between 4 and 6 months of age babies show a marked improvement of orienting-based self-regulatory skills, increasing the orienting of attention toward objects with respect to the mother, which is considered a more mature pattern of self-regulation (Moscardino & Axia, 2006). Data from these studies also demonstrate that infants' control of attentional orientation is an effective form of distress downregulation. Thus, an early landmark in the development of self-regulation consists of moving from exogenous (stimulus-driven) attentional capture to being able to exert a voluntary (goal-directed) control of orientation in order to regulate internal states. It is from the moment that babies start to use the voluntary control of attention that we can talk about self-regulation. In fact, endogenous control of attention orienting show great improvement during the second half of the first year of life, which is when we observe the prominent changes in regulation skills just described (Colombo, 2001).

The link between attention control mechanisms and self-regulation that emerges during the first year of life will remain during childhood and adolescence into adulthood. There is evidence for this link in the toddlerhood (Morales et al., 2005) and preschool period (Susa Erdogan et al., 2017). Also, social interactions with emotional content prominently triggers orienting of attention mechanisms in adolescents, such as moving attention away from their mothers' face while arguing about common disagreements (Woody et al., 2020). Besides, dysfunctional patterns of attention to emotional stimuli (e.g., biased orienting to threaten stimuli or reward) are observed in children and adolescents with externalizing or internalizing problems, suggesting that atypical development of attentional orienting might partially explain the emergence of related anxiety disorders (Morales et al., 2015; Waters & Craske, 2016).

As prefrontal structures of the brain develop, children become more able to use executive attention for carrying out more complex regulation strategies. While mechanisms of attentional orienting are linked to basic self-regulatory strategies based on distraction, the emergence of executive attention mechanisms leads to regulation strategies based on the active control of behavior and thoughts, and the use of top-down mechanisms for the regulation of emotional states. During the last months of the first year of life, infants start to show rudimentary executive attention skills. For instance, babies start to show cognitive flexibility in A not-B tasks and attention switching paradigms, as well as brain reactions to observed errors (i.e., violation of expectancies) localized in frontal midline regions (Conejero & Rueda, 2017; Conejero et al., 2016). Even at this early stage of the development, executive attention appears to be related to infants' ability to regulate negative emotional reactivity (Morasch & Bell, 2012). Also, toddlers showing greater ability to sustain attention are more likely to actively confront a frustrating situation (i.e., by seeking help from another person), which again suggests a significant contribution of attention to the development of more elaborated self-regulatory skills (Graziano et al., 2011).

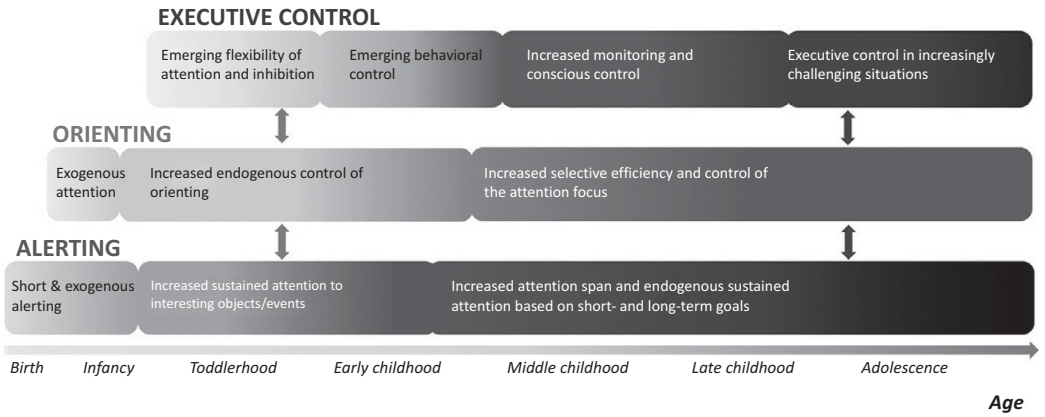

Figure 12.2 Trajectories of development of attention networks from birth into adolescence.

There is also evidence that children's performance in inhibitory control tasks predicts their general ability to voluntarily self-regulate (Tiego et al., 2020). Altogether, this research shows the key role that attention plays on the development of self-regulation skills. Figure 12.2 shows an overview of the main landmarks in the development of attention networks from birth to adolescence. The developmental course off the different functions is clearly interconnected, although the different functions show differential trajectories emerging at different moments in infancy and progressing all the way into early adulthood (Pozuelos et al., 2014; Rueda, 2014).

The relationship between attention and self-regulation will be observed along the lifespan. Much evidence with adults shows that individual differences in executive attention and effortful control are related to the use of emotional regulation strategies, such as reappraisal, as well as clinical and subclinical anxiety and depression symptomatology (Kanske & Kotz, 2012; Kanske et al., 2012).

Moreover, there is evidence showing that training preschoolers in executive attention by means of a set of computerized games fosters brain markers of children's executive attention, an improvement that seems to transfer to the ability to self-regulate behavior as measured with an adapted version of the adult gambling task (Rueda et al., 2012). In the same vein, mindfulness meditation practice, based on the control of attention in order to achieve a state of focused attention, engages the executive attention network and also has a positive effect on self-regulatory skills (Tang et al., 2014). The training of executive attention skills via a mindfulness program also produces enhanced cognitive control in the performance of an emotional inhibitory control task for trained participants, increasing their capacity to manage emotions (Quaglia et al., 2019).

In line with the previously reviewed literature examining the behavioral correlates of attention and self-regulation, neuroimaging studies confirm the close relationship between executive attention development and self-regulation. Neuroimaging studies have shown consistent evidence that the executive attention network underlies self-regulatory skills. For instance, children's electrophysiological indices of conflict processing and error monitoring predict individual differences in self-regulation measured by a delay of gratification task and an inhibitory control task (Checa et al., 2014). Findings from recent fMRI

research provide further support for this idea. It has been found that the use of explicit, but not implicit, strategies for the regulation of emotion (e.g., cognitive reappraisal) by adolescents and young adults is associated with the activation of frontal brain structures, suggesting the involvement of executive processes (Pozzi et al., 2021). In fact, decline in executive functioning has been linked to incipient impairments in the reappraisal of negative emotions explained by reduced efficiency of frontolimbic circuits (Lloyd et al., 2021).

Furthermore, studies with fMRI usually identify the ACC, a brain structure belonging to executive attention network, as involved in self-regulation. For example, in the case of emotion regulation, research indicates that the ACC may intervene by reducing amygdala response toward emotional stimuli (Dolcos et al., 2011; Oschner & Gross, 2005). An atypical activation pattern of the ACC is found for highly irritable children when they are challenged with frustrating situations (Tseng et al., 2019). The supramarginal gyrus, a parietal brain structure with numerous afferences to prefrontal structures such as the dorsolateral prefrontal cortex, has also been identified as key to both attention control and self-regulatory processes. It was found that the supramarginal gyrus intervenes in processing conflicting information as well as in emotion regulation in a sample of patients with depression suggesting that this structure is also a common neural node in brain networks overriding attention control and self-regulation (Loeffler et al., 2019). Indeed, the dorsolateral prefrontal cortex (particularly the right dorsolateral prefrontal area) has a fundamental role in disengagement from emotional stimuli when the application of top-down control of attention is required (Sanchez-Lopez et al., 2018).

To sum up, overall, attention skills are the foundation for individual differences in the general ability to self-regulate emotional states and behavior. The development of attention-orienting mechanisms enables infants to initially implement elementary self-regulation that will evolve into more complex forms of self-regulation as executive attention skills develop. Having established the connection between attention and self-regulation, in the next section we explore the implication of individual differences in attention for the development of coping as one particular aspect of self-regulation. We further review literature with reference to coping styles and their association to different temperament profiles, describing some findings about the impact that environmental factors may have in the development of effective coping strategies.

Attention, Self-Regulation, and Coping Styles

The ability to adapt and face stress and adversity constitutes a specific aspect of the general construct of self-regulation (Compas et al., 2001; Eisenberg et al., 1997; Skinner, 1995). In fact, coping has been defined as an automatic or controlled response whose aim is stress modulation (Skinner & Zimmer-Gembeck, 2007). Given the central role of attention in the implementation of self-regulatory processes, the successful modulation of responses under stressful conditions will likely require the use of attention control resources in order to detect, monitor, and choose the best strategy to cope with threatening situations (Skinner & Zimmer-Gembeck, 2016). However, people greatly differ on how they react to adversity. In the context of temperament, the distinction between reactive and self-regulatory components leads to the idea that there exist automatic and controlled components in people's coping responses, and that temperamental reactivity and self-regulatory systems may constitute complementary coping mechanisms by

themselves (Derryberry et al., 2003). In this sense, temperamental characteristics could constitute stable dispositions that influence the ways people cope with stressful situations (Sandler et al., 1997).

Temperamental reactivity refers to automatic reaction tendencies involving both defense and approach biobehavioral systems that enable withdrawal or approaching behaviors respectively to potential sources of threat or rewards (Derryberry et al., 2003). On the other hand, effortful control encompasses individual differences in the self-regulation of attention and in the ability to modulate behavior, either by inhibiting or activating nondominant responses, in order to accomplish goals and regulate emotional reactions (Rothbart et al., 1994). To the extent that temperamental reactivity is expected to influence the initial automatic stress reaction, the volitional response to stress is likely constrained by the initial automatic activation of defense and approach systems (Compas, 1987). While the defense system promotes behavioral inhibition and avoidance, the approach system entails orientation toward potential rewards. Consequently, children's coping behaviors are, partly at least, the result of temperamental differences in reactivity and self-regulation (Rueda & Rothbart, 2009), and indicate the relevance of temperament to the selection of coping strategies.

Behavioral responses to modulate stress may be categorized into coping styles or strategies that conform to the typical response patterns generally used by people when confronting diverse stressful situations (Sandler et al., 1997). In the context of developmental research, Ayers et al. (1996) found that children's responses to deal with stressful situations could be classified into four strategies: active coping, avoidant coping, distraction, and support-seeking. According to Ayers et al. (1996), active coping entails focusing on the stressor with the aim of deploying behavioral or cognitive efforts to deal with the stressor; avoidant coping is a strategy whereby behavioral and cognitive attempts to escape from the situation are made; the coping strategy of distraction prevents people from thinking about the problem; and support-seeking implies searching for help from other people to find a solution to the problem and to deal with the negative emotions related with the stressor.

In a recent study about developmental changes in coping strategies from childhood to adolescence, Eschenbeck et al. (2018) documented an age-related increase in the tendency to adopt active coping strategies, parallel to the decrease of use of avoidance, with the most evident improvements occurring between 9 and 11 years of age. This general trend is in line with the idea that, with age, coping increasingly relies on the ability to self-regulate behavioral and emotional reactivity. Our claim here is that individual differences in attention regulation and temperament modulate the emergence and developmental path of coping response patterns. Arguably, the increased ability to control the focus of attention and flexibly adjust responses according to strategic decisions (i.e., executive attention) is expected to be related to the use of more adaptive coping responses, such as the implementation of active coping strategies based on problem-solving and reappraisal (Skinner & Zimmer-Gembeck, 2016). In a similar vein, links between coping styles and individual differences in temperamental factors related to reactivity (i.e., extraversion and negative affect) and self-regulation (i.e., effortful control) have been found. Next we review empirical evidence supporting these theory-based connections.

Attention and Coping

The attentional networks play a fundamental role in the emergence and development of the ability to voluntarily regulate coping responses

to stress. Alerting, orienting, and executive attention networks develop according to a sequential path (Pozuelos et al., 2014; Posner et al., 2014). This implies that the relevance of the different attention functions for coping also changes throughout the course of development, particularly those related to the voluntary control of orientation and responses.

Infants, as well as older children and adults, show a reduction in heart rate and motor activation during periods of focused attention (Richards & Casey, 1991; Ruff & Rothbart, 1996). This physiological association underlies caregivers' strategy to orient babies' attention toward distracting stimulation when they are upset, in order to reduce their distress. From about 3 months of age, the coupling between focalization of attention and emotional down-regulation is observed (Harman et al., 1997). At the end of the first year of life, the emergence of executive control of attention brings about additional opportunities to use attention for emotional regulation. We have shown that babies who are 9–12 months old who are rated as high in negative affect by their parents show less ability to disengage attention from fearful faces as well as increased perseveration errors in a nonemotional task requiring attentional flexibility (Conejero & Rueda, 2018). Likewise, greater ability to disengage attention from threatening stimuli correlates with lower negative affectivity at 13 months of age (Rothbart et al., 1992). By toddlerhood, it has been demonstrated that babies start to apply the volitional and self-directed control of attention to deploy regulated actions (e.g., Feldman, 2009) and to cope with the stress elicited by maternal separation (e.g., Sethi et al., 2000).

During early childhood, children's ability to voluntarily regulate coping responses to stress is likely founded in the rapid improvement of attentional shifting skills. In this regard, Caspi and Silva (1995) reported better school adjustment and ability to adapt to changing demands in preschoolers showing greater flexibility in the orientation of attention. Also, attention and effortful control are strong predictors of both academic performance and socio-emotional adjustment in the school context (Rueda et al., 2010). Children's knowledge about and use of coping strategies in connection with their attentional skills is especially evident in middle childhood. This is likely due to the development of increasingly sophisticated cortical representations, which incorporate connections between events and responses including expectations about outcomes that will follow from the coping strategy (Derryberry et al., 2003). Moreover, the social and cultural context is also increasingly incorporated as a factor moderating both the strategy and the necessity to regulate emotional reactivity.

Individual differences in attention skills in middle childhood are then presumably influencing how likely children are to opt for an active coping strategy. As argued by Skinner and Zimmer-Gembeck (2016), the deployment of executive attention when dealing with stressful situations facilitates the use of coping strategies like problem-solving as well as the modulation of emotion through the control of attention. The role of attention in the flexible use of coping strategies has been demonstrated by Babb et al. (2010), who focused on children with and without ADHD. They found that children without ADHD presented age-related increases in flexibility in the selection of coping strategies oriented to adjust to uncontrollable aspects of situations, whereas children with ADHD were less flexible in their coping behaviors, as they utilized a limited variety of coping strategies. By observing coping responses to stressful episodes involving functional abdominal pain, Hocking et al. (2011) examined whether children's and adolescents' attention regulation skills could predict the

coping strategies they employed. They found that greater selective attention skills correlated with the use of coping strategies characterized by cognitive reappraisal and attention disengagement, and that those coping strategies mediated the relation between attention regulation skills and reduced anxious symptomatology. In adults, Young (2005) found that aggressive strategies, as well as avoidance and positive reappraisal, were the most common ways of coping among adults with ADHD; in contrast, the implementation of problem-solving strategies was less frequent in the ADHD group than in the control group. Also, within the ADHD group, individual differences in attention control were associated with active control coping strategies of support-seeking and problem-solving. Specifically, better regulation of attention was associated with greater use of active coping strategies. More recently, Al-Yagon et al. (2020) reported that adults with ADHD tend to use coping strategies that confront the emotional distress, and rely to a lesser extent than adults without ADHD on coping strategies focused on problem-solving.

Temperament and Coping

As argued by Rothbart and colleagues (1992), and in line with the theory of Gray (1991), temperamental tendencies of approximation and avoidance have an influence on children's coping strategies and modulate the susceptibility to reward and punishment. Temperamental systems of reactivity and regulation pave the way for children's individual differences and developmental trajectories in coping (Skinner & Zimmer-Gembeck, 2016). For example, avoidant coping is more likely among shy children, who are also more susceptible to punishment; instead, cognitive efforts to reappraise the stressful situation and to deploy problem-solving strategies are more likely among children who score high in effortful control and positive affectivity (Compas et al., 2001; Derryberry et al., 2003; Rueda & Rothbart, 2009).

The relationship between temperament and strategies used to regulate stress helps uncover the connection between temperament and maladjustment (e.g., Rothbart, 2011; Rueda & Rothbart, 2009). Evidence suggests that the temperament profile characterized by high extraversion and effortful control and low negative affectivity is the one associated with the most adaptive coping strategies (Rothbart, 2011) and with reduced risk for internalizing and externalizing behavioral disorders (Derryberry et al., 2003; Jaffee et al., 2007). According to Rothbart (2011), infants with a moderate reactivity level to stress can be soothed by their caregivers with less difficulty; this, in turn, promotes infants' development of more adaptive responses to stress by means of the construction of a coping system based on interpersonal interactions. In contrast with this, infants who are highly reactive easily become overwhelmed by even mild stressful situations, that makes it difficult for them to coordinate and adjust coping responses.

In childhood, the combination of high reactivity and low effortful control is linked to persistence of maladaptive coping strategies, like avoidance, flight, and submission (Lengua, 2006; Lengua & Long, 2002). On the other hand, an extremely extroverted temperament that is not counteracted by some degree of effortful control may lead to maladaptive coping characterized by impulsivity, rigidity, and frustration in response to unsuccessful coping responses (Derryberry et al., 2003; Skinner & Zimmer-Gembeck, 2016). In line with the assertion that effortful control contributes to adaptive coping, it has been found that children with greater ability to flexibly adapt to changes in the environment score higher in effortful control (Eisenberg et al.,

1996; Eisenberg & Valiente, 2004). Another piece of evidence suggests that temperamental tendencies in the preschool age period provide the foundation of personality and susceptibility to stress in adulthood; in particular, high extraversion combined with low effortful control at age 3 predict adults' neurotic tendencies and heightened stress reactions (Caspi et al., 2005). Similar to findings in children, high negative affect and effortful control scores in adults have been associated with avoidant coping and active coping, respectively (Bolger, 1990; Fabes & Eisenberg, 1997).

Nevertheless, two meta-analytical reviews focusing on several developmental stages (Connor-Smith & Flachsbart, 2007; Solberg Nes & Segerstrom, 2006) suggest that the connection between personality and coping from childhood to adulthood is moderate. The meta-analysis of Connor-Smith and Flachsbart (2007) reported a moderate association between extraversion and diverse active coping strategies, like problem-solving, seeking social support, and cognitive reappraisal, as well as links between conscientiousness and active coping based on problem-solving and cognitive reappraisal. Similarly, moderate connections were uncovered between neuroticism and coping responses implying avoidance, like denial and escape. Additionally, other studies highlighted the role played by optimism. For instance, Solberg Nes and Segerstrom (2006) reported that more optimistic people do not rely on avoidance coping strategies when facing stressors related with health issues, academic demands, or traumatic episodes.

In conclusion, coping has been defined as an automatic or controlled response whose aim is stress modulation. The attentional networks play a fundamental role in the emergence and development of the ability to voluntarily regulate coping responses to stress. As attention networks development takes place sequentially, the relevance of the different attention functions for coping also changes throughout the course of development. Concerning temperament, evidence suggests that temperamental tendencies in the preschool age period provide the foundation of personality and susceptibility to stress in adulthood; however, data form meta-analysis studies point to the fact that the connection between personality and coping from childhood to adulthood is moderate. Besides we address the role played by environment on attention and coping developmental paths.

Environmental Influences on Attention and Coping Development

Cross-sectional developmental analyses of the relationship between coping responses and individual differences in temperament and attention have elucidated some of the factors that contribute to adaptive coping in different developmental stages. In infancy, moderate fear together with the emergence of top-down control of attentional orientation act as regulatory factors that protect babies from potentially stressful situations (e.g., Johnson et al., 1991; Rothbart et al., 1994). Across childhood, the development of executive attention facilitates the control of affectivity and the adjustment of behavior to social norms (Checa et al., 2009; Rothbart et al., 2003; Simonds et al., 2007). By the end of childhood, there seems to be a shift from avoidant to active coping strategies (Eschenbeck et al., 2018). As already argued, the substantial improvement of regulation of attention may support the shift in coping skills due to enhanced metacognition that enables children to carry out planful action.

A further aspect that deserves attention is that general trends in coping development are shaped by environmental influences that may either foster or undermine cognitive development. The functional development of attention

networks, and hence also of temperamental systems related to them, are under the influence of the cultural and social context of the individual (Mezzacappa, 2004; Rueda & Cómbita, 2013). As a consequence, the ways in which individuals cope with stressful events, as well as changes in coping strategies over time, result from the interplay between cognitive development and social experiences. Therefore, a complete understanding of the development of coping throughout life needs to take into consideration the socioeconomic, cultural, and educational context of the individual (Skinner & Zimmer-Gembeck, 2016).

Much evidence shows that social experiences in the early years of life may either foster or compromise the normative development of, for instance, children's ability to voluntarily regulate their responses to the challenges posed by the environment (Bornstein & Bradley, 2003). For example, frontal and parietal brain circuits underlying the voluntary control of attention and self-regulation are greatly impacted from very early on by factors related to low socioeconomic status (SES; Hanson et al., 2013). We and others have demonstrated that infants and young children raised in low SES families show poorer cognitive and brain indices of executive attention (Conejero et al., 2016; Conejero & Rueda, 2018). This shows that adverse social factors associated with low SES undermine the development of children's ability to regulate attention. This is particularly true when social adversity is linked with a stress response that overwhelms the child's resources to cope with the stressful situation, and accordingly affects normative development (Skinner & Zimmer-Gembeck, 2016). It is then likely that attention development is compromised under heightened experience of stress, and that disorders related to difficulties in the regulation of attention may emerge. As evidence related to this point, the early exposure to adverse social circumstances, like poverty, maltreatment, and family adversity may impact neurobiological responses to stress, and this, in turn, favors the emergence of internalizing and externalizing psychopathology in later developmental stages (Zimmer-Gembeck & Skinner, 2016). Accordingly, the association between early adversity and later poor coping may be at least partly explained by the neurobiological impact that stressful situations have on brain development. In this vein, Chad-Friedman et al. (2021) reported that exposure to adversity in early childhood (e.g., low SES, stressful episodes, and parental depression) has a negative impact on executive functions like the flexible regulation of attention and memory measured in middle childhood, which appears to be mediated by decreased thickness of key brain regions for those functions, such as the right superior parietal cortex. Thus, the measure of cerebral thickness in this region was a mediator of the relationship between the extent of early cumulative risk and children's impaired ability for story recall as measured several years later. One of the environmental factors that most likely hinders the development of coping is extreme poverty. In this regard, homelessness constitutes another risk factor for maladaptive coping due to the disruption of neurocognitive development. Homeless children experience stressful life events with higher frequency than nonhomeless children (Herbers et al., 2014; Masten et al., 1993; Miller, 2011). For instance, by adopting a developmental perspective, Herbers et al. (2014) analyzed early adversity and traumatic events experienced by children living in emergency housing. They gathered data on cumulative adversity, children's behavioral and emotional disorders, and the quality of parent–child interactions. Researchers found an association between cumulative adversity and indices of traumatic symptoms and behavioral problems, although the quality of

parenting protected children from the impact of adversity. These findings provide further support for the assertion that early-life experiences may compromise the later acquisition of adaptive coping skills because the normative development of brain functioning relevant for regulation of emotion and behavior is affected by stressful life events.

Together with the study of the factors that may hamper the development of adaptive coping strategies, there is research focused on examining the educational and contextual aspects that promote the ability of individuals to cope with stressful events. For instance, parenting can act as a protective factor of the child's normative cognitive development even under early adverse conditions like poverty. Parental characteristics like warmth and responsiveness are consistently linked with children's adjustment irrespective of risk-related contextual factors (e.g., Bernier et al., 2010; Evans & Kim, 2012). Arguably, children's self-regulation development, and hence the development of adaptive ways to cope with stressful events, is enhanced when parents respond adequately to their children's needs (Herbers et al., 2014).

Adaptive coping may also be fostered through intentional practice. Interventions designed to train coping skills include strategies that, although not directly designed to foster attention regulation, draw on an individual's ability to regulate attention, to think ahead, and implement planned action. Grey et al. (2009) carried out an investigation aimed to train children's coping skills. In their study, 8–12-year-old children were trained to confront stress related with symptoms of diabetes by means of reflection on and a flexible use of coping strategies adapted to solve difficult situations. The coping trained group showed better self-efficacy, lower impact of diabetes, and less need for parental control following training, although to the same extent as a group receiving general education on diabetes.

Another promising line of intervention is the use of meditation and mindfulness training. As pointed out earlier in this chapter, mindfulness training has proven to significantly improve attention control in relation to general self-regulatory skills. The practice of mindfulness aims to gain control over attentional focus by reorienting to the present moment, and often also includes relaxation, breathing practice, and mental imagery. Tang and colleagues have demonstrated that mindfulness-based interventions show benefits in behavioral (e.g., better indices of executive attention) and physiological (i.e., reduced concentration of salivary cortisol) responses to stressful situations (Tang et al., 2007), an effect possibly mediated by training-related improvements of white matter fibers' integrity in regions of the executive attention network (Tang et al., 2010). A recent study has replicated the benefits of short-term (a 7-day intervention) mindfulness training on attention networks, and showed that the trained group also enhanced the use of positive coping style following the intervention (Quan et al., 2018).

To sum up, the functional development of attention networks, and hence also of temperamental systems related to them, are under the influence of the cultural and social context of the individual. As general trends in coping development are shaped by environmental influences that may either foster or undermine cognitive development. a complete understanding of the development of coping throughout life needs to take into consideration the socioeconomic, cultural, and educational context of the individual.

Moreover, evidence informs that adaptive coping may also be fostered through intentional practice. Those interventions, although not directly designed to foster attention regulation, draw on the individual's ability to regulate attention.

Concluding Remarks

In this chapter, we have made conceptual and empirical connections between attention and self-regulation, at both behavioral and temperament levels, and have argued in favor of the existence of a link between individual differences in self-regulation and coping styles. We discussed evidence about the development of self-regulatory processes on the basis of maturation of brain circuits of executive attention. The progressive development of this system enables the emergence of coping styles that increasingly rely on the regulation of emotional reactivity and inhibition of dominant tendencies in favor of carefully weighted, and often long-term established, goals and intentions. In addition, we have presented a branch of timely research dealing with environmental circumstances (e.g., poverty and adversity during development) and educational experiences (i.e., interventions and psychoeducational programs) that may hinder or foster the development of self-regulatory skills. Taken together, the role of attention and self-regulation in the development of coping has an important potential for designing interventions that will potentially contribute to enhancing children's ability to cope with adversity.

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13 The Development of Emotion Regulation and Coping in Early Childhood

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Introduction

Life, as wondrous as it is, can be challenging. As we write this chapter, the people of Ukraine are being assaulted and displaced, and the world is still reeling from the throes of a pandemic. In many nations, people face profound injustices and political upheaval, including families fleeing one set of impossible circumstances to face challenges and obstacles in new, unfamiliar places. In addition to these stresses, we also face the hassles that arise regularly. A vending machine takes our money but does not deliver the snack; we misplace our keys. Given the challenges of life, a complete science of human behavior must explain how we come to both regulate our emotions and cope with stress. This requires explaining the developmental foundations of emotion regulation and coping, how these skills change with age, and how families, communities, and societies foster resilient, flexible children who can manage both ordinary challenges and less common life stresses. Such knowledge is needed to improve the promotion of effective emotion regulation and coping, including during the foundational early childhood years.

Over 40 years, research clearly demonstrates that individual differences in children's emotion regulation are consequential for development. For example, basic skill at emotion regulation is a component of being school-ready by kindergarten age (Blair, 2002; Harrington et al., 2020). Preschoolers who are disruptive are prone to preschool expulsion (Perry et al., 2008), and tend to have difficulty regulating anger (Wakschlag et al., 2008). Moreover, early emotional dysregulation is a precursor of later symptoms of psychopathology (McLaughlin et al., 2011). In sum, the quality of emotion regulation in early childhood predicts many developmental outcomes (e.g., Blair et al., 2015). Yet, surprisingly, there is insufficient evidence of the early within-person development of emotion regulation and coping and uncertainty about how emotion regulation and coping differ.

In this chapter, we summarize what is known about the development of coping and of emotion regulation in early childhood, defined as the period between birth and 72 months. We identify issues that remain to be addressed with suggestions for future research (see Table 13.1 for a summary). That discussion includes potential ways to better integrate the study of the development of emotion regulation and coping.

Emotion, Stress, Emotion Regulation, and Coping

To begin, we share our conceptualizations of the concepts we use. We first address emotion and stress from the vantage of early childhood development. We then discuss the regulation of emotion and the implications for how emotion regulation relates to coping.

Emotion

The functional perspective on emotion and its development (Adolphs & Andler, 2018;

Table 13.1 *Summary of the chapter key messages*

- Emotion regulation and coping are distinct but related within-person processes that first develop in early childhood.
- In infancy, coping involves regulation of physiological stress reactions that occur before emotions develop.
- Although individual differences in emotion regulation are associated with a range of developmental outcomes, we still need to investigate emotion regulation and coping as moment-to-moment within-person processes that develop over the course of early childhood.
- Future directions for research include distinguishing stress and emotion, conceptualizing them as within-person processes, and investigating their related developmental trajectories.

Barrett & Campos, 1987; Frijda, 1986) conceptualizes emotions as goal-oriented processes that enable us to maintain, regain, achieve, and relinquish goals for well-being. Emotions are not things that are reducible to facial expressions or subjective feelings. Rather emotion involves an ongoing, dynamic relation between individual and environment (Cole, 2016). That is, emotion is a relational construct, better conceptualized by verbs than nouns, defined by two continuous, coterminous processes: appraising one's relation to the actual or perceived environment in matters of significance for well-being and preparing to act to achieve, maintain, or regain well-being (Barrett & Campos, 1987). Moreover, emotion is integrally related to other psychological and physiological processes. For example, appraising involves perceiving and evaluating the environment and readying to act entails physiological and motoric changes, regardless of whether they lead to action.

Stress

Stress also involves matters of personal significance to the person, namely threats to well-being. Although appraisal was central to early conceptualizations of adult coping (Lazarus, 1966), contemporary evolutionary perspectives define stress in terms of reactive changes in the sympathetic-medullary and hypothalamic–pituitary–adrenal systems. Stress reactivity, which is critical for survival because it equips organisms to adapt to the demands of life, is present in many nonhuman organisms, including many that are incapable of emotion as defined by functional theory (Gunnar & Quevedo, 2007; Meaney, 2001; Sapolsky, 2005). The evolutionary perspective initially included physiological responses to any demands made upon the body, including emotionally positive experiences (Selye, 1974). With evidence of differentiations among types of stressors and resulting physiological reactivity, stress is now largely conceptualized in terms of demands that overtax the body's ability to regain physiological homeostasis (Sapolsky, 2005).

Stress and Emotion in Early Childhood

The demands of birth and the first days of life activate innate stress responses in human neonates who depend on caregivers to regain physiological equilibrium (Gunnar, 2000). Therefore, stress reactivity is present before infants appear to have emotions. Although much more research is needed, very early stress reactivity may accelerate or sensitize the development of the emotional fear system (Blair & Ku, 2022; Loman & Gunnar, 2010).

Precisely when the basic emotions emerge in infancy is debated. Differential emotion theory (Izard, 1991) asserts that infants are biologically prepared to develop a set of basic emotions that emerge during the first year – joy,

interest, sadness, anger, and fear (Ackerman et al., 1998). These emotions involve innate schema that do not require learning and that emerge as infants gain experience with the environment. Evidence of this developmental progression relies on emotion expressions, but there is debate about how reliable infant emotion expressions are (Camras & Shutter, 2010) and whether human neurophysiology only supports recognition of valence and arousal and not discrete emotion schema (Feldman, 2017). The evidence depends on the context in which infant emotion expressions are observed. Parents report observing infant fear expressions within the first 2 months of life, for example when their babies are immersed in bath water or hear sudden loud noises, whereas, in the lab, reliable fear expressions only appear later in the first year, for example, when children can perceive depth and distinguish primary caregivers from unfamiliar persons (Campos et al., 1978; Mangelsdorf, 1992; Nagy et al., 2001). In any case, physiological stress reactivity is present at birth and before even the earliest indication of infant emotion.

Emotion Regulation

There is a question whether a dynamic, functional view of emotion renders it indistinguishable from emotion regulation (e.g., Campos et al., 2004; Thompson et al., 2008). Emotion is integrally situated amidst multiple, interacting levels of many physiological and psychological processes, which it both regulates and is regulated by. This suggests that regulation is an inherent property of emotion and not a reaction to it. Nonetheless, as observers of ourselves and others, we choose whether we approach or avoid emotion-eliciting situations, experience emotional reactions (or anticipate them), and engage in strategies to modify them (Cole et al., 2004; Gross, 2015). We infer emotion regulation from these sequences.

Because young children cannot describe their experiences, we often infer emotion regulation from observing their behavior. Although many studies use adult reports to measure individual differences in children's emotion regulation skills, behavioral observations, especially coupled with physiological measures, are needed to demonstrate *within-person regulation* in early childhood (Cole et al., 2004, 2019). We know surprisingly little about the within-person development of regulation. Many studies show inverse relations between the young children's emotional intensity and their strategy use, but these relations cannot demonstrate whether a strategy alters ongoing emotion or spontaneous reduction in emotion intensity increases the likelihood of strategy use. The study of regulation requires demonstrating that a source – a child's or another person's behavior – alters the inherent ebb and flow of emotions elicited by the situation (Cole et al., 2019). If a strategy forestalls, minimizes, or resolves prepotent emotions, we have evidence of emotion regulation.

Developmental models of emotion regulation all begin with the fundamental role of caregiving (e.g., Blair & Ku, 2022; Calkins & Perry, 2016; Feldman, 2009; Kopp, 1982; Sameroff & Fiese, 2000). Very young children have rudimentary strategies (e.g., averting gaze, self-soothing) that have salutary effects on their states, but throughout early childhood, emotion regulation involves others. The term emotion regulation therefore includes interpersonal regulation, which occurs throughout the lifespan (e.g., dyadic co-regulation in couples; Butler & Randall, 2013).

Emotion Regulation and Coping

Given these conceptualizations of emotion, stress, and emotion regulation in early childhood, how does early childhood development help us distinguish between emotion regulation

and coping? Most discussions indicate that emotion regulation and coping are distinct while recognizing significant overlap (e.g., Compas, Jaser, et al., 2014; Losoya et al., 1998). We approach this question, using two interesting definitions of coping: (1) as action regulation under stress (Skinner, 1999) and (2) as voluntary, conscious control (Compas et al., 2001). With these in mind, we address the relation between emotion regulation and coping through the lens of early childhood development, concluding that distinguishing stress and emotion is critical.

Stress and Emotion

Although poorly understood, infant stress reactivity and the regulatory aspects of caregiving appear to influence the development of (at least) the fear system (Gunnar et al., 2015). Exposure to early-life stress appears to have broad and cascading effects on physiological and psychological development, including the development of emotion regulation (Blair & Ku, 2022; Pechtel & Pizzagalli, 2011). Moreover, situations that elicit stress at one age point may not elicit stress, but elicit negative emotion, at a later age point (Gunnar & Quevedo, 2007).

Caregivers regulate infant stress. If a caregiver not only fails to help the infant regain equilibrium but is actually the source of the stress, it is unsurprising that the consequences for many aspects of development are profound. This view is consistent with the view of coping as action regulation under stress (Skinner, 1999). There are likely important ways that stress regulation in infancy not only influences emotional development but also emotion regulation and coping development and how they intersect over the course of early childhood. The pathway from early-life stress in the presence of both adequate and inadequate caregiving to the development of children's emotion regulation and coping clearly warrants empirical attention.

Voluntary, Conscious Control

Coping can be defined as a conscious, voluntary act (Compas et al., 2001). However, there are no firm conclusions about when young children are consciously aware of their own thoughts, emotions, and behavioral choices (Kopp, 2011; Perner & Dienes, 2003; Zelazo & Cunningham, 2007). Moreover, the development of consciousness is complex. There are different levels of self-awareness in the first 5 years of life (e.g., Rochat, 2003) but these have not been mapped onto emotion regulation or coping. Infant self-awareness, which develops toward the end of the first year, is associated with infant reactions to others' emotion and, to a lesser extent, to their own rudimentary, nonconscious regulatory behaviors (gaze aversion, self-soothing) (Geangu et al., 2011).

Effortful control, a dimension of temperament that requires intentionality but not conscious awareness, and executive functioning, a set of cognitive skills that afford behavioral control, are both associated with improvements in self-regulation (Eisenberg et al., 2016; Zelazo, 2004). Conscious awareness of a rule of conduct, however, does not automatically lead to self-regulation; preschoolers can state a rule, intend to use it, but fail to inhibit a prepotent response (Zelazo, 2004). Preschoolers' understanding of emotion regulation strategies indicate they are aware that their thoughts can be strategies (Blankson et al., 2013; Cole et al., 2009; Grenell et al., 2019) but less is known about their spontaneous use of mental strategies. Finally, the issue of the role of conscious control is complicated by the fact that well-practiced strategies become automatic and nonconscious even in adults (e.g., Mauss et al., 2007). The benefit of defining coping as a conscious act clearly requires much more research.

Positive Emotion, Strategies, and Interpersonal Regulation

There are three other ways we could distinguish emotion regulation and coping (see also Compas, Jaser, et al., 2014). First, emotion regulation includes up- and downregulation of both positive and negative emotions. Because most studies of early childhood emotion regulation focus on downregulation of negative emotion, emotion regulation and coping are often treated as interchangeable. However, downregulation of positive emotions is also important for social competence (du Pont et al., 2016). Laughing at another's misfortune lacks compassion and politeness and laughing at an adult's scolding can be interpreted as defiance. Emotion regulation also includes upregulation of negative emotion. Mustering righteous anger helps a preschooler stand up for a friend who is bullied; the readiness to act with effort to overcome an obstacle to well-being (i.e., the bully) can effectively defend the friend. Coping as action regulation under stress, however, includes these as ways to manage stressful transactions (Skinner & Zimmer-Gembeck, 2007).

Another potential distinction involves the strategies that are used. Early childhood coping research still alludes to the distinction between emotion-focused and problem-focused strategies (Folkman & Lazarus, 1984), which are not prevalent in early childhood emotion regulation research. However, both constructs are now studied with a much wider range of strategies such that any meaningful differences do not appear (Zimmer-Gembeck & Skinner, 2011).

Finally, although coping research focused historically on the individual, whereas emotion regulation research emphasizes socialization, the role of caregivers in teaching children coping strategies is now commonly considered. Less well understood is the role of caregivers as sources of coping for young children, leaving open how caregiver contributions to children's coping differ, if at all, from contributions to the development of self-regulation of emotion.

In sum, the distinction between stress and emotion is the best way to differentiate coping and emotion regulation. This distinction requires careful consideration of both the situations in which we observe children and how we measure stress and emotion. Given the observational nature of early childhood developmental research, we might distinguish between the ordinary challenges that elicit children's emotions and unusual, overtaxing situations that elicit stress reactions. Coping with infrequent adverse events or chronic exposures to adversity are stresses in ways that everyday challenges are not. Although the personal significance of situations is central to the definitions of both emotion and stress (Barrett & Campos, 1987; Sapolsky, 2005), only stress overtaxes children's ability to regain equilibrium.

By design, for ethical and practical purposes, the emotion-eliciting tasks used to study emotion regulation in early childhood are modeled after common situations in children's lives – disappointments, frustrations, and new uncertain situations. If children become too distressed, we stop procedures. Observations of young children's coping, in contrast, often involve naturally occurring, less typical situations, such as uncomfortable or invasive medical procedures. However, if we link situational context with physiological stress reactivity, we can identify circumstances that are stressful and not just emotionally negative.

Having grappled with these conceptual issues, we organize the rest of this chapter around two aims: (1) to summarize what is known about the development of coping and of emotion regulation in early childhood, defined as the period between age 2 through 6 years, and (2) to identify gaps in knowledge about the development of emotion regulation

and coping, with an eye toward ways that future research can integrate our knowledge of these important processes.

Age-Related Differences and Changes in Early Childhood Coping and Emotion Regulation

Hundreds of studies refer to emotion regulation in children, many of which focus on infancy and early childhood or adolescence, with middle childhood being studied less often. In contrast there is a smaller corpus of research on young children's coping. Unfortunately, very few studies in either group focus on age-related changes in a longitudinal design. Rather most focus on between-person individual differences as they relate to children's cognitive skills (e.g., Carlson & Wang, 2007), behavioral symptoms (Blandon et al., 2010), or socioemotional competencies (Graziano et al., 2007). Table 13.2 lists studies of age differences or changes that guide our summary, some of which extend beyond early childhood. Most are cross-sectional and many did not treat age differences as a central question. None considered cohort effects, although a cross-sequential design, in which two or more cohorts of children are followed for at least three age points, is an optimal design for identifying cohort and age effects (Schaie & Baltes, 1975). Cohorts of children may have different experiences; some cohorts have more exposure to early childhood socioemotional learning programs that explicitly aim to foster emotion regulation and cohorts have different stress exposures, such as the 9/11 attacks, school shootings, and the COVID-19 pandemic.

We also note interchangeable use of the terms coping and emotion regulation even when studies differ in the literature cited. That is, articles differ in whether they cite conceptual and empirical papers on coping or on emotion regulation, rarely integrating the two explicitly (but see Losoya et al., 1998). Coping studies typically cite frameworks that originate with models of adult stress and coping (Folkman & Lazarus, 1984) or the two-process model of perceived control (Rothbaum et al., 1982). Studies of young children's coping often distinguish between strategies aimed at modifying a situation (problem-focused or primary control strategies) and those aimed at modifying internal experience of the situation (emotion-focused or secondary control strategies). Predictions of age differences in these types of coping are rarely guided by developmental theory (Losoya et al., 1998; Skinner & Zimmer-Gembeck, 2007; Zimmer-Gembeck & Skinner, 2011).

Emotion regulation research in early childhood rarely cites these models. As noted, they focus on predicting individual differences, often using models of attachment or temperament to guide them, and often considering parental socialization as an influence. Many refer to Kopp's (1982) developmental model of the emergence of self-regulation. As a result, there is ample description of putative regulatory strategies that children employ during laboratory tasks that elicit negative emotions. When there are tests of the relations between how much or how often young children use certain strategies and how angry they appear, inverse relations are shown. These suggest that greater strategy use contributes to less negative emotion, but few studies test temporal or reciprocal causal relations.

Age Differences in Coping in Early Childhood

Over the past 40 years there have been relatively few studies of young children's coping and fewer of developmental changes in this period (Losoya et al., 1998;

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Table 13.2 *Age-related findings in selected studies of coping and emotion regulation in early childhood*

Citation	Sample characteristics	Study design	Age associations
Altshuler and Ruble (1989)	Age: 5–12 years n = 72 typically developing children	Cross-sectional	Older children used a greater number of coping strategies than younger children. Avoidant strategies were more common than approach strategies for children of all ages. Older children used fewer escape strategies and more cognitive distraction than younger children.
August et al. (2017)	Age: 5 months to 5 years n = 45 at-risk mother–child dyads	Longitudinal	Self-comfort, attention-seeking, and fretting in infancy was associated with increased negativity in preschool age.
Baumgartner and Strayer (2008)	Age: 3–5 years n = 150 typically developing children	Cross-sectional	In episodes of peer conflict, older children used more verbal provocations while younger children engaged in more direct competition for access to desired objects. Younger children were also more likely to display intense emotions without actions directed at the protagonist in a conflict than older children.
Bernzweig et al. (1993)	Age: Kindergarten and second-grade-age children n = 105 typically developing mother–child dyads	Cross-sectional	Children used instrumental coping when observing other children's distress, but used distraction or avoidance when experiencing stress. Older children relied less on support from caregivers and used more cognitive restructuring, cognitive avoidance, and problem-solving than younger children.
Blair et al. (2015)	Age: 3–6 years n = 356 typically developing children	Longitudinal	Emotion regulation, social skills, and peer acceptance were mostly stable across middle childhood with some individual variation in each construct.
Carlson et al. (2007)	Age: 4–5 years n = 53 typically developing children	Cross-sectional	Inhibitory control predicted emotion regulation in 4-year-old children but not 5-year-old children after controlling for language abilities.

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Table 13.2 (*cont.*)

Citation	Sample characteristics	Study design	Age associations
Cole et al. (2009)	Age: 3–4 years n = 116 typically developing children	Cross-sectional	Older children displayed increased emotion regulation strategy recognition than younger children.
Cummings et al. (1991)	Age: 5–19 years n = 98 typically developing children	Cross-sectional	Younger children perceived unresolved anger as less angry and were more saddened by resolved anger.
Dollar et al. (2020)	Age: 2–15 years n = 270 typically developing children and their parents	Longitudinal	Respiratory sinus arrhythmia (RSA) is stable from toddlerhood through adolescence. RSA *reactivity* is not stable from toddlerhood through adolescence, but is stable between ages 4–5 and ages 7–10, suggesting periods of change during these points in childhood.
Eisenberg et al. (1994)	Age: 52–76 months n = 91 typically developing children	Longitudinal	Individual differences predict naturalistic angry reaction of older preschoolers more than younger preschoolers.
Eisenberg et al. (2001)	Age: 55–97 months n = 214 typically developing children	Cross-sectional	Parent-reports of inhibitory control increased with child age. Parent-reports of impulsivity and teacher-reports of attention focusing decreased with age. Older children were able to sit still longer but also expressed more negative affect when given a disappointing gift.
Eisenberg et al. (1997)	Age: 4–10 years n = 77 typically developing children	Longitudinal	Early negative emotionality predicted later poor school social competence and increased problem behavior. Better emotion regulation was predictive of later better school social competences and decreased problem behavior.
Fabes and Eisenberg (1992)	Age: 42–71 months n = 69 typically developing children	Cross-sectional	Younger children were more likely to display anger and use strategies like escape. Older girls were less likely to seek adult support.

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Fabes et al. (1994)	Age: 67–82 months n = 49 typically developing mother–child dyads	Cross-sectional	Older children were more likely to comfort a "crying" baby doll than younger children. Children's lower heart rate was associated with lower observed anger expression. Children's higher heart rate variability was associated with more direct problem-solving, comforting, and higher parent report of constructive coping. Younger children exhibited higher heart rate variability than older children.
Halpern (2004)	Age: 3–6 years n = 58 typically developing children	Cross-sectional	Older preschoolers reported more problem-approach coping, but used emotion venting coping strategies and noncoping strategies less often than younger preschoolers.
Halverson and Waldrop (1974)	Age: 30 months to 7 years n = 74 typically developing mother–child dyads	Longitudinal	Toddlers who were more persistent in their attempts to remove a barrier displayed better coping at 7 years of age.
Kromm et al. (2015)	Age: 4–8 years n = 98 typically developing children	Cross-sectional	Children's ability to volitionally regulate their emotion expressions increased with age such that older children were better able to mask disappointment. This effect was enhanced for children with higher emotion understanding.
Lessing et al. (2019)	Age: 3–8 years n = 75 typically developing children	Short-term Longitudinal	Executive function abilities grow between ages 5 and 8 years. This growth is particularly pronounced between the ages of 5 and 6 years. This growth in executive function was negatively associated with children's use of situational accommodative coping strategies.
Lewis et al. (2004)	Age: 14–25 months n = 24 typically developing mother–infant dyads	Short-term Longitudinal	Results indicated a shift from sensorimotor to interrelational operations at 18–20 months.
Liebermann et al. (2007)	Age: 3–5 years n = 60 typically developing children	Cross-sectional	Older children displayed more positive behaviors when presented with a disappointing gift than younger children.

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Table 13.2 (*cont.*)

Citation	Sample characteristics	Study design	Age associations
Losoya et al. (1998)	Age: 4–12 years n = 93 typically developing children	Longitudinal	Instrumental coping was consistent inter-individually, increased with age, and was positively correlated with positive coping strategies (e.g., cognitive restructuring, support-seeking). Aggressive coping was also inter-individually consistent, decreased with age, and was negatively correlated with positive coping and positively correlated with negative coping (e.g., venting).
Rossman and Gamble (1997)	Age: 4–6 years n = 34 typically developing children and their mothers	Cross-sectional	Stressor appraisal differs across age, with older children displaying more complex appraisals.
Santucci et al. (2008)	Age: 4–7 years n = 54 typically developing children and their parents	Cross-sectional	Younger children were more focused on a desired object during a delay of gratification task and showed more sadness than older children.
Sayfan and Lagattuta (2009)	Age: 4–7 years n = 48 typically developing children	Cross-sectional	Older children offered more mental strategies for coping than younger children, but behavioral strategies were stable between age groups.
Shoda et al. (1990)	Age: 6–16 years n = 95 parent respondents	Longitudinal	Preschoolers with better delay of gratification displayed better coping in adolescence.
Wilson et al. (1987)	Age: 3–11 years n = 169 typically developing children	Cross-sectional	Older children endorsed cognitive coping strategies as more effective than younger children.
Wong (2016)	Age: 5–7 years n = 216 typically developing children	Longitudinal	Children reported fewer incidences of social stress in school as they aged.

Skinner & Zimmer-Gembeck, 2007; Zimmer-Gembeck & Skinner, 2011). Studies of age differences in early childhood coping use two different methods. The majority interview children, asking them how they would feel and what they would do in hypothetical situations involving parent–child, school, and/or peer situations. The remainder interview or observe children undergoing an uncomfortable, unusual medical procedure. In interviews, children older than age 5 years more often describe using mental strategies, for example cognitive restructuring, relative to younger children. Rates of referring to behavioral strategies (e.g., leave the situation, engage in a different activity) occur at equivalent rates across age groups.

Early literature reviews acknowledge the dearth of longitudinal studies of coping and the limited number of studies of early childhood coping. Fields and Prinz (1997) located only five studies comparing the coping of preschool age children (3- through 7-year-olds) with older school–age children. Losoya and colleagues (1998) include both coping and emotion regulation studies and lamented the dearth of longitudinal studies. Nonetheless, both reviews describe a similar pattern of findings. Specifically, problem-focused coping is more common among younger children, and emotion-focused, cognitive coping strategies are observed mainly among elementary school–age children, a conclusion reached in later cross-sectional studies (Sayfan & Lagattuta, 2009; Wilson et al., 1987). Losoya and colleagues, however, also note that studies including avoidance and support-seeking yield inconclusive findings. Which strategies are used likely depends on the controllability of the stressful situation (if a situation cannot be fixed, one resorts to emotion-focused coping). In sum, the evidence across study types appears to support the long-held belief that strategy use depends in part on the cognitive resources children have as well as their socialization experience. However, a study of diabetic 3- through 11-year-olds receiving insulin injections reported no age differences in coping (Antal et al., 2011).

Unfortunately, few studies provide a theoretical basis for predictions about age differences in coping. An exception is a cross-sectional study (Rossman & Gamble, 1997) predicting age differences in young children's understanding of coping strategies based on skill theory, a neo-Piagetian theory of cognitive development (Fischer, 1980) that emphasizes age-related changes in cognitive complexity. Most 4- through 6-year-olds provide complex descriptions of the situations and their feelings, but only 6-year-olds describe their coping complexly. Another study, one of the few longitudinal studies, tests whether the ability to alter one's goals in a stressful situation (i.e., accommodative coping) is a function of children's executive functioning, that is, cognitive flexibility (Lessing et al., 2019). Executive functioning, assessed with the Dimensional Change Card Sort task at child ages 5½, 6, and 8 years, was used to predict emotion-focused coping, including accommodative coping at 8 years. Unexpectedly, better executive function performance at 5½ years is associated with *less* emotion-focused coping at 8 years. Although the factors that account for developmental changes in coping clearly require more research, these studies used theory-based approaches to assess the underlying cognitive demands of understanding coping.

Among preschool-age children, those past their fourth birthday more often describe using strategies than younger preschool-age children. Older preschool-age children describe more problem-focused strategies, such as approaching or avoiding a situation, whereas younger preschool-age children more often describe venting (expressing negative emotion) or using no strategy (Halpern, 2004). Notably,

a significant number of preschoolers do not provide any strategy, ranging from 33% for parent–child conflict to 53% for separation from parent. Two observational studies mirror these findings. After an intervention (coping training versus usual care), observers rated 3- through 7-year-olds during a voiding cystourethrogram; coping training was associated with more observed strategy use and less distress (Zelikovsky et al., 2000). In post-hoc analyses, regardless of condition, younger children displayed more distress and engaged in fewer strategies. An observational study of 3-, 4-, and 5-year-olds experiencing peer conflicts found that younger children tend to retaliate or escape, whereas older preschoolers are more likely to negotiate, or reason with the perpetrators (Baumgartner & Strayer, 2008).

There are serious limitations to the conclusions we can reach. There is considerable variation in situational context, ranging from more common peer and parent conflicts to uncommon events that young children rarely experience. Which situations, or for which children, the physiological stress reactivity system is overtaxed is unknown. The findings suggest that when children use strategies, secondary control, or emotion-focused, strategies are more common (Nabors & Liddle, 2017) and more effective (Compas, Desjardins, et al., 2014; Langer et al., 2005) even for young children (Treiber et al., 1985; Zelikovsky et al., 2000).

Studies of uncommon, uncomfortable medical procedures often include wide age ranges to have sufficient sample size, with no deliberate examination of age-related differences or changes in coping. Studies involving more normative situations that are still infrequent (i.e., dental visits, immunizations, first day of school) present opportunities to study within-person age-related changes in coping. For example, in a longitudinal study, children at ages 5, 6, and 7 years describe social stressors they experience in school, such as bullying, fear of authority, peer conflicts, and sense of isolation, and the strategies they used to cope with them (Wong, 2016). Most children report using direct problem-solving to cope with stress regardless of age; few report emotion-focused strategies.

In sum, despite a dearth of longitudinal and cross-sectional studies comparing coping in early childhood to coping among school-age children, the conclusions of Fields and Prinz (1997) parallel evidence from later studies. During early childhood – after age 4 years – children both verbalize and use behavioral coping strategies. However, it is not until they reach 6 or 7 years that there is clear evidence that they use cognitive coping strategies. Prior to age 4, at least in the contexts studied, children do not generate strategies. These age differences are consistent even though they are based on different methods.

Age Differences in Emotion Regulation in Early Childhood

Although studies of young children's coping are limited, there are hundreds of studies of young children's emotion regulation. Where the coping literature frequently uses hypothetical vignettes to study children's coping, the emotion regulation literature relies on either parent or teacher ratings or laboratory-based emotion-eliciting tasks. Adult reports aid the study of individual differences, but observational studies have the potential to study emotion regulation as a within-person process that changes with age.

Observational studies of young children's emotion regulation typically depend on emotional expressions; a criticism of early work is that it often interpreted fewer or less intense negative expressions as indicating better regulation (Cole et al., 2004). Some studies also code the strategies that young children use in

emotion-eliciting tasks. There is no single organizing framework for which strategies are included. Which strategies are observed depends on the emotion being elicited (e.g., anger versus fear; Buss & Goldsmith, 1998) and whether the mother is present and/or permitted to interact with the child (e.g., Grolnick et al., 1996). The strategies studied are drawn from germinal descriptive studies of spontaneous behaviors of infants, toddlers, and preschool-age children (Buss & Goldsmith, 1998; Eisenberg et al., 1994; Grolnick et al., 1996; Rothbart et al., 1992; Stansbury & Sigman, 2000). Although some observations occur outside of the lab setting, most involve lab-based emotion-eliciting tasks, particularly anger-eliciting tasks, designed to mimic ordinary challenges that young children face. They are not designed to be highly stressful.

As with early childhood coping, there are few longitudinal investigations of how emotion regulation changes with age. Longitudinal studies that include emotion regulation typically examine it as a moderator of outcomes (e.g., Gilliom et al., 2002; Perry et al., 2018), although some study age-related changes in emotion regulation itself (Supplee et al., 2011). In our lab, we attempt to document how emotion regulation, specifically self-regulation of anger, changes between toddlerhood and preschool years. For example, we observe how children behave when their mothers tell them they must wait until she completes her work before they can open a gift. We find age-related changes in the frequency, duration, and latency to anger and in children's bidding to mother about the demands of waiting and in distracting themselves from the gift and the busy mother (Cole et al., 2011; Tan et al., 2013). Anger reactivity declines with age during early childhood, but there are at least three developmental trajectories – typically developing, later developing, and at-risk trajectories (Bendezú et al., 2018) – and declining anger reactivity is associated with both children's internal resources (e.g., language skills; Roben et al., 2013) and parental socialization strategies (Bendezú et al., 2018; Ravindran et al., 2021).

Young children's use of strategies, however, does not indicate whether their strategy use changes their emotions. We examine the extent to which children's strategies imply engagement of their cognitive resources (memory, planning, reasoning, attention control) and whether these then modify their emotional expressions. That is, rather than focus on a specific candidate cognitive ability, or on any specific strategy, we code the extent to which any behavior reflects a putative strategy and the extent to which that behavior reveals engagement of any cognitive strategy (Cardwell et al., 2022). We find momentary effects of the extent of strategies on 36-month-olds' desire for the gift and frustration about waiting (Cole et al., 2017) and growth in the effects of strategies on reducing emotional reactions, concluding that effective regulation is not well-established even by age 5 years (Cole et al., 2020).

Parenting and the Early Childhood Development of Coping and Emotion Regulation

The role of parenting receives more empirical attention in studies of early childhood emotion regulation relative to coping (but see Bradley, 2007; Power, 2004). Of the coping studies considering parenting, none examine how children's age or skills affect parenting. Nonetheless, it is reasonable to assume that the development of children's coping is embedded in social relationships – with parents, teachers, siblings, and peers (Skinner & Edge, 2002). When parental influences on children's coping are studied, parent-reported stress is a major focus. Parent reports of daily stress over a 10-day period are associated with children's

learned helplessness (Brown et al., 2016), but the design cannot address whether the association is attributable to parenting practices aimed at fostering children's coping. Similarly, higher parent-reported stress is associated with preschoolers' poorer coping competence and school readiness (Soltis et al., 2015).

Parenting interventions are designed to change parenting, which should then change children's coping. An emotion-focused parenting intervention for toddlers and mothers appears to increase toddler coping and delay of gratification (Brophy-Herb et al., 2012). Notably, delay of gratification is not necessarily a stressor. Interventions with caregivers are effective in improving older children's and adolescents' coping with parental loss (e.g., Sandler et al., 2011), poverty-related stress (Wadsworth et al., 2020), and community violence and urban strife (Kliewer et al., 2006). Given that parents are usually present for stressful medical procedures, including normative stresses such as immunizations or extraordinary stresses such as serious pediatric illness and treatments, they provide opportunities to conduct observational and intervention studies longitudinally to investigate how parents cope for young children and how those interactions contribute to children's later coping.

By comparison, there are many studies of parenting in the early childhood emotion regulation literature. Though children first engage in more effortful, autonomous emotion regulation by 3–4 years, parents continue to contribute to children's emotion regulation development (Kopp, 1982). Parental influences include effects of children's observations of parental emotion, of parental responses to children's emotions, of direct instruction and coaching, and of family emotional climate (Eisenberg et al., 1998; Morris et al., 2007, 2017). In general, supportive parenting practices, such as comforting, explaining, and encouraging, predict better emotion regulation concurrently and prospectively even through age 10 years (Perry et al., 2020; Shewark & Blandon, 2015). However, the effectiveness of specific practices appears to shift during the preschool-age years. Better child emotion regulation is associated with warm, sensitive, directive support in toddlerhood and the early preschool years, but with less directiveness and increased autonomy support as children approach kindergarten age, possibly due to parental perceptions that children are becoming competent at coping (Mathis & Bierman, 2015; Mirabile et al., 2018; Russell et al., 2016).

The effects of parental practices depend on the quality of the parent–child relationship. Individual differences research indicates that insecure attachment is associated with poorer emotion regulation in early childhood and as children age (Guo et al., 2015; Viddal et al., 2017), although the magnitude of effects is limited (Zimmer-Gembeck et al., 2017). There is a need for longitudinal studies that test within-person developmental processes in culturally meaningful ways, investigating whether and how parenting fosters and maintains attachment security and how that translates to children's regulatory abilities. Parents who are emotionally positive and regulated have children with better emotion regulation, whereas parental emotional dysregulation and emotional symptoms are associated with poorer child emotion regulation (Binion & Zalewski, 2018; Chen et al., 2018; Hu et al., 2017; Pat-Horenczyk et al., 2015; Tan & Smith, 2019; Wu et al., 2017). There is a dearth of studies, however, that investigate the mechanisms that account for such associations.

Next Steps in Research on Early Childhood Emotion Regulation and Coping

Emotion regulation in early childhood is associated with major developmental outcomes,

such as school readiness, mental health, and social competence. Effortful emotion regulation strategies, largely behavioral strategies, occur spontaneously by age 3 or 4 years. Spontaneous cognitive strategies are less common prior to 6 years, although preschool-age children recognize that such strategies are possible and use them when instructed. However, few studies assess young children's coping through the view of overtaxing their ability to regain physiological equilibrium. In part this is due to a lack of clarity about how coping and emotion regulation differ, and a dearth of theory-guided longitudinal studies of these phenomena as within-person processes. Although conclusions about emotion regulation or coping in early childhood are therefore limited, the first 6 years of life are formative and require more sophisticated research that can translate developmental science to practices and policies for young children.

Emotion Regulation and Coping as Distinct but Related Phenomena

The evidence that neonates have physiological stress reactions, months before the earliest behavioral indications of emotions, suggests a potentially useful way to distinguish coping from emotion regulation. This distinction, however, requires research to (a) determine if it is meaningful and (b) document how stress reactivity and emotion relate to each other. For example, we need to understand how individual differences in early-life stress contribute to emotional development, including but not limited to the development of emotion regulation (Gunnar & Quevedo, 2007). Future research should carefully conceptualize both the situations and the measures of human functioning that allow us to test potential distinctions.

Early childhood emotion regulation research often uses laboratory-based procedures that emulate common problems that arise in young children's lives: not getting something you want (disappointment), having to wait for something you want (frustration), and encountering a novel person or situation (anxiety and fear). These situations likely differ from circumstances that overtax children's physiological equilibrium, the central feature of stress. Young children may face health problems that entail pain and treatments that are unfamiliar and painful; some face family situations that are threatening, confusing, and disturbing, such as interparental violence, abuse, or parental loss; and some deal with community-wide stressors, such as poverty, discrimination, natural disasters, and wars. The research agenda going forward must demonstrate whether these circumstances, which extend beyond ordinary, common challenges, overtax a child's ability to recover quickly from the stress response. We must also investigate how situations that elicit stress reactions at one age point no longer elicit physiological stress but nonetheless elicit negative emotion expressions at a later point. Children's familiarity with situations and their skill at dealing with them must play a role.

Only a small proportion of young children experience extraordinary conditions like pediatric cancer, other chronic illnesses, and invasive and painful medical procedures. More experience family (interparental conflict) or school (e.g., bullying) situations that are potential stressors. Research with these circumstances can inform the early development of coping but with limited generalizability. Many children experience immunizations and dental procedures; we can study when these elicit stress reactivity, how coping changes with repetitions of these normative experiences, how coping as a process changes with age when these are stressful, and any transition to their being emotionally negative without being stressful.

If conceptualizing the extent to which a situation taxes children's existing ability to

regulate emotion and stress is scientifically meaningful, then there are interesting research questions to pursue to achieve better integration in research on emotion regulation and coping. For example, to what extent does a young child's ability to regulate negative emotions in ordinary, familiar challenging situations predict how that child copes when faced with a new stressor? If a young child develops competence at regulating ordinary frustrations and disappointments, does that child cope better or differently when confronted with a major stressor? How do caregivers foster emotion regulation and coping skills in young children such that the children are later effective at managing problematic situations on their own?

Emotion Regulation and Coping as Within-Person Processes

The substantial evidence of the importance of individual differences in early childhood emotion regulation, and to a lesser extent coping, must be complemented by well-informed studies of these phenomena as within-person processes. Understanding how reactions (stress or emotion) and strategies unfold and relate to each other over the course of a situation will inform the development of the effectiveness of caregivers' or children's strategies in modulating stress or emotion, and different ways that those efforts may be ineffective. Time-series analyses – across moments, hours, or days – can be used with both observational and physiological data. Modeling a time series, as opposed to aggregating data across intervals within a task, reveals the regulatory process. For example, ordinary differential equation modeling shows that children's strategy use during a frustrating wait task has only brief effects on their desire to open a gift and anger about waiting (Cole et al., 2017). Moreover, as task time unfolds, young children's strategy use can be overwhelmed by their emotions (interference) or their strategic efforts may fail to alter or even exacerbate emotion (inefficiency; Cole et al., 2017). Longitudinal analysis using this method indicates that strategy effectiveness cannot be assumed in early childhood and that the development of effective strategy use requires more investigation (Cole et al., 2020).

Conceptualizing and Measuring Developmental Progressions in Regulation

The processes of regulating emotions and of coping change with age. However, the assumption that their development depends not just on socialization but also on cognitive development requires more research. Kopp (1989, 2011) posited that the internal resources that children develop – for example, language, memory, and cognitive inhibitory control – can be used strategically to modify negative emotions and distress. Effortful control, a temperamental dimension reflecting individual differences in the neurophysiological executive attention network, and executive functioning, a set of cognitive functions involving working memory, inhibitory control, and cognitive flexibility, are studied extensively as they relate to emotion regulation (Rothbart et al., 2011; Zelazo & Cunningham, 2007). Other candidate processes (e.g., language abilities and theory of mind) receive less empirical attention. Charting the development of theory-guided candidate processes that constitute internal resources and how they relate to age-related changes in emotion regulation are essential to advance knowledge. Many early childhood studies focus on external resources, predominantly mothers' parenting styles and practices. Using multiple timescales, we can document how temporal associations during a task change with age. For example, we can

investigate developmental changes in how parental strategies during a task modulate child behavior and how child characteristics and behaviors modify parental behavior. In sum, the evidence base would be substantially improved by theoretically driven research that conceptualizes and measures internal and external resources as explanatory factors for how and why children's emotion regulation and coping change with age.

Growth in emotion regulation and coping involves emergence of new strategies, improving effectiveness, and greater flexibility. Understanding age-related changes in the dynamics of emotion regulation and coping within situations will explain why a toddler becomes a school-ready, well-adjusted 5-year-old. The use of task time series analyses can answer questions about the extent and limits of early childhood emotion regulation and coping. In addition to longitudinal designs that evaluate change every year or every 6 months, it would be interesting to include burst assessments around pivotal points, for example the birth of a sibling or entry into school. The use of multiple timescales will open the door to enriching our understanding of individual differences in how emotion regulation and coping are fostered and compromised.

Linking Early Childhood Development of Emotion Regulation and Coping to Later Years

Finally, we need to link early childhood development of emotion regulation and coping with later developmental periods, such as the proximal period of middle childhood. Studies of age differences in coping and, to a lesser degree, emotion regulation indicate that children report using cognitive coping strategies by the time they reach middle childhood. Moreover, although there are continuities in coping styles, there are age differences as well as differences in coping as a function of situational context (Losoya et al., 1998). How then can we bridge gaps in our understanding of the development of emotion regulation and coping?

The substantial literature on young children's emotion understanding (Denham, 2003) offers techniques to study children's awareness of strategies and their effectiveness. Animated story stems, puppet tasks, and picture stories, which compensate for young children's limited verbal skills, reveal that children as young as 3 and 4 years generate or recognize strategies to resolve distress and cope with interpersonal conflict, including cognitive strategies (Dennis & Kelemen, 2009; Emde et al., 2003; Macfie et al., 1999; Smith & Walden, 2001; Vikan et al., 2013; Zahn-Waxler et al., 1994). In some cases, their recognition of effective strategies is associated with how well they regulate emotions (Cole et al., 2009). These types of procedures have promise for linking early childhood understanding of cognitive strategies to the development of their use and effectiveness as children transition from early childhood to middle childhood.

Conclusions

In sum, early childhood research indicates that stress reactivity and negative emotion are related but distinct phenomena. Coping is specific to stress regulation; emotion regulation involves the regulation of both positive and negative emotions that may or may not accompany stress reactivity. Research is needed that sheds light on how young children's regulation of emotions when challenged by common, familiar circumstances is influenced by earlier experiences with stress, and how the ability to regulate emotion in ordinary circumstances relates to coping with stress. Research that incorporates both physiological

stress measurement and observations of emotion and behavior may help us understand both the distinctiveness and relations between emotion regulation and coping.

Evidence thus far suggests that very young children, that is, roughly between the ages of 24 and 36 months, have limited abilities to regulate emotion and cope with stress; they depend on caregivers, and are generally less able to demonstrate awareness of strategies. From 36 to 72 months, children engage in putative regulatory strategies and problem-focused coping, but we know little about how effective their strategy use is. We need evidence drawn from within-person time series analyses to understand the strengths and limitations of their strategy use, and longitudinal studies to document and explain how emotion regulation and coping as processes change with age. Moreover, when possible, multiple timescale studies should be theory-driven, especially in terms of the internal, cognitive resources that should contribute to the ability to engage in self-regulatory strategies and cognitive coping. Such advances in research should help us understand how emotion regulation and coping relate to each other, how they are distinct, and how we can bridge the two concepts. We are confident that such advances will enrich our basic developmental knowledge and improve our ability to translate our knowledge to helping children and families.

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14 Toward a More Inclusive, Contextualized Approach to Studying Executive Functions and Self-Regulation in the Context of Coping

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Executive functions (EFs) and self-regulation (SR) support the pursuit of goal-directed behavior through control of one's attention, cognitions, emotions, and impulses (Diamond, 2013). As such, applications of these cognitive and regulatory processes are implicated in coping, defined as "conscious and volitional efforts to regulate emotion, cognition, behavior, physiology, and the environment in response to stressful events or circumstances" (Compas et al., 2001, p. 89). In this chapter, we discuss how EF skills and SR behaviors may facilitate the use of various coping strategies and contribute to successful coping outcomes by supporting positive adaptation in contexts of stress and adversity.

We start by acknowledging that the four key constructs that we will discuss – EFs, SR, coping strategies, and adaptation – have conceptual and empirical overlap as well as develop through bidirectional longitudinal processes (see Figure 14.1). By EFs, we refer to the cognitive skills that support goal-directed behaviors by helping children to control impulses and stay focused amid distractions (i.e., inhibitory control), mentally manipulate verbal and nonverbal information (i.e., working memory), and flexibly shift between competing task rules or environmental demands (i.e., cognitive flexibility). EFs are directly assessed via performance on standardized tasks that are available for a wide range of ages, spanning early childhood through adulthood (Best et al., 2009). By SR, we refer to the applications of EF skills in everyday life, such as behaviors that help children sustain focused attention, suppress impulsive thoughts and actions, stay organized, plan ahead, and successfully regulate emotions. Children's SR is measured via surveys completed by adults, including parents, teachers, and trained observers (e.g., Roth et al., 2014; Rothbart et al., 2001; Smith-Donald et al., 2007). Across different cultures, direct assessments of EF skills and reports of SR behaviors show relatively modest convergence (Friedman & Banich, 2019; von Suchodoletz et al., 2015; Willoughby et al., 2019), suggesting that they are measuring related yet distinct processes. The overlap between EFs and SR (see Figure 14.1) may reflect bidirectional influences in that the displays of SR are supported by EF skills and the performance on EF tasks is supported by concurrent SR behaviors as well as a confounding of the two constructs in the literature via the use of composites that average direct assessments with behavioral reports. However, each construct is also shaped by unique dispositional and contextual factors.

In the first section, we describe conceptual and empirical relations among EFs and SR and the most frequently studied child coping strategies. We focus on direct and indirect evidence that EF skills and SR behaviors support

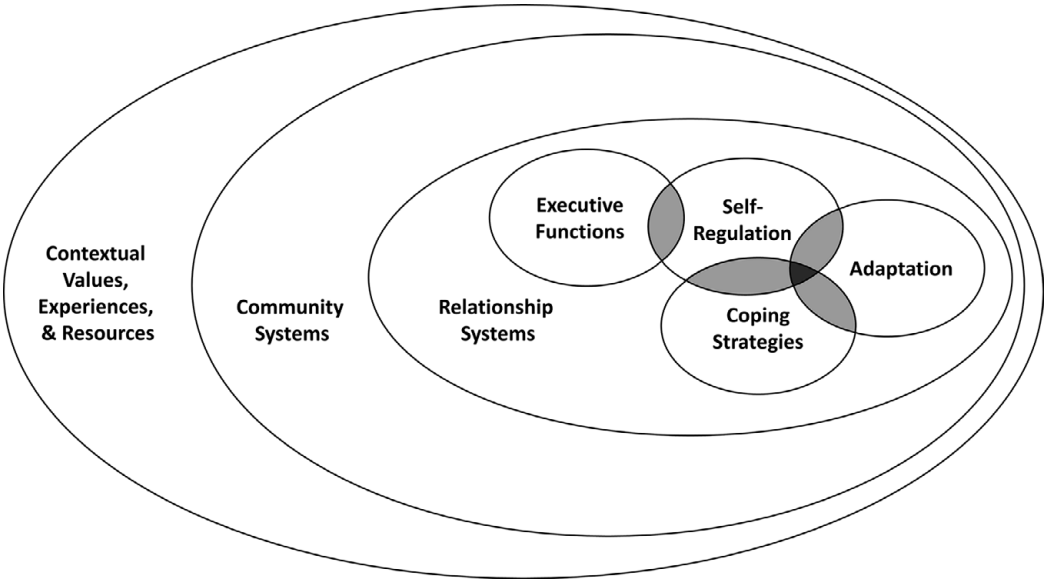

Figure 14.1 Associations among self-regulation, executive functions, adaptation, and coping strategies within broader contextual systems. Shaded sections represent conceptual and empirical overlap among constructs.

the use of coping strategies, but also highlight the overlapping conceptualization and measurement (e.g., self-regulation of emotions and emotion regulation coping strategies). In the second section, we discuss how EFs and SR relate to positive adaptation in adverse contexts. We conceptualize adaptive outcomes in the context of adversity as markers of successful coping and highlight work that examines EFs and SR as moderators and mediators of adverse experiences. As shown in Figure 14.1, we also acknowledge that measures of adaptation sometimes overlap with assessments of coping strategies and SR behaviors. In the third section, we suggest important future directions for studying EFs and SRs in the context of coping, highlighting the need for improved assessments; a reconceptualization of what is adaptive and maladaptive; an understanding of promotive aspects of adverse experiences; examinations of dyadic, family, classroom, and communal co-regulation processes; and the identification of processes that promote coping-relevant EFs and SR. As shown in Figure 14.1, we argue that EFs, SR, coping strategies, and adaptation outcomes must be studied within the relationships, communities, and contextual systems and experiences that affect and co-produce these individual-level processes. As most of the extant research uses samples from the USA, we highlight when studies were conducted in other countries and draw attention to the need to expand this work to represent children's diverse cultures and contexts.

Executive Functions and Self-Regulation: Conceptual and Empirical Links to Coping Strategies

Researchers have proposed various taxonomies of coping strategies, including problem-focused versus emotion-focused strategies (Lazarus & Folkman, 1984) and approach versus avoidance ones (Roth & Cohen, 1986). In this chapter, we adopt Connor-Smith and

colleagues' (2000) conceptual framework, which has been widely employed in empirical analyses of coping among children and adolescents. This model draws on Lazarus and Folkman's (1984) definition of coping as a process that is voluntary, effortful, and goal-directed. It distinguishes between three domains of voluntary coping: (1) *primary control coping strategies* aim to change the stressor or one's emotional response (e.g., problem-solving, emotion regulation and expression); (2) *secondary control coping strategies* focus on adapting to the stressor (e.g., cognitive reappraisal, distraction); and (3) *disengagement coping strategies* involve avoiding the stressor or one's emotional response.

To date, children's and adolescents' use of coping strategies has largely been studied via self-reported questionnaires, limiting the understanding of strategies employed by young children, who are not able to reliably self-report. Although a small number of studies have used parent- and teacher-reported surveys or observations of children's coping strategies (e.g., Blair et al., 2004; Eisenberg et al., 1993; Fabes & Eisenberg, 1992), these studies do not examine how children's use of coping strategies relates to their EFs and SR. Whenever possible, we synthesize research directly linking EFs and SR to specific coping strategies. In the absence of existing conceptual and empirical evidence linking these constructs, we review indirect work on how EFs and SR relate to behaviors and relationships relevant for employing specific coping strategies. Conceptual and empirical relations among children's coping strategies with EFs and SR are summarized in Table 14.1.

Primary Control Coping Strategies

Problem-Solving

Problem-solving, or the conscious effort to change a stressful situation and/or contain its consequences (Zimmer-Gembeck & Skinner, 2016), is a voluntary, goal-directed coping strategy classified as primary control coping in the Connor-Smith et al. (2000) taxonomy. Survey items that assess children's and adolescents' problem-solving capture thinking about ways to change a problem or situation, as well as taking action toward that end (Connor-Smith et al., 2000). Whether engaging in conflict resolution with a peer, performing on a high-stakes academic test, or finding a safe shelter, coping through problem-solving requires children to sustain attention, flexibly consider a range of options, and plan a specific approach to address the given stressor – all of which rely on children's EFs and SR capacities. However, the extant empirical literature has not investigated how children's EFs and SR contribute to their selection or use of problem-solving coping strategies.

In the absence of such research, we highlight prior work that has documented the role of EFs and SR in helping children to stay focused and remain on task (e.g., Brock et al., 2009; Gathercole et al., 2008), weigh multiple solutions (Evans et al., 2016), and design and implement plans (Zelazo et al., 1997). Further, a small number of empirical studies have examined how EFs and SR relate to both cognitive and social problem-solving. Among adults, EFs have been linked to directly assessed reasoning abilities (Fletcher et al., 2011) as well as self-reported problem-solving (Rodríguez Villegas & Salvador Cruz, 2015). In a small sample of 10-year-olds, greater working memory capacity was found to predict improved logical reasoning across all problem types, while inhibition specifically predicted reasoning on problems requiring children to resist the influence of prior beliefs (Handley et al., 2004). Further, in studies of small samples in middle childhood and adolescence, reduced EFs and SR have been associated with poorer self-reported and directly

Table 14.1 *Conceptual and empirical associations between EFs/SR and coping strategies*

Coping strategy	Conceptual links with EFs and SR	Empirical links with EFs and SR
Primary control		
Problem-solving	Requires children to sustain attention, flexibly consider a range of options, and plan a specific approach to address the given stressor.	Direct evidence: Not established. Indirect evidence: Brock et al. (2009), Evans et al. (2016), Fletcher et al. (2011 [adults]); Ganesalingam et al. (2007), Gathercole et al. (2008), Handley et al. (2004), Muscara et al. (2008), Rodríguez Villegas and Salvador Cruz (2015 [adults]); Zelazo et al. (1997).
Emotion regulation and expression	Conceptual overlap between emotion regulation and emotion-related SR; both involve being able to modulate, redirect, or suppress emotion expression or emotion-related behavior.	Direct evidence: Carlson and Wang, (2007), Gago Galvagno et al. (2019), Lantrip et al. (2016), Perry et al. (2018), Reilly and Downer (2019), Simonds et al. (2007), Yap et al. (2011). Indirect evidence: Kim et al. (2012), Obradović and Finch (2017), Willoughby et al. (2011).
Support-seeking	Involves organizing and interpreting social cues, considering optimal responses, inhibiting socially inappropriate responses, and communicating positively with others. EFs and SR support the expression of prosocial behaviors and the formation of positive relationships.	Direct evidence: Not established. Indirect evidence: Berry (2012), de Wilde et al. (2016), Hilton et al. (2017), Loomis (2021), McIntyre et al. (2006), McKinnon and Blair (2018), McQuade et al. (2013), Nilsen and Bacso (2017), Portilla et al. (2014), Zakszeski et al. (2021).
Secondary control		
Composite of multiple secondary strategies	Includes the abilities to suppress maladaptive thoughts (inhibitory control), selectively identify and attend to adaptive thoughts (working memory), and view information from alternative perspectives (cognitive flexibility).	Direct evidence: Andreotti et al. (2013) (adults), Campbell et al. (2008), Hocking et al. (2011), Jackson et al. (2018) (adults), but cf. Prussien et al. (2018). Indirect evidence: Hughes and Ensor (2007), Robinson et al. (2015).
Distraction	Requires children to inhibit predominant responses of attending to a stressor and flexibly shift attention to a distraction topic or task, while prioritizing information in their working memories relevant to that distraction topic or task.	Direct evidence: Dahlquist et al. (2019), Verhoeven et al. (2011, 2014).

Table 14.1 (*cont.*)

Coping strategy	Conceptual links with EFs and SR	Empirical links with EFs and SR
Rumination	May be associated with challenges in inhibiting negative thoughts, switching attention to more pleasant stimuli, and generating alternative ways of coping.	Direct evidence: Dickson et al. (2017), Harmon et al. (2020), Hilt et al. (2014), but cf. Connolly et al. (2014), Wagner et al. (2015), Wilkinson and Goodyer (2006).
Disengagement	May be more common among children with less developed working memory and sustained concentration capacities, which are necessary for primary and secondary control coping.	Direct evidence: Campbell et al. (2008), O'Rourke et al. (2020), cf. Hocking et al. (2011).

assessed social problem-solving skills (Ganesalingam et al., 2007; Muscara et al., 2008) and, ultimately, poorer social outcomes (Muscara et al., 2008). Future work needs to investigate whether children's EFs and SR relate to children's deployment of problem-solving coping strategies as well as the role of EFs and SR in supporting problem-solving in contexts of stress and adversity.

Emotion Regulation and Expression

Emotion-related SR (also known as emotion regulation) is a multifaceted set of processes used to manage emotions and emotion-related states that include modulation of physiological, attentional, cognitive, and behavioral responses (Eisenberg et al., 2010). There is considerable conceptual overlap between behavioral aspects of emotion-related SR and emotion-related coping (Compas et al., 2017). In Connor-Smith and colleagues' (2000) theoretical framework, emotion regulation refers to controlling emotion-related behaviors in response to stress, and emotion expression refers to communicating one's emotions to others. Thus, emotion regulation as a coping strategy and emotion-related SR in everyday settings may appear to be very similar; both involve being able to modulate, redirect, or suppress emotion-related behavior. Other aspects of the broader construct of emotion regulation, such as cognitive reframing and distraction, will be reviewed later, as they relate to secondary control coping strategies.

Relative to children with poor EFs or SR, children with strong EFs or SR are more likely to control their emotion-related behaviors when stressed, as well as to find constructive ways to express their feelings. For example, children's SR at 3½ years has been shown to predict anger regulation at age 5 (Skibo et al., 2020). Among preschool-age children, EFs have been positively associated with parent- and teacher-reported emotion regulation (Carlson & Wang, 2007; Reilly & Downer, 2019). In 5-year-olds, parent-reported SR has been positively linked with parent-reported and observed emotion regulation (Perry et al., 2018). In 7- to 10-year-olds, EFs have been related to the duration of smiling after receiving a disappointing gift, which is an indicator of emotion regulation (Simonds et al., 2007). Further, SR has been negatively

associated to emotion regulation during a parent–child interaction task in early adolescence (Yap et al., 2011).

Relevant to emotion regulation is a distinction between "hot" and "cool" EFs (Zelazo, 2020). Hot EFs refer to EF skills measured during emotion-eliciting situations, typically involving risks or rewards, whereas cool EFs are generally viewed as having less emotional salience. Among Latin-American toddlers, a composite of hot and cool EFs was associated with better emotion regulation during the still-face procedure (Gago Galvagno et al., 2019). Hot EFs have also been uniquely associated with preschoolers' externalizing symptoms, suggesting that they play a role in anger regulation (Kim et al., 2012; Willoughby et al., 2011). Relatedly, hot EFs have been linked to faster physiological recovery after a social stressor in kindergarteners (Obradović & Finch, 2017). In stressful situations that often elicit strong emotions, it is important to further investigate the unique roles of hot and cool EFs and examine whether hot EFs are particularly relevant in contexts of limited or inequitable resources and rewards (Sturge-Apple et al., 2017).

Much of the research on emotion expression has focused on suppression, which refers to attempts to hide expressions of emotions from others. Suppression of emotional expression is considered an immature coping strategy (Gullone et al., 2010) that is negatively associated with EFs in adolescence (Lantrip et al., 2016) and ineffective as an emotion regulation strategy in daily life (Ruan et al., 2020). Studies of parental emotion socialization practices that discourage the expression of negative emotions (e.g., punishment, minimization) have generally found that these practices are associated with lower child emotional competence (Perry et al., 2020; Rogers et al., 2016; Shaffer et al., 2012). However, these associations have been shown to differ depending on culture, race/ethnicity, and gender (Bardack & Obradović, 2017; Leerkes et al., 2015; McCord & Raval, 2016), suggesting that emotion suppression may not always be maladaptive.

Support-Seeking

Support-seeking is broadly understood as a constructive coping strategy that encompasses children's and adolescents' active efforts to solicit comfort, distraction, advice, or instrumental help from parents, friends, teachers, or other adults or peers (Zimmer-Gembeck & Skinner, 2016). In Connor-Smith et al.'s (2000) coping taxonomy, support-seeking is conceptualized as overlapping with problem-solving (e.g., asking other people for help or ideas to make the problem better), emotion regulation (e.g., getting help from other people when trying to figure out how to deal with feelings), and emotion expression (e.g., letting someone or something know how one feels). While studies have not linked EFs and SR to support-seeking behaviors in the context of coping, EFs and SR have been linked with better social skills and positive relationships that children and adolescents rely on to cope with stress and adversity (Osher et al., 2020; Zimmer-Gembeck & Skinner, 2016). In particular, children's EFs and SR may contribute to supportive interpersonal interactions via organizing and interpreting social cues, considering optimal responses, inhibiting socially inappropriate responses, and communicating positively with others (McKinnon & Blair, 2018).

A substantial body of scholarship has examined how children's EFs influence their social skills and relationships in the classroom environment. Among demographically diverse young children, EFs and SR have been shown to predict greater teacher–child closeness and reduced teacher–child conflict in preschool, kindergarten, and first grade (Loomis, 2021;

McIntyre et al., 2006; McKinnon & Blair, 2018; Portilla et al., 2014). In elementary school, inhibitory control and working memory have been similarly associated with teacher–child relationship quality (Berry, 2012; de Wilde et al., 2016; Zakszeski et al., 2021) and social competence with peers (de Wilde et al., 2016; McQuade et al., 2013). Although less studied among older children, several investigations have documented relations of adolescents' EFs with their social competence and peer relations in small samples (e.g., Hilton et al., 2017; Nilsen & Bacso, 2017). Of note, a recent analysis of a large national longitudinal dataset found that associations between students' self-regulation and teacher–child relationship quality were not moderated by student socioeconomic status or race/ethnicity, offering evidence that self-regulation is promotive for positive social relationships for students of diverse sociodemographic identities (Zakszeski et al., 2021).

A handful of studies have shown that children's relationship quality – in particular with their teachers – is related to their support-seeking behaviors. Elementary and high school students with high-quality teacher–child relationships are more likely than peers without those relationships to intend to seek out mental health-related supports and to actually do so (Eliot et al., 2010; Halladay et al., 2020; Mariu et al., 2012). Moreover, over and above the individual child level, links between teacher–child relationship quality and support-seeking have been found at the school level (Halladay et al., 2020), implying that students are more likely to seek help from teachers when their school has a climate of positive student–teacher relationships. Going forward, researchers should investigate the contributions of children's EFs and SR to their ability to build relationships to seek social support, particularly in contexts of adversity where children experience heightened stress.

Secondary Control Coping Strategies

The aforementioned primary control coping strategies seek to directly address the source of stress (e.g., problem-solving) or one's emotional reactions to stress (e.g., emotion regulation and expression). In contrast, secondary control coping strategies are used to adapt to stress. These strategies include *cognitive restructuring* (e.g., "I think about the things I'm learning from the situation, or something good that will come from it"), *positive thinking* (e.g., "I tell myself that I can get through this, or that I'll do better next time"), *acceptance* (e.g., "I realize that I just have to live with things the way they are"), and *distraction* (e.g., "I think about happy things to take my mind off the problem or how I'm feeling"). Secondary control coping strategies are understood to be particularly beneficial when children and adolescents are faced with uncontrollable stressors (Compas et al., 2012).

Children's and adolescents' abilities to cognitively reframe, come to terms with, or distract themselves from stressors relies on key aspects of EFs and SR, including the abilities to suppress maladaptive thoughts, selectively identify and attend to adaptive thoughts, and view information from alternative perspectives (e.g., Campbell et al., 2008; Hocking et al., 2011). Researchers employing both self- and adult report of children's coping strategies typically create a composite measure of positive thinking, cognitive restructuring, acceptance, and distraction strategies. A small yet illustrative body of literature has investigated the relevance of EFs and SR for secondary control coping among youth facing the uncontrollable stressor of chronic illness (Compas et al., 2012). Among children and adolescents with chronic medical conditions, EFs have been found to predict the use of secondary control coping strategies (Campbell et al., 2008; Hocking et al., 2011). Further, in a small

sample of child and adolescent cancer survivors, secondary control coping strategies fully mediated relations among higher EFs and SR and reduced behavior problems (Campbell et al., 2008). Similar positive associations between EFs and secondary strategies have been documented among young adults with congenital heart disease (Jackson et al., 2018), as well as typically developing college students (Andreotti et al., 2013). Nevertheless, others have failed to find links between EFs and secondary control coping (Jackson et al., 2018; Prussien et al., 2018).

Although coping strategies have not been explicitly studied in early childhood, researchers have demonstrated links between preschoolers' cognitive flexibility and their ability to understand alternative points of view, which may in turn facilitate engagement in secondary coping strategies such as cognitive reappraisal (Hughes & Ensor, 2007). In older children and adolescents, the conceptual relevance of EFs for secondary coping strategies is also supported by neuroimaging studies that show that the prefrontal regions of the brain associated with EF are also activated during the use of secondary control coping strategies such as cognitive restructuring (e.g., Robinson et al., 2015). Future work needs to go beyond studying a composite of secondary control coping strategies to examine how EFs and SR support the use of cognitive restructuring, positive thinking, and acceptance as unique coping strategies.

Distraction

Distraction – or engaging with a more positive thought or activity unrelated to the stressor with the goal of decreasing emotional arousal – is one aspect of secondary control coping that has been independently studied in relation to EFs and SR (Connor-Smith et al., 2000). To distract themselves effectively, children must be able to inhibit predominant responses of attending to the stressor and flexibly shift their attention to a distraction topic or task, while prioritizing information in working memory that is relevant to that distraction topic or task. As such, distraction has been theorized to be most feasible as a coping strategy among those with greater inhibitory control, cognitive flexibility, and working memory capacities (Verhoeven et al., 2011).

To date, much of the relevant empirical literature has examined the contributions of youth's EFs and SR to their use of distraction to cope with pain. Specifically, multiple lab-based studies have explored children's and adolescents' ability to cope with cold pressor pain, finding that stronger EFs and SR are associated with higher engagement with and performance on distraction tasks – but not the effectiveness of these tasks at reducing pain (Verhoeven et al., 2011, 2014). However, in a study of 6- to 12-year-olds, Dahlquist et al. (2019) found that distraction was more effective at reducing pain for children high in SR. Given the previously mentioned utility of secondary control coping strategies – including distraction – when children are faced with uncontrollable stressors, future research can examine their use and efficacy in the context of systemic stressors.

Rumination

Rumination, or the tendency to mentally perseverate on the symptoms, causes, and consequences of one's negative mood (Nolen-Hoeksema et al., 2008), has also been linked to EFs and SR. Theoretically, children with weaker EFs and SR may be more likely to ruminate because they have difficulty inhibiting negative thoughts, switching their attention to more pleasant stimuli, and generating alternative ways of coping (Davis & Nolen-Hoeksema, 2000; Harmon et al., 2020).

Indeed, in some of the studies that have investigated relations between EFs and rumination in youth, rumination has been associated with challenges in the EFs of inhibitory control (Hilt et al., 2014), cognitive flexibility (Dickson et al., 2017; Harmon et al., 2020), and working memory (Harmon et al., 2020). Nevertheless, the literature is mixed, with other studies failing to find significant associations between rumination and inhibitory control (Harmon et al., 2020), cognitive flexibility (Connolly et al., 2014; Wagner et al., 2015; Wilkinson & Goodyer, 2006) and working memory (Connolly et al., 2014; Wagner et al., 2015). Interestingly, there is some evidence that associations between EF and children's responses to negative emotions may be affect-specific: among 8- to 13-year-olds, Harmon and colleagues (2020) noted that sadness rumination was linked to difficulties updating negative thoughts and shifting between mental sets, while anger rumination was associated with a *better* ability to update negative thoughts.

Disengagement Coping Strategy

Whereas *distraction* as a coping strategy involves actively trying to deal with a stressor by engaging in alternative activities, *disengagement* coping strategies – including avoidance, denial, and wishful thinking – involve efforts to orient oneself entirely away from a stressor or one's emotional responses to the stressor. Unlike distraction and the other engagement-oriented coping responses already described, which have been shown to be adaptive, disengagement coping strategies have been associated with greater emotional and behavioral problems (Compas et al., 2017). Conceptually, children with more developed working memory and sustained concentration capacities may leverage those skills to engage with the stressor through primary control or secondary control strategies, and may thus be less likely to use disengagement strategies. As such, we might expect children with less developed EFs and SR to utilize disengagement strategies more frequently.

Indeed, two studies with adolescent and young adult samples have documented that youth with less developed EFs and SR were more likely to employ disengagement coping strategies (Campbell et al., 2008; O'Rourke et al., 2020). In contrast, among a small sample of children and adolescents with chronic abdominal pain (N = 44), greater selective attention skills were associated with greater disengagement coping (Hocking et al., 2011). The authors – who had anticipated a negative relation between EFs and disengagement coping – speculated that children with stronger selective attention abilities may more efficiently identify threat stimuli and use disengagement strategies to avoid threat-related stressors (Hocking et al., 2011). Additional work is needed to unpack these mixed findings to understand how EFs and SR relate to disengagement coping. Relatedly, the coping literature would benefit from a clearer distinction between distraction and disengagement coping strategies, which are sometimes confounded in both conceptualization and measurement.

More broadly, it will be important to investigate how children shift between or combine various coping strategies depending on the contextual stressors and supports they are experiencing. For example, if a child employs a coping strategy that is ineffective in their current environment (e.g., support-seeking), they may change to an alternative strategy (e.g., cognitive restructuring). In some situations, the most optimal coping outcome may emerge when a child concurrently engages in multiple strategies (e.g., emotion regulation and problem-solving). Whether children with more developed EFs and SR are able to switch among strategies more

successfully in light of environmental demands needs to be investigated.

Executive Functions, Self-Regulation, and Positive Adaptation in Adverse Environments

To a large extent, coping represents the application of cognitive control and self-regulatory processes in response to a stressor. As such, *successful* coping depends heavily on EFs (i.e., higher-order cognitive skills that support goal-directed behavior), SR in everyday contexts (Eisenberg et al., 2009), and emotion-related SR (Compas et al., 2017). Assuming that successful coping contributes to positive adaptation in the context of adversity, empirical research linking EFs and SR with indices of positive adaptation (e.g., well-being, learning, social connections) among children who experience stressful environments demonstrates the relevance of EFs and SR for coping. In this section, we review illustrative studies examining EFs (as measured by structured tasks) and SR (as measured by surveys) as protective factors that mitigate the negative effects of stress on adaptation, as well as EFs and SR as mechanisms that explain how stressful environments undermine adaptive outcomes that reflect successful coping.

Executive Functions and Self-Regulation as Moderators of Adversity

Traditionally, resilience researchers have distinguished *protective factors*, which have stronger positive effects in high-adversity environments relative to low-adversity environments, from *promotive factors*, which have equally positive effects regardless of adversity exposure (Fergus & Zimmerman, 2005; Luthar et al., 2000). To understand the role of EFs and SR as protective factors that have particular relevance for coping with adversity, we review studies that test moderation of adverse experiences by EF or SR (i.e., interaction effects) by showing that higher levels of EFs or SR lessen the association between exposure to adversity and negative developmental outcomes in children and adolescents.

Unsupportive parenting has been one of the most frequently studied stressors in research examining EFs or SR as a protective factor. Studies examining externalizing symptoms as an outcome have found evidence supporting moderation by EFs and SR from early childhood through early adulthood. Specifically, researchers have reported that EFs or SR reduced the associations between inconsistent parenting and externalizing behaviors in early (Schoppe-Sullivan et al., 2009) and middle childhood (Lengua et al., 2008). Similarly, EFs were protective against the positive association between unsupportive parenting and attention deficit hyperactivity disorder symptoms in early elementary school (Joseph et al., 2021). Among low-income boys, lower "cognitive impulsivity" (which included performance on EF tasks) reduced the positive association between disengaged parenting and delinquency throughout adolescence and early adulthood (Menting et al., 2016). Studies examining internalizing symptoms as an outcome in adolescence have similarly supported the moderating role of EFs, which have been found to reduce the positive association between unsupportive parenting and adolescents' rumination (Hilt et al., 2012) and between parental psychological abuse and adolescents' internalizing behavior problems (Sætren et al., 2021).

Investigations of a more diverse set of adverse experiences suggest that the protective role of EFs and SR generalizes across a variety of stressors for social and emotional adaptation in childhood and adolescence. In preschool, EFs reduced the negative association between teacher–child conflict and

teacher-reported academic and behavioral school readiness (Graziano et al., 2016). In middle childhood, EFs protected against the positive association between being a victim of community violence and aggression (Jakubovic & Drabick, 2020) and between a cumulative risk index and a composite of internalizing and externalizing behavior problems (Lengua, 2002). In a longitudinal, nationally representative US sample of adolescents EFs similarly reduced the positive association between deviant peer behavior and delinquency (Hinnant & Forman-Alberti, 2019) and SR reduced the positive association between cumulative risk and delinquency in rural Chinese children and adolescents (Lei et al., 2019). Also, SR was protective against the positive association between stressful life events and depressive symptoms in a sample of children and adolescents (Gulley et al., 2016). It has been found that EFs protect against the association between prior institutional care and separation anxiety in adolescence (Alba et al., 2019).

In summary, results from studies testing moderation show a consistent pattern in which EFs and SR are protective, partially or fully reducing the association between environmental risk factors and adjustment across various domains, with much of the research focusing on externalizing behavior problems. Moreover, the pattern of findings is similar across development from early childhood through adolescence. These results suggest that self-regulatory skills may function as a marker of successful coping with stressors.

Executive Functions and Self-Regulation as Mediators of Adversity

EFs and SR can help protect against the negative effects of stressors on child and adolescent adaptation; however, the healthy development of EFs and SR may also be undermined by those same stressors. In psychological research, a mediator is an intervening variable that explains how two other variables are linked, and mediation analysis provides information about the process or mechanism of influence (MacKinnon et al., 2007). Research on EFs and SR as mediators of the associations between stressful environments and children's adaptation can help inform our understanding of the role that EFs and SR play in supporting outcomes that are indicative of successful coping, such as mental health and academic achievement. A comprehensive review of this literature is beyond the scope of this chapter, so we focus on the most rigorous research, especially studies that use longitudinal designs to investigate how childhood stressors (e.g., unsupportive parenting, trauma, poverty) are linked to successful social-emotional adaptation and academic skills through EFs and SR.

Similar to research on moderation, studies testing EFs or SR as a mediator have often focused on parenting. Although these studies often emphasize positive aspects of parenting, they measure parenting on a continuum from supportive to unsupportive, and thus have relevance for studies of adverse experiences and coping. Several of these studies have examined externalizing behavior problems as an outcome. In two large studies of elementary school children, EFs mediated the positive longitudinal association between supportive parenting and externalizing behavior problems (Belsky et al., 2007; Sulik et al., 2015). In a third study, SR mediated the negative longitudinal association between supportive parenting in middle childhood and externalizing behavior problems in early adolescence (Eisenberg et al., 2005). A number of longitudinal studies have instead examined academic skills as an outcome. Results from these studies indicate that EFs or SR mediate the positive association between supportive parenting

and math and reading skills in early childhood (Brophy-Herb et al., 2013), middle childhood (Liew et al., 2018), and adolescence (Bindman et al., 2015). Further, SR has also been found to mediate the positive longitudinal association between supportive parenting and young children's learning-related behaviors (Berthelsen et al., 2017).

Researchers have also tested the mediating role of EFs and SR between other adverse environmental exposures and developmental outcomes. Studies focusing on externalizing and internalizing behavior problems as an outcome have revealed that EFs or SR mediate the effects of environmental exposures that include parental maltreatment (Coe et al., 2020), institutionalization in a Romanian orphanage (Wade et al., 2020), and community violence (Esposito et al., 2017). A similar pattern of findings has emerged in studies examining school readiness and academic skills as outcomes, for which EFs have been found to mediate the negative association between socioeconomic risk factors and academic skills in preschool or elementary school in the USA (Brown et al., 2013; Nesbitt et al., 2013) and Ghana (Suntheimer et al., 2021). Among Syrian refugee children, EFs mediated the positive association between perceived community safety and academic skills in middle childhood (Kim et al., 2020) .

In summary, the literature broadly supports an interpretation of EFs and SR as factors that explain the link between exposure to adversity and important developmental outcomes that include mental health and academic skills. Support for the mediating role of EFs and SR has been found from early childhood through adolescence, with no apparent difference in findings across development. The frequent use of longitudinal designs has been a strength of research on EFs and SR as mediators, but only a few studies have included controls for longitudinal continuity on both the mediator and outcome. A better understanding of whether and how such controls affect the results of mediation analyses would strengthen our understanding of the mediating role of self-regulation and EFs across development.

The Role of Coping in Understanding Moderating and Mediating Processes

Although it is clear from the numerous aforementioned studies that EFs and SR are critical to understanding adaptation to various stressful environments in childhood and adolescence, we lack an understanding of how proximal coping processes link EFs and SR with positive developmental outcomes. There is a need to understand whether theoretically relevant approaches to coping (e.g., primary control coping, secondary control coping) and more specific coping strategies (e.g., problem-solving, distraction) can explain how EFs and SR affect adaptation. In one such study, low-income Latino adolescents' disengagement coping mediated the negative association between EFs and negative mood (Papadakis et al., 2018). In another study, brain activation in the dorsolateral and anterior prefrontal cortices (which play an important role in supporting EFs and SR) mediated the negative association between stress exposure and secondary control coping (Reising et al., 2018). Moreover, there is some evidence that the effectiveness of some coping strategies depends on EFs and SR (O'Rourke et al., 2020).

More complex theoretical models that combine mediation and moderation have been used to identify how individual characteristics and contextual factors affect the roles that EFs and SR play in supporting adaptive outcomes. For example, SR mediated the association

between gentle maternal control and children's learning-related behaviors in elementary school, but only for mothers who were high in sensitive parenting (Kopystynska et al., 2016). In another study, SR mediated the association between fathers' harsh parenting and children's aggression only when it was accompanied by mothers' parenting that was low in warmth (Wang, 2019). Expanding moderated mediation models to include measures of coping can shed light on whether EF/SR mediation of adverse effects on adaptation is conditional on effective use of coping strategies or whether coping strategies mediate the effects of adversity on adaptation conditional on one's EF and SR.

New Directions for Studying Executive Functions and Self-Regulation in the Context of Coping

To expand our understanding of how EFs and SR support or reflect coping processes, we suggest five areas for new research. First, we need to interrogate the objectivity of current assessment approaches to identify how the assessment context and reporter biases may affect the measurement of individuals' EFs and SR in a way that undermines their relevance for coping. Second, we should consider when regulated behavior may be maladaptive and when dysregulated behavior may reflect coping. Third, we should examine coping strategies and outcomes that may explain why some adverse experiences promote better EFs and SR. Fourth, we should study how dyadic, family, and communal co-regulation processes support coping. Finally, we should develop novel strength-based approaches to promoting coping-relevant EFs and SR. Our recommendations for future research are summarized in Table 14.2.

More Equitable and Inclusive Assessments of Executive Functions and Self-Regulation

Standardized EF tasks have been considered to provide a decontextualized, even objective, measure of EF skills. However, studies of both adults and children reveal that performance on EF tasks can be affected by situational stressors and structural inequities (Obradović & Steyer, 2022). Experimental manipulation of financial worries decreased EF performance only in adults who faced financial difficulties in real life and had no effect on high-income adults (Mani et al., 2013). By comparing EF performances of children who participated in a study either 1 week before or after a violent crime happened in their neighborhood, researchers found that a recent nearby homicide was linked to lower levels of preschoolers' attention and impulse control (Sharkey et al., 2012). Similarly, a study of elementary school children from a low-income urban community revealed that living within a half mile of crime that occurred the week before testing was associated with faster and more error-prone responses, when compared to peers who were assessed either before or well after a crime incident (McCoy et al., 2015). It is critical that studies consider the role of sleep, stress arousal, and fatigue on children's EF performance, rather than presuming that EF tasks are decontextualized, objective measures of children's EF skills. Examining children's concurrent physiological stress response may provide insights into how acute stressors and challenges may further undermine children's performance on research tasks (Heissel et al., 2021; Obradović & Armstrong-Carter, 2020). Young children's stress response during assessment procedures also interacts with their family economic risk in predicting performance on EF tasks and observer ratings of their

Table 14.2 *Key issues and future directions*

Conceptualization	• Clearly distinguish between EFs/SR, coping strategies, and markers of positive adaptation at a conceptual and empirical level. • Develop stress-adapted, culturally relevant approaches to promoting EFs and SR in contexts of risk and adversity. • Reconceptualize what is considered adaptive or maladaptive behaviors across different contexts and cultures.
Assessment	• Ensure that extant and new measures and assessment procedures are developmentally appropriate, inclusive, unbiased, and culturally relevant. • Investigate how assessments are related to situational stressors and structural inequalities. • Employ measures that examine co-regulation and coping processes at dyadic, family, and community levels. • Differentiate among different types of adverse experiences when studying how they are linked to EFs/SR and coping.
Development	• Investigate how early co-regulation experiences in family relationships affect the development and application of EFs/SR and coping strategies. • Investigate how stress and adversity are related to the development of coping strategies use and associations between coping and adaptation. • Investigate nonlinear growth patterns.
Context	• Investigate how contextual levels of SR (e.g., family or classroom) are related to coping strategy use and adaptation. • Investigate how contexts affect whether EFs/SR support or reflect adaptive or maladaptive coping strategies. • Investigate intra-individual variability in associations between EFs/SR, coping, and adaptation.
Study design	• Conduct research outside of Western, educated, industrialized, rich, and democratic (WEIRD) settings. • Conduct research directly linking EFs/SR to coping strategy use and effectiveness. • Investigate proximal coping processes that mediate the association between EFs/SR and adaptation. • Investigate how "hot" and "cool" EFs are related to coping. • Test moderated mediation models linking adversity, EFs/SR, coping, and adaptation.

SR behaviors (Obradović et al., 2016): Specifically, heightened cortisol response during a laboratory visit was associated with better performance and behavior in more economically advantaged children and worse performance and behavior in more economically disadvantaged children.

Additionally, perceptions of the assessors' behavior may affect children's performance on tasks, as studies of preschoolers show that their ability to delay gratification could be influenced by experimental manipulation of the assessor's trustworthiness (Kidd et al., 2013; Michaelson & Munakata, 2016; Moffett et al., 2020). Given that developmental research is still conducted primarily by White researchers (Roberts et al., 2020), it is important to investigate whether demographic

match or mismatch between the assessors and the participants may influence children's task performance and whether it has implications for how EF may relate to coping with stress. More adaptation work is needed to ensure that assessments of EF skills are accessible and not confounded by children's language or cultural knowledge. Ultimately, researchers employing standardized performance-based assessments should consider and model differences in children's subjective experience of the assessment context and procedures as well as acute stressors (e.g., fatigue, hunger, anxiety), without assuming that these tasks measure only differences in skills (Obradović & Steyer, 2022).

Similarly, researchers using adult reports to assess children's and adolescents' SR behaviors should examine potential sources of reporter bias. For example, teachers provide a unique perspective into children's self-regulation behaviors in the classroom setting (e.g., Fuhs et al., 2015; Toplak et al., 2013) that complements direct assessment of EF skills in explaining additional variability in children's adaptation (Dekker et al., 2017; Lonigan et al., 2017; Obradović et al., 2018), but adult reported measures need to be more equitable and inclusive. Behavioral markers of students' SR should rely less on behaviors that exemplify compliance with teachers' and schools' rules and expectations as well as mainstream academic engagement and achievement, especially when they are not sensitive to diverse students' cultural and ethnic/racial values and experiences. Given the discriminatory classroom and disciplinary practices experienced by students of color, and especially Black students, in the United States (Annamma et al., 2020; Gregory & Fergus, 2017), disobedience or obstinacy in these contexts may indicate resistance or even active coping and should not be equated with low SR capacities (Spencer, 2007). Thus, it is important to consider how educational contexts and experiences may support or undermine expressions of children's SR behaviors, while also training teachers to recognize and correct any systemic demographic biases they may hold when observing and reporting on student SR behaviors (e.g., Garcia et al., 2019).

We also need to expand empirical research on how self-regulatory and coping behavioral expectations vary across different settings and develop culturally and community-relevant assessment tools beyond Western, educated, industrialized, rich, and democratic (WEIRD) contexts. A recent mixed-method study in rural Tanzania found that parents and teachers consider being respectful, obedient, disciplined, polite, calm, and an active listener to be the most important socio-emotional competencies of elementary school children (Jukes et al., 2021). It is critical that we expand our conceptualization and measurement of culturally relevant self-regulatory behaviors that support coping and adaptation in non-WEIRD and low-and-middle-income country (LMIC) settings. Ecologically valid assessments of EF and SR will provide more accurate understandings of how these skills and behaviors support coping across contexts.

Reconceptualizing What Is Adaptive and Maladaptive

An extensive body of literature in the United States has established that greater ability to control one's attention, behavior, and emotions is related to more optimal developmental outcomes, ranging from school readiness and academic achievement to better mental health, as indexed by lower internalizing and externalizing behavioral symptoms (Eisenberg et al., 2010; Zelazo et al., 2016). Further, a growing number of studies in LMIC contexts corroborate that greater levels of EF skills, and to a lesser extent reports of SR behaviors, are

associated with greater cognitive skills and academic achievement (Obradović & Willoughby, 2019; Suntheimer et al., 2021). As a result, EFs have been conceptualized as a promotive and protective factor in children's and youth's lives. However, a longitudinal study by Brody and colleagues (2013) demonstrated that in African American nineteen-year-olds from more economically disadvantaged families, displaying SR behaviors consistent with mainstream expectations may have a physiological cost that places those well-regulated individuals at higher risk for subsequent health problems. A study of coping profiles across economically disadvantaged and community samples of adolescents found that a "cognitive coping" profile, indexed by above-average use of cognitive engagement and disengagement strategies, was adaptive in a lower-stress context but maladaptive in the context of chronic and uncontrollable poverty-related stress (Perzow et al., 2021). Studies of SR and coping behaviors must take a longitudinal, multilevel analysis approach to re-examine what is adaptive across biological, psychological, behavioral, and relational systems and identify any trade-offs or contextual moderators.

At the same time, it is important to consider that behaviors that have been traditionally considered dysregulated may be adaptive responses to specific contextual stressors or broader systemic inequities. For example, Gaylord-Harden and colleagues (2018) observe that some African American boys' and youths' hypermasculine behaviors can be perceived as dysregulation, even when these behaviors are a coping strategy in response to ongoing experiences of discrimination, threats, and mistreatment. While acknowledging that traditional reports of SR serve as a protective factor for a majority of African American boys who display high levels of these behaviors, there is a need for a more nuanced conceptualization of adaptive SR behaviors – one that considers both the competing environmental demands and psychological needs of children facing discrimination and racism. Through mathematical modeling, Fenneman and Frankenhuis (2020) found that informational impulsivity, or acting quickly without deliberation or planning, is adaptive when available resources are low quality or unpredictable. Further, McCoy and colleagues (2015) found that children's anxiety moderated the effects of proximal community violence on their selective attention, such that low anxiety was associated with increased attention to negative images and decreased attention to positive images (i.e., a vigilant response pattern), whereas high anxiety was associated with increased attention to positive images and decreased attention to negative images (i.e., an avoidant response pattern) in the context of recent violent crime. This work highlights a complex interplay of adaptation, cognitive processing, and coping. Future research should investigate how regulation of attention, behavior, and emotions reflects coping and adaptation to one's lived experiences and how these adaptations affect subsequent health, learning, and relationships.

The Role of Coping in Understanding How Adverse Experiences May Promote EFs and SR

Traditionally, research on EFs and SR in the contexts of stress and adversity has adopted a deficit model in which adverse experiences undermine the development of these important skills and behaviors. Nevertheless, recent years have witnessed the emergence of promising new directions that aim to show how some adverse experiences may foster EFs and SR. First, we need to reconsider what constitutes an adverse experience. A growing number of studies show that some challenging or adverse experiences may be positively linked to EFs

and SR (Finch & Obradović, 2017; Howard et al., 2020; Warren & Barnett, 2020). Our work also highlights the need to consider non-linear associations when studying EFs and SR in relation to stress and adversity. We found that parental emotional challenges were linked to children's cool EFs and observed SR in an inverted U-shaped fashion (Finch & Obradović, 2017). Corroborating the notion of a "steeling effect," mild-to-moderate parental emotional challenges were related to the highest levels of EFs and SR in a community sample of kindergarten children in the USA.

Reflecting on empirical work that shows that some social and cognitive capacities may be enhanced in children and adults who experienced stress and adversity, Frankenhuis et al. (2020) advocate for studying so-called hidden talents or stress-adapted abilities. Recent work demonstrates that certain experiences of adversity may be associated with better EF performance. For example, adults who reported growing up in unpredictable, chaotic families performed better on a shifting EF task than adults who grew up in more stable home environments – but only when tested under conditions of uncertainty (Mittal et al., 2015). In addition, a study of Nigerian children revealed that those experiencing more disadvantage by living in institutional homes and foster families performed better on a working memory task than their less disadvantaged peers (Nweze et al., 2021). Further, studies show that enhanced cognitive performance might occur only for stress-relevant information (Frankenhuis et al., 2019; Goodman et al., 2019) that may be especially relevant for coping. While this research program has several conceptual and methodological challenges to address (Frankenhuis et al., 2020), it offers a framework for studying which types of stimuli or assessment conditions may reveal enhanced EFs or alternative displays of SR in a way that reflects or promotes coping efforts and adaptation to adverse circumstances.

Dyadic, Family, Classroom, and Communal Processes

EF skills and SR behaviors are typically studied at a child level. Individual children complete performance-based standardized EF tasks, or adults observe and rate the frequency or degree of individual children's behaviors. However, in real-life settings, children's application of EF skills and displays of SR behaviors are dynamic processes that involve interactions and co-regulation with others. Indeed, young children's capacities for regulating their own attention, behavior, and emotion emerge from the quality of co-regulation experiences with their primary caregivers (Calkins et al., 2007; Feldman, 2017; Sroufe et al., 2005). By responding in a sensitive and contingent way to infants' and toddlers' needs, and by engaging in positive reciprocal interactions, caregivers build a foundation for developing self-regulation as children internalize behavioral expectations and strategies to control impulses, ignore distractions, and manage negative emotions.

To capture the quality of dynamic, dyadic co-regulation, researchers have employed an analytic technique known as the State-Space Grid, which represents the regulatory behavioral *states* of each dyad member (e.g., parent, child) in two-dimensional *space*, such that each grid cell represents a possible dyadic state of co-occurring parent and child behaviors (Hollenstein, 2013). Using this method, studies have found that preschoolers and kindergarteners had greater teacher-reported social skills and self-regulated classroom behaviors when they spent more time in stable co-regulated states with their parents (Bardack et al., 2017; Lunkenheimer & Wang, 2017). Since the positive parent–child co-regulation space can

include the child's dysregulated behaviors as long as the parent responds in a sensitive and supportive manner, this approach does not pathologize age-appropriate and context-appropriate displays of negative emotions and behaviors. As such, operationalizing dyadic co-regulation in this way may reveal novel ways by which caregivers can support children's coping, especially since co-regulation most often emerges in the context of coping with contextual stressors or in response to child's negative emotions and behaviors. This analytic approach should be expanded to study how teacher–student co-regulation may support or undermine students' emotion expression, self-regulation, and coping in educational settings.

Whole-family regulatory dynamics, such as family adaptability, family conflict, and family mealtime routines, have been implicated in studies of child and family resilience (MacPhee et al., 2015). However, overreliance on survey-based instruments and a lack of co-regulation measures among siblings, triads, and larger family systems limit our understanding of the interplay between family-level processes and children's self-regulation and coping. For example, researchers have scarcely explored the role of nonresident grandparents and three-generational households in contributing to diverse families' regulatory dynamics and coping processes (Dunifon, 2013). Further, most existing studies on family regulatory dynamics have been conducted in Western high-income countries, especially the United States, or with measures developed for use with WEIRD populations. Yet family structures, roles, and regulatory dynamics are shaped by cultural, racial/ethnic, and socioeconomic experiences. For example, a study of Israeli and Palestinian families revealed that family conflict resolution predicted toddlers' dysregulated behaviors in both cultures, but the processes by which resolution was achieved were culturally specific (Feldman et al., 2010). As we expand studies of coping to focus on processes beyond individual actions to include the roles of families and communities, it is critical that we expand our measurement toolkit to capture the diversity of co-regulation processes that are relevant to group-level coping strategies.

In the United States, some educators are implementing reward systems that focus on whole-classroom behavioral states (e.g., everyone being on-task or demonstrating good listening skills) rather than rating individual students' behaviors. This interdependent group contingency approach encourages students to see themselves as part of a larger classroom community and contribute to the group's effort by regulating their own attention and behavior (Joslyn et al., 2019). Given that experimental studies demonstrate that preschoolers' performance on EF tasks can be improved through manipulation of children's perceptions of their group's skills and norms (Doebel & Munakata, 2018; Munakata et al., 2020), the effectiveness of these new pedagogical approaches should be studied in classroom settings. These studies should employ group assessment procedures to measure individuals' EF skills and SR behaviors in all students simultaneously (Obradović et al., 2018; Sulik & Obradović, 2018) and use an aggregated EFs and SR measure as a classroom-level variable (e.g., Finch et al., 2019). Future work should also identify specific classroom-level supports and processes that promote self-regulation and coping through children's sense of belonging and communal experience. For example, ritualized versions of school games designed to promote EFs (i.e., activities presented as conventions with no rationale or stated goal) yielded better results than instrumental versions of the same activities (i.e., those presented with instructions that include a goal-directed rationale) in

young children from Central Europe and Melanesia (Rybanska et al., 2018). Haslam and colleagues (2019) posit that in LMICs, regulation is a less individualistic and more collective effort. They advocate for studies of collective efficacy as a form of "collective regulation" such as community capacity to regulate or direct individuals' or groups' behaviors to create safe environments. In such contexts, collective regulation may be more predictive of collective coping and adaptation, or even a marker of collective proactive coping, highlighting how these constructs overlap in practice.

Promoting Coping-Relevant Executive Functions and Self-Regulation

In recent years, researchers have also called for rethinking EF and SR research to inform efforts to reduce racial, social, and economic structural inequalities (Raver & Blair, 2020). As studies shift to measure family-level and community-level regulatory processes, it is important to consider and identify systemic inequities that families and communities face that may undermine their regulatory capacities. For example, studies have linked household chaos to lower levels of children's EFs and SR (Berry et al., 2016; Sturge-Apple et al., 2017). Given that household chaos is a family-level construct of instability and disorganization, one may assume that caregivers have agency in or responsibility for this type of family dysregulation. However, a recent meta-analysis emphasized that household chaos reflects systemic inequities rather than family choices. Household events that reflect instability and a lack of systemic supports (e.g., changes in residence, employment, caregivers, and routines) correlated more strongly with lower EFs and SR than household markers of everyday disorganization (e.g., presence of noise, clutter, crowding, and repairs) (Andrews et al., 2021). We need to further investigate how differences in family and community routines, resources, and experiences that support EF skills and co-produce SR behaviors may be confounded with or representative of societal inequalities. Future research should also investigate whether changes in system-level policies and practices affect the development and use of EFs and SR and their relation to coping.

At the same time, researchers need to develop new measures and methods to study culturally relevant family and community experiences that promote EFs and SR, as current contextual assessments center experiences of WEIRD settings and predominantly White upper-middle-class families in those countries (Miller-Cotto et al., 2022; Obradović & Willoughby, 2019). By focusing on culture-specific environmental stimulation, caregiving behaviors, and daily activities, we can identify how diverse familial and communal systems, relationships, responsibilities, routines, and rituals may contribute to EFs and SR as well as coping.

Finally, it is crucial that future work examines intra-individual variability in EFs and SR, including its relation to environmental factors that can fluctuate over relatively short time periods, such as sleep quality (Anderson et al., 2009) and caregivers' well-being (Finegood & Blair, 2017). Identifying day-to-day experiences that affect children's capacity for self-regulation would help provide targets for intervention that leverage and amplify children's existing strengths and supports. Diary methods and ecological momentary assessments could be used to better understand how self-regulatory skills and coping are related within individuals (e.g., Papadakis et al., 2018). A focus on intra-individual processes would also help us understand bidirectional associations between EFs/SR and coping – for example, successful coping may

reduce an individual's stress level, leading to increased self-regulatory capacity, and yet successful coping may also depend on an individual's regulation skills. In turn, knowledge of these reciprocal relations can inform the design of interventions to support a virtuous cycle in which coping and self-regulatory skills co-develop in a mutually reinforcing way.

Conclusion

Despite clear conceptual implications and robust empirical evidence that EFs, SR, and coping strategies all contribute to adaptive outcomes in the contexts of heightened stress and adversity, researchers have largely studied EFs/SR separately from coping. With the renewed commitment to make developmental science more relevant, inclusive, and just for children and youth around the globe (Brown et al., 2019), we must investigate the interplay of EFs, SR, coping, and adaptation across different timescales, developmental stages, systems, and contexts. To support new generations that will need to cope with growing global economic, racial, and climate injustices, we need a new wave of research that will identify how and when we can promote coping-relevant EFs and SR in a way that centers policy changes, cultural diversity, and system-level processes.

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15 The Development of Accommodative Coping

Conditions and Consequences from a Lifespan Perspective

Werner Greve and Cathleen Kappes

Introduction

Since early childhood he had dreamed of becoming a ballet dancer, but the accident with the bicycle, the day after his 15th birthday, in which his knee was very badly injured, definitively blocked this path. When her parents divorced, the year she turned 10, she realized that the warm evenings spent together with her parents, which meant so much to her, would never return in that way. Some problems and crises we encounter in life, sometimes even early in life, cannot be solved by direct action. In order to resolve and overcome them, we must find a view of the unchangeable situation that allows us to live with it confidently and contentedly.

Accommodative coping refers to precisely that category of coping processes that reduce the burden of a problem by adjusting the attractiveness of a threatened goal or good, the evaluative criteria of how the problem is experienced, or other evaluative aspects of the constellation, among other threat-mitigating processes. Maybe instead of being a dancer, I can become a gifted choreographer or composer. Maybe I can learn how to be grateful for the time with my parents that I have already experienced, and also for being allowed to live in a country at a time when it is possible to correct life choices that are experienced as faulty, instead of being forced to remain in an unhappy relationship for life. Thus, accommodative coping is essentially constituted by two components: Disengagement from a goal or value or other normative standard is complemented by reorientation toward (or upgrading of) another goal, value, or standard that appears more attainable with the person's available resources. As a result of accommodative regulations, an initially stressful problem constellation is not solved but dissolved – the experienced stress is reduced or disappears no less than with more active problem-solving strategies. Moreover, appropriate reorientations make resources usable that would be wasted or remain unused if the blockade were to persist. Although the processual basis of accommodative processes consists of cognitive adjustments, they do rest on (or consist of) several and various cognitive processes (shifting attention, altering associations, reframing concepts, etc.). Actually, the categorization of this family (Skinner & Zimmer-Gembeck, 2007, 2016) of processes as "accommodative" is due to their "family resemblance," not because they all consist of (or use) an identical set of cognitive mechanisms.

In fact, many findings suggest that accommodative coping is functional, especially when the respective problem situation neither appears to be actively solvable nor can be ignored (e.g., perceptual defense). This category of regulative processes was first proposed with regard to older adulthood (Brandtstädter & Renner, 1990), which is characterized precisely by an increasing probability of problems that cannot be solved by direct action (e.g., loss of sensoric or motoric

capacities, passing away of one's partner). Only recently have accommodative forms of coping also been studied in relation to childhood and adolescence (Skinner & Zimmer-Gembeck, 2007, 2016; Zimmer-Gembeck & Skinner, 2011). Although earlier stages in life especially require the acquisition of the ability to persistently pursue goals against resistance, we face unsolvable obstacles at this age as well. It is the central concern of this chapter to argue that these adult forms of accommodation go through a development over the lifespan, but that at the same time variants and (pre-)forms of accommodation in childhood often have a different, less diverse character; it will become clear in the following why this is the case. Moreover, it is currently an open empirical question under which conditions they develop into adult forms of accommodation, and whether other (especially cognitive) developmental conditions are required for this.

Moreover, even with respect to accommodative coping processes in adulthood, a number of theoretical and empirical questions have not been sufficiently clarified. For example, all authors agree that accommodative coping is not a singular process, but a category (Skinner & Zimmer-Gembeck, 2007, 2016: "family") of coping forms that are characterized by constitutive common elements (e.g., disengagement, reengagement, upgrading processes), but operate quite differently (downward comparison, scale adjustment, goal substitution, etc.). Unfortunately, the breadth of this category is not always delineated consistently. Moreover, the replacement of a blocked goal, via the upgrading of another goal, can presumably be achieved in multiple ways. We know little about the processes that can achieve this result, or whether they are functional in different ways, possibly depending on context or problem.

Similarly, there are hardly any empirical findings to date on the question of the individual or contextual conditions that favor or enable accommodative processes in terms of both actual genetic or ontogenetic explanations; consequently, we also know little about developmental trajectories and developmental preconditions of accommodative coping across the lifespan. In short: We lack a theory of the development of accommodative coping (Skinner et al., 2003; Zimmer-Gembeck & Skinner, 2011). The attempt to outline central questions and demands for such a "developmentally friendly" (Skinner & Zimmer-Gembeck, 2016) theory of accommodative coping is the topic of this chapter. Although the presentation and discussion will focus more on the development of accommodative coping in childhood and adolescence, it is helpful to begin with a brief look at adulthood and old age, which is, as already mentioned, the developmental context for which the two-process model of developmental regulation was originally conceptualized, which in turn provides the theoretical background for the process mode that will be discussed here: accommodative coping. However, the lifespan perspective to be pursued in this chapter goes beyond looking at more than one age group: We hypothesize that the explanation of the development of accommodative coping in childhood and adolescence can substantially benefit from alignment with respect to accommodative developmental regulation in adulthood. In a similar vein, a "backward perspective" on accommodative coping in childhood and adolescence may open or sharpen the view of important developmentally relevant functions. At the same time, it is important to avoid the fallacy of simply applying adult categories to childhood (Skinner & Zimmer-Gembeck, 2009, 2016). Hence, in this chapter we argue in favor of an ontological perspective on accommodative coping.

From Old Age through Adulthood to Childhood: Taking a Lifespan Perspective Seriously

Arguably, the dedicated pleas for a lifespan perspective (Baltes, 1987) have not succeeded in ensuring that developmental psychology actually focuses on the entire lifespan. Even proponents of the lifespan perspective have often been limited to adding research perspectives on the various stages of late adulthood and old age to the traditional focus of developmental psychology on childhood and adolescence (Baltes et al., 2006); almost all approaches that have formally embraced a lifespan approach have been content to focus more closely on one life stage after all – and have barely addressed transitions and similarities to others. Actually, we still lack theoretical approaches that theoretically model and empirically examine developmental dynamics across the lifespan. However, some approaches of the lifespan perspective entail concepts and arguments that may contribute to fill that gap. Perhaps the more important and sustainable yield of the lifespan perspective has been not so much a temporal expansion of the life stages and topics considered (this aspect was already addressed several times at mid-century, for example by Bühler, Erikson, and Havighurst: Lerner, 2018), but above all a "processual turn" in developmental psychology.

Not only the majority of classical, phase-oriented developmental theories (childhood-focused – Kohlberg, Freud – as well as lifespan approaches – Erikson, Havighurst), but also many current thematically oriented research fields (prototypically: theory of mind) primarily or exclusively investigate the timing of the respective target abilities or the postulated sequences of stages (who is able to accomplish what when?) – and thus remain descriptive. The processes that regulate development (age-specifically or across the lifespan) have been addressed less frequently (Piaget is a notable exception: Chapman, 1988). At the latest in adulthood, however, phase theories are hardly defensible because developmental trajectories beyond adolescence are characterized, first, by a high stability over several decades into late adulthood and old age, and, second, by a pronounced individuality (Greve, 2005). It seems reasonable to assume that the heterogeneity of developmental trajectories in adulthood and old age (apart from processes of physiological decline) is due, on the one hand, to an increasing number of individual formative life experiences and their individual processing, and, on the other hand, to the increasingly relevant self-regulation of development from adolescence onward (Brandtstädter & Lerner, 1999). Moreover, it has become increasingly clear that even those developmental steps that seemed to be strong candidates for universalities are strongly influenced by sociocultural context (e.g., attachment theory; Keller & Bard, 2017).

As a consequence, it seems more promising to focus on developmental regulatory processes, that is, on the explanation instead of mere description of developmental pathways. This processual turn may not have been the main intention of these theories at first, but it does alter the view of human ontogenesis. Following both a long tradition in motivational theories (Heckhausen & Heckhausen, 2018) in general and the "actional" perspective on adult development in particular (Brandtstädter & Lerner, 1999), the focus of several lifespan theories has been the individuals' shaping and controlling of their own development (Baltes & Baltes, 1990; Haase et al., 2013; Heckhausen et al., 2010, 2019; Staudinger & Lindenberger, 2003). However, age-related developmental tasks and losses are not always controllable, solvable, avoidable,

or counteracted or mitigated by direct action, and in older age increasingly less so. This suggests that, in addition to active problem-solving approaches, reactive adjustments and changes in goals, evaluations, and preferences might also be useful or necessary, especially when losses seem inevitable or goal blockages seem unsolvable (e.g., end of career, chronic illness, loss of mobility). Among those approaches that address an actional perspective on lifespan development, the two-process model of developmental regulation in particular has elaborated on the interplay between active problem-solving and adjustment processes (Brandtstädter, 2006; Brandtstädter & Rothermund, 2002; see in more detail later in this chapter).

Actually, all of these theories of developmental regulation in adulthood and later life (Baltes & Baltes, 1990; Brandtstädter & Rothermund, 2002; Heckhausen et al., 2010) share a processual perspective: Their focus is on developmental regulatory processes instead of specific developmental stages. This perspective combines several advantages. First, these processes offer approaches for explaining individual developmental trajectories, especially when they vary as a function of individual goals or sociocultural conditions. Second, adaptive developmental processes in particular (in response to goal blockages or losses) can explain unexpected patterns of findings ("well-being paradox"; Staudinger, 2000) and, thus, have made clear that stability of self, personality, and well-being is not the opposite but a special case of development. Stability and changes are produced by the same processes – depending on the individual and sociocultural constellations of conditions (Brandtstädter, 2006; Brandtstädter & Rothermund, 2002; Greve, 2005). Therefore, the phenomenon of resilience is also a developmental phenomenon (rather than the absence of development; Leipold & Greve, 2009).

A number of studies have shown that individuals vary considerably with respect to their preparedness and ability to adapt their goals or values (Barlow et al., 2019; Brandtstädter, 2006; Heckhausen et al., 2010, 2019). Accordingly, the individual's "flexibility of goal adjustment" (Brandtstädter & Renner, 1990) is a predictor for the stability of the self and well-being (Brandtstädter & Greve, 1994) and a buffer against aversive circumstances and experiences (e.g., Greve et al., 2017; Rühs et al., 2017). More importantly, the existence of individual differences in the availability of these processes (Brandtstädter & Rothermund, 2002) suggests that these processes (capabilities) are themselves dependent on developmental conditions and processes. However, this perspective – explaining the development of developmental regulatory processes – has received little attention so far, although it is promising and worthwhile for several reasons. First, especially from a genuine lifespan perspective, the question would have to be addressed which developmental conditions and processes in childhood and adolescence can explain (individual differences in) the availability of flexible goal adjustment processes in adulthood. Second, investigating the availability and functionality of such adaptive processes in childhood and adolescence is important per se: Because children are also confronted with losses and goal blockages, it would be important to know to what extent (and under what conditions) processes of goal adaptation are possibly already available in the first and second decades of life. Both perspectives together would exemplify and contribute to a developmental perspective that actually covers the lifespan. The presentation of the outlines of such a research program and the illustrative presentation of first findings is the main purpose of this chapter.

Accommodative Coping: The Two-Process Model of Developmental Regulation

The two-process model (Brandtstädter, 2006; Brandtstädter & Renner, 1990; Brandtstädter & Rothermund, 2002) distinguishes two modes of regulation by which individuals can reduce or eliminate the burden of a (perceived) problem (i.e., a discrepancy between the actual state of affairs and a desired constellation). According to this model, a sample case of a problem is a blocked goal (e.g., unrequited love, failure of an exam) or loss of a valued relationship, attribute, or competence (e.g., death of one's spouse, declines in memory or mobility, retirement). In the assimilative response mode of tenacious goal pursuit, the individual attempts to resolve the stressful problem situation through active and intentional problem-solving; in doing so, personal goals and intentions are maintained and tenaciously pursued. Sometimes already in anticipatory life planning, but at the latest when assimilative efforts fail, problems cannot be overcome by active problem-solving, or attempts would involve too much difficulty or cost, accommodative processes gain importance. In the accommodative reaction mode, the problem is reduced or dissolved by the flexible adaptation of goals and values to the current situation and its available options for action, thereby stabilizing the individual's well-being and, as a rule, leading also to a regaining of perceived control (Brandtstädter, 2006; Heckhausen et al., 2010, 2019). Accommodative regulation is associated with changing one's perspective on the problem situation, for example, by devaluing the relevance of the previously pursued goal and upgrading alternative goals, changing one's level of aspiration, or cognitively reinterpreting the stressful problem situation (Brandtstädter & Rothermund, 2002). Successful coping with developmental tasks and problems, however, requires the availability of both regulatory categories, and their flexible and appropriate application according to the problem constellation at hand, because neither the rigid pursuit of hopeless goals nor premature goal disengagement and reorientation in the face of solvable difficulties would be functional (Brandtstädter, 2006).

Although the two-process model seems, at first glance, to converge with several other processual theories of developmental regulation, in particular the concept of primary and secondary control (Heckhausen et al., 2010, 2019; see Boerner & Jopp, 2007; Haase et al., 2013; Morling & Evered, 2006), it seems worth emphasizing that accommodative processes are conceptualized as dynamical intraindividual processes of adjustment in contrast to personal control strategies to overcome obstacles and losses. Actually, it is a central tenet of the two-process model that accommodation is neither secondary nor control (Skinner, 2007; see also Morling & Evered, 2007; for a related argument see Greve & Wentura, 2007). Although the category of secondary control includes many of the processes that are encompassed in the "accommodative" mode in the two-process model, the connotation of control would be misleading (some accommodative processes work even unnoticed to the individual). The question of which of these processes are subject to individual control or can be intentionally initiated, then, is an empirical question.

Beyond this pivotal point, some further theoretical and empirical questions with respect to the category of accommodative processes are still underinvestigated. For instance, the assumption that accommodative coping is characterized by disengagement and reengagement (both of which are necessary but not sufficient) is not well clarified – nor has consensus necessarily been reached. While in the

conceptualization of Wrosch (Wrosch, Scheier, Miller, et al., 2003; Wrosch, Scheier, Carver, & Schulz, 2003) this differentiation is constitutive, goal disengagement is used, for instance, in the summary work of Haase et al. (2013) in a broader sense (approximately coextensive to accommodative coping or regulation). However, conceptual clarification here is significant for theoretical modeling and empirical investigation of the development and developmental conditions of accommodative coping (especially in childhood and adolescence) for several reasons. While basal forms of disengagement (such as the form of "perceptual aversion"; Skinner & Zimmer-Gembeck, 2007, 2016) certainly occur in very early childhood, more temporally stable forms of goal commitment (to more abstract goals, for example) are certainly possible only with advanced cognitive development. This in turn suggests that accommodative coping in an elaborated (differentiated) form cannot be a coping form possible in early childhood. This does not preclude, of course, that adjusting preferences to current options is a possible reaction at younger ages – in developmentally appropriate ways (e.g., adjusting short-term wishes). It is an open (partly empirical) question, however, whether these regulations are precursors of "advanced" accommodative adjustments.

Moreover, both disengagement from a blocked goal and upgrading of another goal can presumably be achieved in several ways, in particular with respect to cognitive, emotional, and behavioral aspects of disengagement. It is possible that repertoire diversity itself is beneficial here (Bonanno & Burton, 2013). We also know little about the processes that can achieve this result, and even less about their developmental trajectories and preconditions. Numerous research questions remain unanswered here: How might we qualitatively differentiate between these equifinal processes? Are different processes of goal disengagement differentially situationally or developmentally appropriate?

The Development of Accommodative Coping: Ontogenetic and Deferred Adaptation

Although cross-sectional data indicate an increase in accommodative processes in late adulthood (Aldwin, 2007; Brandtstädter et al., 1993), there has been little theoretical reflection or empirical investigation of developmental trajectories in childhood and adolescence and of their developmental conditions (Heckhausen & Heckhausen, 2018; Meyer & Greve, 2012). While more extensive research is available for the development of active coping competencies and their conditions (including control skills) for almost every life stage in childhood and adolescence, the development and especially the developmental conditions of accommodative coping capabilities are hardly elaborated for this age range (for an overview, see Skinner & Zimmer-Gembeck, 2009, 2016; Zimmer-Gembeck & Skinner, 2011, 2016). Existing approaches on coping and emotion regulation in childhood and adolescence only partially overlap with accommodative coping and mostly deal with the regulation of current emotional stress and the resulting effectiveness on self-esteem and well-being (cf. for an overview Aldwin, 2007; Compas et al., 2001; Eisenberg et al., 2010; Skinner & Zimmer-Gembeck, 2009, 2016). Although several studies describe developmental trajectories in childhood and adolescence with respect to these specific coping reactions (for an overview, see Skinner & Zimmer-Gembeck, 2009, 2016), they often touch only marginally on the question of explaining their emergence and development. In particular, these studies do not address the lifespan perspective of the development of coping

resources into adulthood, nor do they empirically or theoretically address the connectivity of models of child and adolescent coping with problems and obstacles to theories of adult forms of accommodative regulation.

For a more detailed examination of the development of accommodative coping in childhood and adolescence, it is worthwhile to distinguish between immediately functional or relevant forms of accommodative coping and regulation, on the one hand, and the developmental processes in childhood and adolescence that are necessary to build (the components of) accommodative forms of coping and regulation in adulthood, on the other. The independent examination of immediate age-related and prospective developmental functionality is a particularly interesting and instructive example of the distinction between "ontogenetic" and "deferred" adaptations of evolutionary developmental psychology (Bjorklund, 2021): The synchronous or diachronic functionality of the availability and change of a concrete capability will typically only allow an adequate explanation of the development of a capability (here: accommodative developmental regulation) when considered together.

Accordingly, the first perspective of an age-related functionality on early forms of accommodative coping would not only examine the developmental course of accommodative coping resources from early childhood to adulthood, but also focus on them as a possibly relevant or useful resource for dealing with goal blockages and problems already in childhood and adolescence (see also Skinner & Zimmer-Gembeck, 2016). Logically and possibly empirically independent of this, the second perspective on the development of conditions or components necessary for adult accommodative regulation would examine the development of a complex regulatory resource of (older) adulthood. It is not necessary from this perspective to assume that infantile early forms (or preforms) of accommodative reactions exist or, if they do, that they continue seamlessly into middle and higher adulthood. It is perfectly conceivable that infantile forms of preference adjustment rarely occur (e.g., if a goal is definitely blocked that already exists and shapes the child's behavior in an early age) or are not sufficiently effective, or likewise that they remain unstable (e.g., change substantially again in adolescence). At the same time, it is very plausible to assume that constitutive components (e.g., the ability to change perspective) of adult accommodative regulatory abilities emerge in the course of cognitive or emotional development during early childhood, with individual differences in trajectories that can (partially) explain the interindividual differences in adult flexibility of goal adjustments. This leads to the suggestion to pursue both research perspectives as empirical research questions: investigating possible relations between earlier and later forms of accommodative regulations as well as studying necessary conditions for adult forms. However, the relationship between constitutive and consecutive developmental sequences (e.g., if the cognitive ability of reframing were a necessary – constitutive – condition of accommodation, the reverse developmental sequence would be impossible) on the one hand and causal interactions (e.g., early experiences of blockages of personal goals may stimulate the individual's ability to look at such experiences from various perspectives, which in turn facilitates the development of the individual's capacity for reframing) on the other is likely to be extremely complex here (on the general point, see also Greve & Staudinger, 2006; Leipold & Greve, 2009). At the same time, both research perspectives can make important contributions to a genuine lifespan perspective. Both are process- and therefore explanation-oriented, thus going

beyond a mere description of sequences of abilities.

It is important to point out that research on coping in childhood and adolescence has long suffered from being conceptualized exclusively from an adult perspective (Skinner & Zimmer-Gembeck, 2007). This, if one is simply looking for the adult phenotype, is probably really misleading. In contrast, the idea of this chapter is to explain "adult coping" (as it were) from child coping or from the development of the constituents and conditions for adult coping. This is not to say that child accommodative coping must be similar to adult coping. In part it might be – early preforms of accommodative coping are conceivable and likely. But perhaps the indirect pathway is at least as important (Skinner & Zimmer-Gembeck, 2007). At the same time, however, and this is the important point of Skinner and Zimmer-Gembeck's (2007) argument, coping forms that children exhibit in response to the problems that children encounter in childhood must functionally fit the abilities and problems of that developmental stage.

Accommodative Coping in Childhood and Youth: Development and Efficiency

Existing reviews of coping resources in childhood and adolescence (Skinner & Zimmer-Gembeck, 2007, 2016; Zimmer-Gembeck & Skinner, 2011) indicate that accommodative coping, to the extent that it has been studied at all, has not yet shown significant age-related trends. Although there are some hints on the age-specific steps of children with respect to accommodative coping (Skinner & Zimmer-Gembeck, 2016, pp. 54ff, 265ff), several problems are probably responsible for the lack of a lifespan perspective on accommodative coping. A first intricacy is the open question of to what extent children and adolescents already have a sufficiently distinct and effective capacity for accommodative coping that is conceptually sufficiently close to the adult flexibility of goal adjustment discussed earlier. With regard to adolescence and young adulthood, it can be assumed that there is a sufficiently differentiated cognitive representation of one's own person and developmental situation on the one hand and at least medium-term (developmental) goals on the other; accordingly, the Flexibility of Goal Adjustment (FGA) questionnaire proposed by Brandtstädter and Renner (1990) for adulthood can be used either directly (Greve & Enzmann, 2003; Greve et al., 2001) or in a linguistically slightly adapted form for adolescents (Greve & Thomsen, 2013; Thomsen, 2016; Thomsen & Greve, 2013). Empirical evidence for adolescence and young adulthood in longitudinal studies showed stabilizing effects of FGA for self and well-being when individuals are confronted with restrictive developmental circumstances (youth prison: Greve & Enzmann, 2003) or challenging developmental transitions (school change: Thomsen et al., 2015): In both studies, the impact of the respective challenge on the individual's self-esteem (among other indicators) was mitigated (i.e., statistically moderated) by the individual's (self-reported) capacity to adjust their goals (FGA). In addition, there is evidence that the adjustment of the profile of the individual's ideal self toward the real-self's profile (across a number of facets) as an indirect indicator of accommodative *processes* predicts the maintenance of the individual's self-esteem in restricting circumstances (youth prison; Marek et al., 2022).

The question of whether adaptive preference adjustments can also be demonstrated for earlier childhood is more complex (Skinner & Zimmer-Gembeck, 2007, 2016; Zimmer-Gembeck & Skinner, 2011). First, it is doubtful to what extent preschool children have

goals that extend beyond an immediate action goal, that is, those that are based on normative anticipatory self-conceptions on the one hand and a cognitive representation of the current developmental situation on the other. Since a necessary condition of goal adjustment (in the sense explicated in the two-process model) is to have longer-term goals in the first place that are sufficiently elaborated (e.g., hierarchically organized) to adjust this structure (e.g., by "moving" its priority downward), accommodation cannot take place if this condition is insufficiently fulfilled. Second, although younger children will also experience blockings of their more temporary goals or wishes, and it is also not implausible that they show or develop interindividual differences in their reactions to such experiences, it is doubtful whether such dispositions could be sufficiently elaborated in self-representation to provide reliable and valid information on this in a self-report format (questionnaire). Hence, it may be due to substantial reasons as well as to measurement deficits if we fail to demonstrate individual differences with respect to accommodation in early childhood. Alternatively, in a game-based assessment format, the children's propensity and ability to respond with an accommodative coping process were assessed indirectly (reactive adjustment of preferences: RAP; Lessing et al., 2015). Before the start of a guessing game, the children were asked to choose one of several toys ("which one would you most like to get?"). After failing the guessing game, they were denied this prize, but as a consolation they were given the toy they rated as the least attractive. After a distractor task, it was explained to them that due to a construction error it had been impossible to succeed in the previous guessing game and they were given the option of keeping either the toy they had received or one of the others – even the one they had originally rated as the most attractive. Among 7- to 8-year-olds, devaluation of the (denied) toy and upgrading of the compensatory one was found in contrast to a control group, indicating that accommodative reactions actually occur in school age. In addition, the children's degree of downgrading correlates with their flexibility of goal adjustment as assessed by their parents (Lessing et al., 2015). However, longitudinal data on the stabilizing functionality of this form of accommodative coping are not yet available.

The complementary question of the developmental conditions for child and adolescent capacities for accommodative coping is complex, in part because it is plausible to assume that the different aspects of the response forms subsumed under this category depend on different conditions. Indeed, findings from cross-sectional studies with large samples suggest that the developmental conditions of accommodative capabilities in adolescence (mean age: 15 years; Greve & Thomsen, 2013; Thomsen & Greve, 2013) encompass different domains of influence, each of which contributes independently to adolescent flexibility of goal adjustment. If accommodative responses imply the ability to adopt different perspectives and to switch them if necessary, then it is expected that this ability ("divergent thinking") is associated with juveniles' accommodative capabilities. Two small preliminary studies (Greve et al., 2009) with preschool (6 years) and elementary school-aged (8 years) children examined divergent thinking and perspective-taking ability as potential developmental prerequisites for accommodative coping. In both studies, perspective changing and divergent thinking were specifically taught and practiced in several training sessions (without reference to life problems or goal blockages) in the experimental conditions; as the dependent variable, responses to descriptions of everyday stressful situations were recorded in the last session. The preliminary results indicate that

children of both groups (preschoolers in particular) mainly resorted to interpersonal regulation options (which is often the case among these age groups; Skinner & Zimmer-Gembeck, 2016); the improvements of their capacities in divergent thinking and reframing or, at least, their activation of these processes by the training sessions did not predict accommodative responses to the stories of stressful situations. Although the sample was too small to statistically ensure effects, the results fit to the assumption that even if divergent thinking is a necessary condition of accommodative regulation, it probably is not a sufficient one. Rather, in particular, younger children may lack further cognitive prerequisites for generating accommodative reactions (like perspective change, goal adjustment), or the transfer from solving creative tasks to adjust goals is too difficult, or one prerequisite for goal regulation to take place is the experience (not just the imagination) of a goal blockage. Moreover, training studies, even if they allow for experimental arrangements, are burdened in several respects by substantive presuppositions, in particular the (short-term) trainability of the focused ability and the effectiveness of the training. Moreover, with respect to the recording of accommodative responses both with respect to short-story vignettes and in real-life difficulties (which was not realized in this pilot study), it should be noted (especially for younger children) that it does not follow from failure to show (accommodative) performance that accommodative competence is lacking.

In a longitudinal study, the influence of cognitive control processes, such as executive functions (EFs, e.g., set shifting, inhibition, and working memory) on accommodative abilities was investigated (Lessing et al., 2019). Individual differences and intraindividual changes in EFs (tested at ages 5½, 6, and 8) and accommodative coping (assessed by the RAP measure and parental ratings) at age 8 were examined. Contrary to our assumption, a negative association was found between baseline-level performance and change in EFs with the extent of accommodative capabilities. One possible explanation of this pattern of results could be that the relationship between EFs and accommodative coping (including, e.g., cognitive reappraisal) might change with age. Probably one of the most important developmental tasks for early childhood is the capacity to build up and persistently pursue longer-term goals. Since goal blockades in childhood often mean a "not yet" rather than a "never," children's cognitive regulative capacities are possibly needed most for the development of the patience to endure and overcome initial disappointments and to tenaciously try to achieve the initially blocked goal by other means even if it means in some situations to hang on to a nonachievable goal longer than necessary. This assumption fits to the finding of correlations between self-regulation (judgment by parents and behavioral indicators: gift delay) and flexible goal adaptation (RAP) in a study of preschool-aged children (3–6 years) and their parents (Lessing et al., 2017): Young children showed that goal adaptation was stronger when self-regulation was low, whereas older children with pronounced goal adaptation tended to show higher self-regulation. Moreover, even if sufficiently developed EFs are a necessary condition for (the development of) accommodation, it most probably is not a sufficient condition. For instance, a plausible assumption would suggest that sufficiently developed cognitive capacities to evaluate one's goals and their consequences against possible alternatives is another necessary condition for accommodative reactions to occur. Most likely, younger children lack these capacities.

As mentioned previously, a necessary condition for the occurrence of accommodative

coping in a sufficiently substantial sense is the development of a differentially structured representation of oneself on the one hand and a sufficiently differentiated – that is, adaptable – structure of developmental goals and possible selves on the other. Although early forms of self-concept already develop at the age of about 2 years, both are hardly present in a form akin to adult developmental goals and plans in preschool age (Harter, 1999). Hence, accommodative coping processes in the sense studied for adulthood can hardly take effect until elementary school age (which does not exclude accommodative processes in the sense of the previously mentioned reactive adjustment of preferences).

Although accommodative developmental regulation in adulthood has so far been discussed mainly in terms of cognitive processes and conditions (Brandtstädter & Rothermund, 2002), it can be assumed that emotional processes play a role in the realization of accommodative responses – possibly also as necessary conditions. For instance, studies with older adults indicate a relationship between experiencing sadness and accommodative coping (Kunzmann et al., 2017). However, the intersections of cognitive and emotional developmental conditions of accommodative coping have been investigated only rarely to date with respect to childhood and youth. In a cross-sectional study, we found that an emotional facet of letting go (willingness to forgive) separately predicted accommodative capabilities of juveniles beyond the cognitive capabilities mentioned earlier in the chapter (Thomsen & Greve, 2013).

A second step toward a developmental explanation of accommodative coping in childhood and youth asks for supportive or necessary contextual conditions (beyond individual conditions such as cognitive capacities). The cross-sectional studies mentioned previously (Greve & Thomsen, 2013; Thomsen & Greve, 2013) found evidence for at least two different developmental factors. First, several indications of the importance of parents emerged in both studies. Both the emotional quality of the relationship between parents and children and parental accommodative capabilities were found to make an independent predictive contribution to adolescents' accommodative capabilities, respectively. To study the role of social transfer in the form of observational learning of accommodative coping as an explanation for the correlation between parental and adolescent accommodative ability, we conducted several experimental studies. For children (7–12 years), we found that tenacious behavior modeled by a parent when confronted with a challenging situation was unequivocally imitated by the child, while evidence of imitating accommodative coping was less conclusive (Kappes & Thomsen, 2022; Thomsen et al., 2017). In contrast, experimental studies on observational learning of accommodative coping in adults in romantic relationships demonstrated imitation of both observed coping responses (Kappes & Thomsen, 2020; Thomsen et al., 2017). These findings emphasize the role of the social learning context, which extends beyond childhood. Moreover, they point, on the one hand, to the question of functionality of accommodative processes in childhood in contrast to adulthood or necessity of accommodative coping depending on other factors (e.g., role models facilitating accommodative coping in response to lower socioeconomic background, see Chen & Miller, 2012, on a theoretical discussion of this point). On the other hand, they indicate that there might be other abilities to be developed before accommodative coping can develop fully.

Secondly, and independently from parental influences, the adolescents' divergent thinking ability (as a predictor and, possibly, component of their accommodative coping capability)

was found to be predicted by heterogeneous life experiences (here: heterogeneous leisure activities in earlier childhood – according to parents' assessment) – over and above the individual's general capacity for abstract thinking (Greve & Thomsen, 2013; Thomsen & Greve, 2013). This finding leads to the lifespan perspective on the development of accommodative coping: the connection between conditions and constellations of accommodative coping in childhood, youth, adulthood, and old age.

Pathways to Adult Accommodative Coping: Developmental Preforms and Conditions in Childhood and Youth

As already outlined, two developmental pathways, not mutually exclusive, of the development of adult accommodative capacities are conceivable: (1) the development from very simple (pre- and early) forms of (goal) disengagement (from "perceptual aversion" to RAP and beyond) to the adult shape of the individual's capabilities of accommodative coping and (2) the development (and developmental conditions) of the components necessary and/or constitutive for adult accommodative coping.

With respect to the first pathway, it can be assumed that various early or preforms of accommodative reactions play a (growing) role in the context of children's adaptive capacity (Holodynski & Friedlmeier, 2006; Skinner & Zimmer-Gembeck, 2007, 2016), building the pathway toward more mature forms of accommodative coping. Possible antecedents could be, for example, (re) directing attention by alternative actions in early childhood (e.g., engaging with a toy) or distractive thoughts or self-serving attributions in preschool age (e.g., "But I won in the previous game"). By school age, the child is already able to make thought-relieving comparisons and gradually learns to cognitively restructure or reinterpret goal blockages and stressful events (for a summary, see Heckhausen & Heckhausen, 2018; Skinner & Zimmer-Gembeck, 2007, 2016). The reactive adaptation of preferences (e.g., as recognizable by the RAP assessment; Lessing et al., 2015) seems to capture, at least to a certain extent, accommodative capacity. However, longitudinal studies investigating the extent to which such early and preliminary forms actually predict (explain) individual differences in the ability to engage in accommodative coping in adulthood are lacking to date.

With respect to the second developmental pathway, the two-process model explicitly identifies several possible constitutive conditions for an adult's flexibility of goal adjustment (Brandtstädter, 2006; Brandtstädter & Rothermund, 2002). As previously mentioned in this chapter, a sufficient degree of self-complexity seems to be required for alternative, heterogeneous goals to be generated (Affleck & Tennen, 1996; Wrosch, Scheier, Miller, et al., 2003). A complex self-structure consisting of facets that are independent of one another should be supportive or even necessary for the generation of alternative goals, as threats to the self would remain domain-specific and, furthermore, alternative pathways would be open (Brandtstädter, 2006). Plausibly, this necessary condition is hardly sufficiently fulfilled for children at preschool age or even in primary school (Harter, 1999). In fact, the generation or availability of alternative goals is a necessary but not a sufficient condition for accommodative regulation, because only if the original goals can also be substituted can flexible goal adaptation become possible in the first place. Moreover, substitution by alternative goals can only take place if the old goal is no longer adhered to (Wrosch, Scheier, Carver, & Schulz, 2003). A second component is probably the availability of relieving cognitions, which is expressed

in the form of positive reinterpretations of the stressful problem situation on the one hand (being able to see the bright side of a threatening constellation) and in the form of relieving comparisons on the other hand ("others have it even worse than I do"). It implies both the ability to change one's view of the problem and the ability to adopt different perspectives. According to Brandtstädter and Rothermund (2002), the availability of palliative cognitions is linked to the wealth of knowledge and experience accumulated so far: The more experiences gained over the life course, the greater the comparative repertoire on the one hand, and the greater the likelihood of growing from one's experiences and developing resilience on the other (Seery et al., 2010).

Cross-sectional findings indicate (Brandtstädter, 1992; Brandtstädter & Greve, 1994) that from middle adulthood onward the willingness and ability for accommodative regulation of obstacles and threats increases, possibly also because the quality of problem situations shifts with increasing age in the direction of hardly controllable, partly unchangeable life changes and challenges (also losses), which can hardly be coped with by active (assimilative) efforts. If this idea were true, then challenges due to blockages or threats to goals could promote the development of accommodative regulatory resources, possibly also, beyond that, the "developmental stimulation" of generally challenging life constellations and challenges. As already addressed, two independent cross-sectional studies showed that heterogeneity of leisure activities in childhood (parental information) predicts flexibility of goal adjustment in adolescence (Greve & Thomsen, 2013; Thomsen & Greve, 2013). In two other studies, nonprestructured "free" play in childhood was shown to predict flexibility of goal adaptation in middle and older adulthood (Greve et al., 2014; Greve & Thomsen, 2016). A constraint of these studies, however, is that retrospectively reported childhood experiences may be influenced by recollection biases, in particular by tendencies to reframe one's own experiences. Thus, it would be stronger evidence for the hypothesis of flexibility-stimulating effects of heterogeneous experiences if biographical information can be collected arguably independently of the individual's flexibility of goal adjustment. First indications for this come from a retrospective study on the possible (stimulating) consequence of multilingual and thus multicultural, at least multiconceptual development in childhood. The results showed a cross-sectional correlation between multilingual socialization in childhood and a more pronounced flexibility of goal adaptation in adulthood (Greve et al., 2021). Even if these data require longitudinal replications in order to be able to test causal conclusions, biases of the retrospective data are in any case less likely to occur here.

Directions for Future Research

The results presented on the developmental conditions of accommodative coping represent only initial approaches to a theory of lifespan development of accommodative coping. To elaborate a truly lifespan perspective on the development of accommodative coping, longitudinal studies are needed that examine, on the one hand, the extent to which early forms of accommodation (such as RAP) are indeed predictors of adult forms of flexibility in goal adaptation and, on the other hand, which of the necessary causal conditions or the necessary constitutive conditions (e.g., perspective taking, differentiated goal structures) are predictive of adult accommodative coping.

Moreover, it is also necessary to investigate the role of other aspects of children's cognitive, emotional, and social development. One obvious point of departure would be an

investigation of the bridge to Piaget's model of cognitive development. His approach is one of the few "classical" approaches to developmental psychology that, beyond descriptive developmental phases, has in some respects anticipated the "processual turn" precisely by emphasizing the fundamental adaptation processes of accommodation and assimilation (and the principle of equilibration regulating both; Chapman, 1988). Even though the two-process model of developmental psychology decidedly does not investigate the adaptation of cognitive schemata but of goals, desires, and evaluations, the search for convergences is promising. This concerns, for instance, the plausible parallel between the respective regulatory approach (IS-OUGHT discrepancy or disequlibrium), but also the question of what the enabling or necessary conditions for an accommodative adaptation of a goal or a schema could be (attentional expansions, availability of alternative cognitive schemata, etc.). At the same time, this comparative view could also open up interesting theory extension options in both approaches: On the one hand, with respect to Piaget the investigation of stable, possibly cross-phase interindividual differences in the readiness to react accommodatively to a discrepancy (i.e., disequilibrium) is actually missing so far and could be empirically promising. On the other hand, with respect to the two-process model especially the question of the regulation of the interplay of the two process modes – for instance in the sense of an equilibrium – would be an important and also so far empirically unaddressed research question. The focus of these considerations goes beyond the identification of convergences of two theories arguing in terms of processes in a terminologically similar fashion: They could illustrate how the integration of approaches arguing (so far) in terms of life stages can contribute to the development of truly lifespan-spanning theories. For example, the question of what role individual differences in the readiness to adapt schemas accommodatively play for the development of accommodative self-regulatory abilities in adulthood would be a possible (again, only illustrative) starting point.

A second line of theoretical argumentation concerns the measurement of accommodative processes. Currently, the vast majority of available findings are based on self-report measures that are not only likely to be subject to biases in self-perception and self-presentation, but in particular, even in the valid case, can only capture the representation of dispositional competencies. Moreover, as mentioned earlier, this places limits on the assessment of accommodative reaction forms in childhood. Most importantly, accommodative processes have almost never been captured explicitly. To this end, it is necessary to develop methods for assessing accommodative regulatory processes that are not based on self-reports, but rather measure the adaptation of goals or evaluations entailed in accommodative regulations more directly (e.g., using cognitive psychological "subpersonal" procedures; Rothermund et al., 2020). This could perhaps also facilitate or enable the recording of early forms of accommodative responses in infancy (e.g., by adapting experimental or observational methods from research on emotion or attention regulation). For this research perspective, it might also be possible to use indications that self-adaptive forms of reaction might be socially valued differently in different sociocultural contexts and – as a result of different social reactions – might also be functional differently for reducing individual burdens (Chun et al., 2006; Wong et al., 2006). Moreover, there is the need to experimentally investigate processes of goal disengagement and reengagement in order to better substantiate causal conclusions. These could be, for example, experimental setups in

which accommodative processes are acutely favored (Leipold et al., 2014), but should in particular combine the systematic initiation and subsequent blocking of goal setting with testing the functionality of accommodative adaptations (Rühs et al., 2022).

The goal of better understanding the development of accommodative coping over the lifespan is interesting and important in its own right – for example, for early support in childhood. Beyond that, such a theory could be a building block of an actual lifespan theory from a processual perspective on human ontogeny.

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16 The Development of Temperament, Personality Traits, and Coping in Childhood and Adolescence

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Introduction

Children and adolescents face a wide range of stressors that they need to cope with, including daily challenges – like peer rejection, conflict with parents, difficult schoolwork, poverty, or violence – and more major life events – like parental divorce, illness, a big move, or more large-scale catastrophes. In the face of these many different types of adversity, youth develop coping strategies – "conscious volitional efforts to regulate emotion, cognition, behavior, physiology, and the environment in response to stressful events or circumstances" (Compas et al., 2001, p. 89). At the same time, other aspects of youth's personalities are under construction as well; children's more basic early temperamental traits begin to develop into broader personality traits as children transition from infancy and toddlerhood into the preschool and middle childhood years (Shiner & Caspi, 2012). The present chapter addresses the complex links between youth's temperament and personality traits and their emerging coping styles in the first two decades of life.

In this chapter, we adopt the perspective that temperament and personality traits and coping are important and distinct domains of individual differences starting in childhood and that these two domains continue to develop and mutually affect each other throughout childhood, adolescence, and adulthood. We begin the chapter by defining temperament and personality traits and coping strategies and by articulating a framework for understanding the emergence of traits and coping in childhood and adolescence. Second, we review what is known about the associations between temperament and personality traits and coping strategies and about patterns of normative or mean-level development in these two domains in childhood and adolescence. Third, we describe five processes that potentially link stress, temperament and personality traits, and coping over time, and we offer empirical illustrations of each process. Fourth, we suggest that the emergence of life narratives in adolescence is likely to be another, more integrative personality process that enables young people to cope with adversity. Finally, we conclude by offering suggestions for future research in this area; there is relatively little research probing the links between temperamental and personality traits and coping strategies in children and adolescents, so there remains much to be learned about their joint development in the first two decades of life.

Definitions and a Theoretical Model: The Emergence of Temperament and Personality Traits, Coping, and Narrative Identity in Childhood and Adolescence

In this chapter, consistent with the views of contemporary personality research, we adopt

a broad perspective on what constitutes personality across the life course: "Personality refers to an individual's characteristic patterns of thought, emotion, and behavior, together with the psychological mechanisms – hidden or not – behind those patterns" (Funder, 2019, p. 5). Thus, personality is much more than temperament and personality traits and includes attachment styles, emotion regulation, goals and motivations, interests, values, life narratives, and, yes, individual differences in coping as well (Funder, 2019; McAdams, 2013). For many years, researchers and laypeople alike assumed that personality differences, particularly personality traits, are highly stable across time. However, research over the past two decades has demonstrated convincingly that personality, including personality traits, changes throughout childhood and adolescence, and that such changes continue well into adulthood (McAdams et al., 2019). For example, personality traits show normative patterns of mean-level change as people grow older, and findings for rank-order stability of traits likewise indicate that people change in their relative standing on traits, even in adulthood (Caspi et al., 2005; Shiner, 2021). In short, personality encompasses a wide range of individual differences beyond simply personality traits, and these individual differences are worthy of developmental study in childhood and adolescence.

McAdams and colleagues (McAdams, 2013; McAdams & Olson, 2010) have articulated a model for personality development that helps to situate temperament and personality traits and coping within a broader framework of personality differences. In this model, the young person is seen as developing three distinct layers of personality, each emerging in sequence over time from early childhood through adolescence and early adulthood: first, the young child as *actor*, displaying easily observable temperament and personality traits; next, the school-aged child as *agent*, a motivated person who pursues goals, develops values and interests, and copes with stress and challenges; and, finally, the adolescent and young adult as *author*, who crafts a narrative identity that engenders a sense of unity and purpose.

As *actors*, starting early in childhood, children begin to display traits – patterns of thinking, feeling, and behaving that tend to be relatively consistent across time and situation (Allport, 1937). Traits are influenced by genetic and neurobiological processes, as well as by environments and life experiences (Polderman et al., 2015). Early emerging traits tend to be conceived of as temperament traits, which are defined as more basic, biologically based individual differences (Shiner et al., 2012) and which include the traits of surgency (or positive emotionality), negative emotionality, and effortful control (Rothbart et al., 2001); these three temperamental traits are roughly similar to three of the later Big Five personality traits of extraversion, neuroticism, and conscientiousness, respectively (Shiner & DeYoung, 2013). Early temperament also likely includes precursors to two other later personality traits of agreeableness and openness to experience (Shiner & DeYoung, 2013).

In contrast with temperament, personality traits encompass a broader range of individual differences that emerge more fully from earlier temperament and become more consolidated in the preschool or school-age years; these traits are structured as the Big Five personality traits of extraversion, neuroticism, conscientiousness, agreeableness, and openness to experience/intellect (De Pauw, 2017; Soto & Tackett, 2015). Temperament and personality traits have more in common than they have that makes them different, and they include highly overlapping sets of tendencies (Shiner & DeYoung, 2013). *Surgency*, *positive emotionality*,

and *extraversion* include sociability, energy, positive emotions, and eager approach of potentially rewarding situations. *Negative emotionality*, *negative affectivity*, and *neuroticism* include propensities toward a wide range of negative emotions including fear and anxiety, sadness, irritability, frustration, and insecurity. *Effortful control* and *conscientiousness* include aspects of self-control – planfulness, persistence, impulse control, and self-regulation; conscientiousness also includes tendencies toward organization, dependability, and pursuit of high standards. *Agreeableness* includes concern for others, respectfulness, and trust at the high end and egocentrism, hostility, and mistrust at the low end. *Openness to experience/intellect* includes curiosity, imagination, and perceptiveness. Because of the close ties between temperament and personality traits, we discuss them side by side throughout this chapter.

Children's temperament traits emerge in infancy and begin to show moderate stability by the preschool years (Shiner et al., 2012); they therefore seem likely to affect children's development of coping strategies for managing stress. Temperament and personality traits also seem likely to affect the coping skills children and adolescents develop because traits shape children's tendencies toward reactivity in the face of stress and their emerging capacities for self-regulation (Rothbart, 2011). For example, extraversion reflects reactivity to potential rewards (especially social rewards), neuroticism reflects reactivity to potential threats and punishments, and openness reflects reactivity to complex, novel, and interesting stimuli (Shiner & DeYoung, 2013). Effortful control and conscientiousness shape individual differences in capacities for effortful self-regulation, and agreeableness involves regulation in service of maintaining positive relationships with others (Shiner & DeYoung, 2013). Coping involves a balance between stress reactivity and regulation (Skinner & Zimmer-Gembeck, 2016); because temperament and personality traits affect both reactivity and regulation, they likely play an important part in the coping strategies children develop for managing stress.

By the middle childhood years, following what is called the 5- to 7-year shift (Sameroff & Haith, 1996; White, 1965), children become motivated *agents*; children become more self-directed and self-motivated because of their increasing ability to think about the future, consider alternative options, solve problems on their own, and adopt multiple perspectives simultaneously (Del Guidice, 2014). As agents, youth begin to actively pursue their own goals, cultivate their guiding values, and develop their interests (Shiner, Soto & De Fruyt, 2021). According to McAdams' model (McAdams & Pals, 2006), these aspects of personality are likely to vary more across time and situation than are traits because they are more specific to particular contexts, roles, or developmental stages.

Individual differences in coping are yet another important aspect of children's agency. Although younger children have both involuntary and voluntary means of coping, coping strategies become especially important in middle childhood as children become more active agents pursuing their own value-driven goals (Compas et al., 2001). Youth develop coping strategies as a means of dealing with both acute stresses and chronic adversity; these strategies are controlled, conscious, and goal-directed efforts to regulate behavior, cognition, emotion, physiology, or the environment in stressful conditions (Compas et al., 2001, 2014; Connor-Smith & Flachsbart, 2007; Skinner & Zimmer-Gembeck, 2007). Similar to other aspects of personality related to the child as agent, youth's use of coping strategies may vary across contexts, roles, or developmental stages (Skinner & Zimmer-Gembeck,

2007; Zimmer-Gembeck & Skinner, 2011). For example, children and adolescents may use certain coping strategies in academic versus home contexts, in the role of student versus friend, or during childhood versus adolescence.

Although there is reasonable consensus about the structure of temperament and personality traits, there is less consensus about the structure of coping strategies. However, there is considerable support for a hierarchical structure with three broad domains encompassing multiple specific strategies (Compas et al., 2017; Connor-Smith & Flachsbart, 2007). First, *primary control* includes approach-oriented, active strategies for directly addressing the source of stress or one's own emotions. One important type of primary control involves the use of problem-solving strategies in which a person generates possible solutions, decides among those options, and plans a response. An especially important set of primary control strategies includes the seeking of social support in terms of emotional (comfort, empathy, closeness) or instrumental (help, resources, or advice) support. Second, *secondary control* enables a person to change one's relationship to the stressor through strategies like acceptance, reappraisal, or distraction. Third, *disengagement* coping encompasses a wide variety of avoidance-oriented attempts at distancing oneself from the stressors or one's emotions (e.g., withdrawal, denial, wishful thinking, substance abuse). Both primary and secondary control are seen as *engagement* strategies that are approach-oriented responses, in contrast to the *disengagement* strategies that involve an avoidance-oriented response. We use this taxonomy whenever possible in the rest of the chapter.

Finally, in adolescence, youth begin the process of becoming *authors* as they begin to develop a narrative identity (McAdams & McLean, 2013; McLean & Lilgendahl, 2019), a life story that integrates their previous experiences with their goals, values, and imagined future into a more coherent whole. Youth begin to develop particular themes, styles of autobiographical reasoning, and distinctive structures in their emerging narrative identities. Life narratives offer another, more complex means of coping with adversity as young people enter adulthood (McLean & Lilgendahl, 2019). We elaborate more on this domain of personality later in the chapter.

Empirical Links between Personality Traits and Coping Strategies: What Are the Consistent Associations and the Patterns of Normative Change across the Two Domains of Personality?

Associations between Personality Traits and Coping Strategies

Before considering the multiple processes through which temperament and personality traits and coping may be linked developmentally, it is important to establish the strength and patterns of relationships between traits and coping. We discuss here, first, the associations observed between personality traits and coping strategies in two meta-analyses, and second, the patterns of normative change in the two domains.

The most complete picture of the associations between the Big Five personality traits and coping strategies comes from a meta-analysis by Connor-Smith and Flachsbart (2007; see also Carver & Connor-Smith, 2010 for a review of the findings). The 165 samples included only 22 samples of participants aged 17 and younger; 70 samples were ages 18–25 years, mostly college students. Most of the studies assessed personality traits and coping concurrently. Overall, the sizes of the associations between personality traits and coping

were small or, rarely, moderate, but the associations were larger in younger samples, perhaps because coping may be more driven by early traits before youth have had opportunities to try out and hone a variety of coping strategies.

Extraversion was linked with many different primary and secondary control engagement strategies (problem-solving, all types of social support, distraction, and reappraisal), but not with any disengagement strategies. Neuroticism was linked negatively with problem-solving, reappraisal, and acceptance and positively with emotional social support and distraction, as well as robustly positively with a wide range of disengagement strategies (denial, wishful thinking, withdrawal, focus on negative emotions, and substance abuse). Neuroticism's medium-size correlations with disengagement coping were the largest in the meta-analysis. Conscientiousness was linked positively with many engagement strategies (problem-solving, instrumental social support, emotion regulation, reappraisal) and with religious coping and was linked negatively with many disengagement strategies (denial, negative emotion focus, and substance abuse). Agreeableness was linked positively but very modestly with many engagement strategies (problem-solving, all types of social support, reappraisal, and acceptance) and negatively with several disengagement strategies (denial, negative emotion focus, and substance abuse). Openness to experience was modestly positively linked with numerous engagement strategies (problem-solving, all kinds of social support, emotion regulation, and reappraisal), as well as positively associated with withdrawal and negatively with religious coping. Overall, the associations were stronger for stressed samples and for studies where coping was assessed dispositionally, rather than in a situation-specific manner.

A more recent meta-analysis (Barańczuk, 2019) examined the associations between the Big Five personality traits and emotion regulation strategies. There is some overlap between emotion regulation and coping; both involve regulatory processes, and some coping strategies involve emotion regulation (Compas et al., 2014, 2017). Overall, the meta-analytic associations between personality traits and emotion regulation were modest to moderate in size and were strikingly similar in their overall pattern to the results obtained by Connor-Smith and Flachsbart (2007). Again, out of all the associations, the correlations between neuroticism and ineffective emotion regulation strategies were the strongest. Interestingly, the correlations between personality traits and emotion regulation were again larger in younger samples, giving additional support to the possibility that personality traits and coping are more strongly associated in children and adolescents than in adults.

Thus, across these two meta-analyses, the results demonstrate theoretically sensible but generally modest associations between personality traits and coping. However, the stronger associations of personality traits and coping strategies seen in young people in both meta-analyses indicate that it may be especially important to study the processes linking these two domains of individual differences earlier in development.

Normative Changes in Temperament and Personality Traits and Coping

Beyond the simple associations of personality traits and coping strategies, it is useful to consider whether there are similar patterns seen in normative changes in these domains in youth. Normative changes involve changes in the average or mean levels of individual differences with age (Caspi et al., 2005). The rapid and substantial changes that youth experience at biological, cognitive, emotional, and environmental levels, particularly during

transitional periods, seem likely to affect the mean levels of both temperament and personality traits and coping strategies. We consider, first, normative changes in temperament and personality traits and, second, normative changes in coping strategies. As noted earlier in the chapter, temperament and personality traits are no longer seen as fixed and entirely stable, but rather are viewed as being constructed over time through the influence of genetic, environmental, and transactional processes (Caspi et al., 2005; Shiner et al., 2012); thus, normative changes are expected in both traits and coping in childhood, adolescence, and early adulthood.

During the first several years of life, extraversion, negative emotionality, self-control and attention (aspects of effortful control), and empathy and prosocial behavior (aspects of agreeableness) all seem to increase overall (reviewed in Shiner, 2021). Then, during the preschool years and middle childhood, several patterns are observed: Extraversion and openness tend to decrease; the internalizing aspects of neuroticism (e.g., fear, sadness) may increase in the beginning of middle childhood and the externalizing aspects (e.g., irritability) may decrease or be stable; and mixed patterns are observed for conscientiousness and agreeableness, though attention and concentration do seem to increase (Shiner, 2021). However, there are too few studies to be able to draw firm conclusions about mean-level change in early and middle childhood.

Far more studies have examined mean-level change in adolescence, and many have provided support for what is termed the *disruption hypothesis* (Denissen et al., 2013; Soto & Tackett, 2015) – namely that, during the transition from late childhood to adolescence, some negative personality changes take place, followed by increasing personality maturity in the transition to adulthood. Youth decrease in conscientiousness and agreeableness, and they may continue the decline in extraversion and openness that seems to start in middle childhood. Girls often show an increase in neuroticism, whereas boys remain stable or decrease on this trait. Later in adolescence, youth increase on conscientiousness and agreeableness and decrease in neuroticism – a pattern that often continues into early adulthood.

The patterns for mean-level change in coping strategies show both convergence and divergence with the patterns for personality traits (reviewed in Skinner & Zimmer-Gembeck, 2007; Zimmer-Gembeck & Skinner, 2011). By preschool age, children already use four families of coping strategies that remain prominent throughout childhood and adolescence: support-seeking, problem-solving, behavioral escape or avoidance (if it is an option), and distraction when other options are not available. In middle childhood, especially following the 5- to 7-year shift, children's coping becomes more differentiated and includes more cognitive strategies that enable greater self-reliance; there tends to be a decline in escape and maladaptive coping. Across adolescence, youth increase in their capacities for several positive coping strategies: planful problem-solving, the use of cognitive and behavioral distraction tactics, and more sophisticated emotion regulation. In early adolescence, though, youth sometimes use fewer positive strategies like help-seeking and employ negative strategies like cognitive escape, rumination, blaming others, and venting. It seems possible that there may be some interplay between the development of youth's Big Five personality traits and their coping strategies. In middle childhood, there is some evidence that children gain in their skills in self-regulation in terms of both personality traits and coping, whereas there may be a dip in self-regulation across the two domains in the early part of adolescence, with

positive changes to follow again later in adolescence.

Processes Linking Temperament and Personality Traits, Stress, and Coping Strategies over Time

As the meta-analytic work makes clear, there are modest and sometimes moderate associations between temperament and personality traits and coping strategies. There are many different reasons why traits and coping may come to be associated with each other, and we explore those potential processes in this section. We describe each hypothesized process and then offer empirical examples of each type, drawing when we can from the developmental literature. A summary of those processes is shown in Table 16.1, along with examples of each process. Figure 16.1 presents those same processes in temporal form, depicting how temperament and personality traits may be linked with the stress → appraisal → coping → outcome chain of experiences.

First, temperament and personality traits may shape youth's exposure to stressful life events, which in turn shapes youth's need for coping. Second, temperament and personality traits shape youth's appraisals of the stressors that they encounter in terms of whether the stressors are seen as threats or challenges. Third, traits shape a young person's choice of which coping strategies to adopt in response to stressors. Fourth, coping strategies moderate the effects of traits on youth's outcomes (e.g., competence, psychopathology, and well-being); in other words, particular combination of traits and coping strategies may interact to predict youth's outcomes. Fifth and finally, coping strategies have transactional effects on temperament and personality traits, such that the use of particular coping strategies leads to changes in youth's traits over time.

It is important to note that these processes linking traits and coping may produce vicious or virtuous cycles over time. In a vicious cycle, more challenging temperament or personality traits like negative emotionality/neuroticism may lead youth to experience more stressful

Table 16.1 *Processes linking the development of temperament and personality traits with stress and/or coping*

Process linking temperament and personality traits with stress/coping	Example
Traits affect exposure to stressors.	Youth with lower agreeableness may generate more stressful life events for themselves.
Traits affect appraisals of stressors as challenges vs. threats.	Youth with higher extraversion may appraise stressful situations as challenging rather than threatening.
Traits shape the coping strategies used in response to stress.	Youth with higher conscientiousness may use more problem-solving coping because they are better at planning and persevering.
Traits and coping interact to shape adaptation.	Youth with greater effortful control may be less likely to become depressed after ruminating about bad experiences than youth with lower effortful control.
The repeated use of coping strategies affects change and stability in traits.	Youth who use problem-solving coping strategies may experience decreases in neuroticism-related tendencies over time.

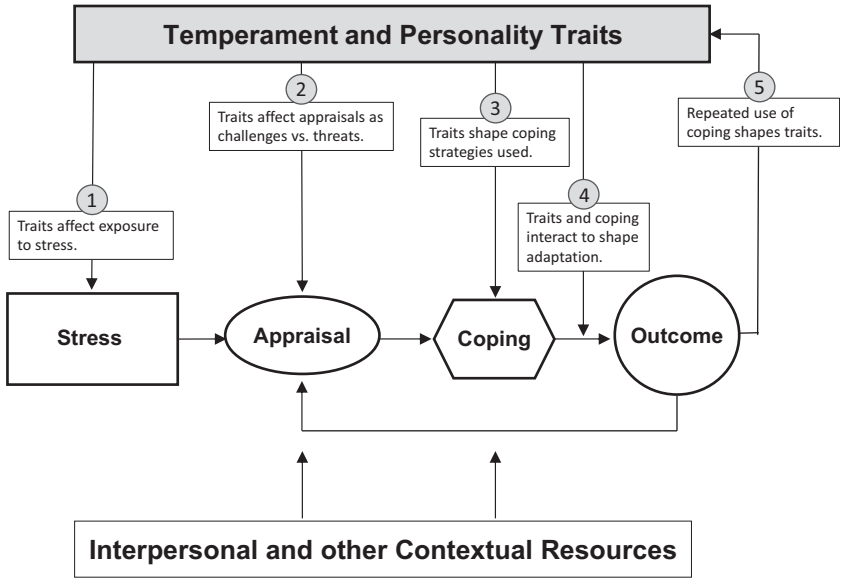

Figure 16.1 A temporal model of the processes linking temperament and personality traits with stress and coping.

events, cause them to perceive such events as more threatening, predispose them to use more disengagement strategies for managing stress, and eventually cause them to experience more negative outcomes from stressful experiences (Shiner, 2019); and these more negative outcomes may in turn cause such youth to become even higher on negative emotionality/neuroticism over time. In a virtuous cycle, more positive temperament or personality traits like effortful control or conscientiousness may predispose youth to experience each step of the stress and coping process in a more positive way, leading to more positive outcomes over time. Thus, rather than seeing each stage of the stress and coping process as distinct, they should be seen as interconnected.

Temperament and Personality Traits Affect Youth's Exposure to Stressors

In the first stage of the stress and coping process, youth with particular personality traits may, through their own tendencies, come to experience particular types of stress and adversity more often, which results in the need for greater coping efforts. Developmental psychologists have recognized for decades that people shape their environments in part through their genetically influenced tendencies (Scarr & McCartney, 1983). Youth do so in part by behaving in particular ways that in turn evoke varied responses from other people; for example, a child who is low on agreeableness may evoke greater conflict with others, an experience that is stressful for most people. Youth also shape their environments by "selecting" themselves into certain environments. This selection process may be conscious in cases where youth deliberately choose particular environments, for example, when an extraverted adolescent purposefully chooses to go to parties to meet his needs for socializing. The selection processes may also be unintentional or unconscious; for example, an adolescent who is low on conscientiousness

may drop out of high school and may therefore find herself in stressful environments where she has fewer resources available. Researchers investigating depression have applied similar ideas to their study of depression by developing the *stress generation hypothesis*, which is the claim that people with a history of depression tend to generate more stressful experiences in their day-to-day lives by virtue of their own depressive actions (Hammen, 1991; Liu, 2013). The stress generation hypothesis has been well-substantiated in samples of youth and adults over the past several decades (Hammen, 2018).

Youth's temperament and personality traits are likely to affect their exposure to stressful life events through similar processes, including through the responses that they evoke from others and through the environments they select themselves into. A number of longitudinal studies have now demonstrated that youth's personality traits shape their exposure to stressful life events over time. The personality traits of negative emotionality and neuroticism in adolescence are predictive of different types of stressful life events over time, including episodic life stress (Uliaszek et al., 2012), acute and chronic interpersonal life stress (Stroud et al., 2015; Uliaszek et al., 2012), and negative life events and long-term difficulties (Jeronimus et al., 2014). There is likewise evidence across multiple samples that effortful control and self-control in childhood and adolescence predict reductions in stressful life events over time (Galla & Wood, 2015; Laceulle, Jeronimus, et al., 2015; Laceulle, van Aken, et al., 2015; Ong et al., 2019). There is some evidence that temperamental traits linked with extraversion and low agreeableness may predict greater exposure to stressful life events in adolescence (Laceulle, van Aken, et al., 2015), including stress resulting from romantic relationships for extraversion and stress in peer and family relationships for lower agreeableness (Laceulle, Jeronimus, et al., 2015).

There is thus convincing evidence in youth for the role of neuroticism and poor self-control in the generation of stressful life experiences and some more limited evidence for the role of other traits as well. The experience of stressful life events may in turn have negative effects on personality development, for example, by increasing youth's levels of neuroticism (Jeronimus et al., 2014; Shiner et al., 2017) or decreasing their self-control (Laceulle, van Aken, et al., 2015; Ong et al., 2019). Some of the existing research has documented more complex pathways linking neuroticism and poor self-control with later internalizing disorders via the mediating role of stress generation (Snyder & Hankin, 2016; Uliaszek et al., 2012). For a more complete understanding of the process of temperament and personality traits in stress generation, it would be helpful for future research to also examine the complete mediational model of traits ➔ stress generation ➔ coping strategies.

Temperament and Personality Traits Affect Youth's Appraisal of Stressors as Challenges versus Threats

Youth's temperament and personality traits may affect their interpretation and appraisal of potentially stressful situations. Appraisal processes can be defined as a person's assessment of their experiences and the implications of that assessment for the person's well-being and capacity for coping with these experiences (Lazarus & Folkman, 1984). Appraisal processes likely play a key role in children's and adolescents' vulnerability to the experience and impact of stress.

Individual differences in appraisal are likely to be affected by youth's temperament and personality traits. When stressful events occur, individuals subjectively evaluate the stressor as

a challenge or a threat (Jamieson, 2017; Lazarus & Folkman, 1984). Evaluating the stressor as a challenge (i.e., something one can handle) comes with the expectation of gain or mastery over the situation. Evaluating the stressor as a threat (i.e., not having adequate resources to deal with the stressor) causes individuals to feel overwhelmed. Temperament and personality traits seem likely to affect whether a stressor is seen as a challenge or a threat, given that personality traits have important effects on how people interpret the situations that they encounter (Caspi & Shiner, 2006). In the following, we review evidence for how each of the Big Five personality traits shapes the appraisal of stressors; we primarily include studies of adolescents and young adults because fewer studies have examined the appraisal process in children.

Of all the Big Five personality traits, neuroticism is of particular importance in the context of appraisal. Neuroticism is described as the relatively stable tendency toward negative affectivity and emotional distress (McCrae & Costa, 1987). Given that neuroticism involves reactivity to a wide range of negative stimuli (Shiner, 2019), the personality trait is likely to lead people to interpret stressful situations in a more negative way. Schneider et al. (2012) found that higher levels of neuroticism in an undergraduate sample were related to lower state positive affect and higher state negative affect after completing a stressful task, as well as higher threat appraisals. Moreover, neuroticism in adolescents is associated with greater levels of perceived stress (Kiekens et al., 2015), worrying, and more reported symptoms of illness (Van de Ven & Engels, 2011). By focusing on negative elements of situations, individuals high on neuroticism tend to experience stressors in a more threatening way that undermines their sense of being able to cope effectively and that may lead them to use more disengagement strategies like rumination. Given that threat appraisals arise from the sense that one has inadequate resources to cope (Lazarus & Folkman, 1984), and individuals high in neuroticism tend to use ineffective coping strategies (Connor-Smith & Flachsbart, 2007), people high on this trait may indeed have both more distress to manage and fewer available resources for managing stress.

In contrast to the findings linking neuroticism with threat appraisals, extraversion appears to be associated with challenge appraisals. Extraversion, the tendency toward positive affectivity, sociability, and assertiveness (McCrae & Costa, 1987), is usually correlated with happiness, pride, and self-satisfaction, and negatively correlated with stress and fear (Penley & Tomaka, 2002). Someone who is high in positive affectivity may be more inclined to recognize possible positive outcomes of events, making it likely that this person feels able to cope with stressful situations. Considering extraversion as a sensitivity to reward, extraverts may see stressful situations as an opportunity for reward when dealt with successfully. Accordingly, extraversion has been found to be positively related to challenge appraisals of academic stressors in university students (Gallagher, 1990) and in adolescents (Mak et al., 2004).

Openness involves having a curious and creative thinking orientation (McCrae & Costa, 1987) and has been associated with lower perceived stress in undergraduates (Penley & Tomaka, 2002). Schneider et al. (2012) found that openness was negatively related to threat appraisals and marginally positively related to challenge appraisals in undergraduates. The tendency toward exploring new situations fosters an approach orientation to stressors that are unfamiliar (Schneider et al., 2012). By being open to new experiences, even those that may be stressful, one may feel better able to deal with stressors and see them as

challenges rather than threats. Less is known about how conscientiousness and agreeableness are related to stress appraisal. Conscientious persons, being self-disciplined, ambitious, and goal-oriented (McCrae & Costa, 1987), seem to describe situations in a more positive way by highlighting positive aspects of the situation. Similarly, agreeable persons, being trustworthy, sympathetic, and cooperative (McCrae & Costa, 1987), pay less attention to discomfort and try to see the positive aspects of stressful situations (Van de Ven & Engels, 2011). Research also shows that agreeableness is related to less perceived stress in adolescents (Kiekens et al., 2015). In a systematic review of adults, however, Kilby et al. (2018) reported that only one study found a negative relationship between agreeableness and threat appraisal (Shewchuk et al., 1999), but this was not replicated in other studies. It is possible that conscientiousness and agreeableness may each include facets that relate to stress appraisal in different ways. For example, conscientious youth usually have high effortful control, which enables them to feel relaxed and in control in challenging situations (Oldehinkel et al., 2011). In contrast, the perfectionistic side of conscientiousness may cause greater distress in stressful situations (e.g., Zureck et al., 2015).

Taken together, in samples of adolescents and young adults, the following links have been found: neuroticism with higher threat appraisals, extraversion with higher challenge appraisals, and openness with lower threat appraisals and higher challenge appraisals. Less is known about how conscientiousness and agreeableness relate to stress appraisals. Finally, it is important to note that personality traits may affect individuals' reactivity to stressors in ways that go simply beyond their effects on stress appraisals; personality traits may also shape a wide range of other emotional, cognitive, and behavioral processes in response to stressors (Derryberry et al., 2003).

Temperament and Personality Traits Shape the Coping Strategies Youth Adopt in Response to Stressors

Temperament and personality traits relate not only to how people perceive stress, but also to the coping strategies that they adopt in reaction to stress (Parker & Wood, 2008). In an early theoretical framework for personality trait-coping relationships, Bolger and Zuckerman (1995) termed this association the *differential coping-choice model*. As noted previously, meta-analytic results make it clear that personality traits are associated with particular coping strategies (Connor-Smith & Flachsbart, 2007; Barańczuk, 2019), and these results have typically been interpreted to mean that personality traits affect the coping strategies people adopt (e.g., Carver & Connor-Smith, 2010). A handful of studies have investigated the mediating role of coping strategies in the association between personality and life outcomes in young people. These studies represent an extension of the differential coping-choice model in that they have tested whether personality traits predict coping strategies, and whether those coping strategies in turn predict competence, psychopathology, or well-being. Nearly all of these studies have been cross-sectional, rather than longitudinal, so the evidence for possible causal relationships is relatively weak, but the results do point to patterns worthy of future investigation. In the following, we offer some potential explanations for why personality traits may lead youth to adopt particular coping styles and describe some of the limited evidence for possible temperament/personality trait → coping strategies → adaptation pathways.

Extraversion has many features that may promote the development of engaged and active means of coping. Assertiveness and approach tendencies might facilitate problem-solving, while positive affect might facilitate

cognitive restructuring (Carver & Connor-Smith, 2010; Connor-Smith & Flachsbart, 2007). Furthermore, extraverted youth may have larger and more connected social networks they can call on for emotional or instrumental support (Carver & Connor-Smith, 2010; Kalka & Karcz, 2020). Studies on the mediating role of coping have also found that the engagement coping strategies of extraverts may lead to positive outcomes. For example, Evans et al. (2018) found in a sample of adolescents that extraversion was associated with productive coping, which predicted school satisfaction and subjective happiness 6 months later. Similarly, in a cross-sectional study of middle schoolers, Lyons et al. (2016) found that extraversion was associated with approach coping, which in turn predicted greater life satisfaction.

As noted previously, a substantial body of research has demonstrated that neuroticism is related to disengagement coping strategies, such as withdrawal, avoidance, and wishful thinking (Carver & Connor-Smith, 2010; Connor-Smith & Flachsbart, 2007; Evans et al., 2018; Lyons et al., 2016). A study of middle school-age youth (Zimmer-Gembeck & Skinner, 2015) found that, in anticipating how they would cope with two peer rejection scenarios, adolescents with greater social anxiety (which can be considered as an important manifestation of higher neuroticism) expected to use more disengagement strategies, and those with more depressive symptoms expected to use fewer engagement strategies. As described in the preceding section, neuroticism predicts a tendency to perceive stressors as threats. Threat appraisals are related to greater use of emotion-focused coping (Penley & Tomaka, 2002) and disengagement strategies, likely because those strategies enable people to escape and be relieved of the perceived stress more quickly (Kilby et al., 2018; Lengua et al., 1999). Disengagement coping strategies are typically maladaptive and ineffective (Compas et al., 2017), which may cause youth with high levels of neuroticism to experience even more stress, generating a vicious circle of stress and ineffective coping. In the short term, disengagement from stressors reduces distress, which in turn may dampen the motivation to cope with the stressor using engagement strategies or may prevent people from experiencing the effectiveness of engagement coping.

The self-discipline that accompanies conscientiousness (e.g., persistence, organization, and goal orientation) facilitates strategic planning (Kalka & Karcz, 2020) and productive coping in general (Evans et al., 2018). These same qualities may also motivate youth to productively engage with stressors, resulting in active (Taylor et al., 2018) and engagement coping strategies (Valiente et al., 2009). The skills that conscientious people have are helpful not only in developing effective coping strategies, but also in identifying and adapting to stressors that may arise in the future (Straud et al., 2015). Youth who can regulate themselves well may be less prone to becoming overwhelmed when experiencing stress and thus may be better able to calmly think of the best strategies for coping. For example, in a longitudinal study of Mexican-origin youth, effortful control, which we view as a proxy for trait conscientiousness, predicted positive changes in the use of engagement coping strategies over time, potentially counteracting the negative effects of economic hardship (Taylor et al., 2018). Likewise, a longitudinal study of elementary school-age children found that effortful control predicted better regulation of frustration, which in turn predicted lower levels of conduct problems and depression (Zalewski et al., 2011). In contrast, poor cognitive control seems to be related to the generation of more stress by increasing rumination, leading in turn to greater anxiety and depression (Snyder & Hankin, 2016).

Fewer studies of youth have examined the links between agreeableness and openness and coping strategies, beyond concurrent studies assessing personality traits and coping. As noted previously, links between agreeableness and coping are modest (Connor-Smith & Flachsbart, 2007). The qualities of openness may be helpful in reframing situations (cognitive restructuring) and finding creative solutions for problems or addressing problems (Straud et al., 2015). On the other hand, higher openness could also facilitate wishful thinking (Carver & Connor-Smith, 2010).

Thus, there is good evidence linking extraversion with engaged, approach-oriented coping, and this may promote stronger well-being in youth. Neuroticism is associated with ineffective disengagement strategies, perhaps because the trait predisposes youth to perceive stressors as more threatening and distressing. Conscientiousness, typically measured in existing studies as effortful control, predicts the adoption of positive engagement strategies, and there is some longitudinal evidence that these more active strategies promote better outcomes over time. Less is known about how agreeableness and openness come to be associated with coping strategies in youth.

Temperament and Personality Traits and Coping Strategies Interact to Shape Youth's Outcomes

As described in the previous section, Bolger and Zuckerman (1995) proposed that personality traits shape the selection of coping strategies. They expanded on this framework to argue that personality traits not only affect the selection and development of particular coping strategies, but also personality traits shape how effective those coping strategies are – a process they term the differential choice-effectiveness model. This means that some coping strategies may work well for people with certain temperamental or personality traits and be less effective for others with different traits. This may occur for several reasons. First, personality traits may be a buffer for maladaptive coping strategies. In this instance, although the coping strategies adopted may not be effective, a person's personality traits may still result in positive outcomes, such as less distress in daily life. Second, the use of effective coping strategies may be a buffer for personality traits that tend to have negative life outcomes. And third, coping and personality may reinforce each other in a good or bad way, resulting in more positive or more negative outcomes than might be expected from the coping strategies alone. Relatively few studies have focused on these interaction effects for personality traits and coping, so we describe here several examples of such moderation effects in the limited literature available.

Two studies have pointed to the possibility that the effects of avoidant coping may be moderated by personality traits. Bolger and Zuckerman (1995) found in a daily diary study in first-year university students that the use of escape-avoidant coping strategies led to more depression (i.e., feeling sad, hopeless, and discouraged on the next day) but only for students low on neuroticism. For students high on neuroticism, there was no effect of escape-avoidant coping on depression. In this case, young adults with the more generally positive personality trait (i.e., emotional stability) were more vulnerable to the negative effects of using negative coping strategies. In contrast, Lengua and Sandler (1996) found that avoidant coping was related to higher anxiety and conduct problems for children who were low in approach-flexibility, but not for children who were high in approach-flexibility (i.e., meaning positively oriented to change and new situations; can be considered as a proxy for openness). Thus, in this case, youth with more

generally negative personality traits (essentially, markers of lower openness) were more vulnerable to the negative effects of avoidant coping. These two studies provide an interesting demonstration that the same negative coping strategies may have a more negative impact on people when combined with either a more positive or a more negative set of personality traits, depending on the outcome being assessed.

Another interesting example of a moderation effect comes from a study of adolescents tracked over a year (Verstraeten et al., 2009). Higher levels of negative affectivity (considered a proxy for neuroticism) were related to a ruminative response style, which in turn predicted more depressive symptoms 1 year later. However, this mediation effect was only found for adolescents with low effortful control. This means that effortful control might be a buffer preventing rumination and subsequent depression for youth with higher neuroticism. As noted previously, youth high on effortful control are able to implement more effective coping strategies in stressful contexts. Thus, neuroticism might induce stress generation, while effortful control is potentially important in breaking this vicious circle of stress and ineffective coping. As these examples suggest, moderation effects of personality traits and coping are worthy of future study, particularly using longitudinal methods.

Coping Strategies Affect Change and Stability in Youth's Temperament and Personality Traits

A final process linking coping and temperament/personality traits is one in which youth's tendencies to use particular coping strategies may affect stability and change in their temperament and personality traits over time. There are several good reasons to suspect that the regular use of particular coping strategies may affect the development of youth's traits over time. Some coping strategies appear to be more effective than others in mitigating the effects of stress, as shown by the consistent links between types of coping strategies and various adaptive outcomes (Compas et al., 2001, 2017; Modecki et al., 2017). A recent meta-analysis revealed that primary control coping and secondary control coping strategies are related to lower psychological symptoms, whereas disengagement coping, emotional suppression, avoidance, and denial are all related to higher psychological symptoms (Compas et al., 2017). We previously noted that there are longitudinal studies demonstrating a pathway from temperament/personality trait ➔ coping strategies ➔ adaptation as well, providing further evidence that coping strategies predict competence, psychological symptoms, and well-being. Since coping predicts adjustment in the face of stress, it seems highly likely that it likewise shapes the development of youth's personality traits over time, in part because of coping's effects on mitigating stress. Youth's regular use of more positive primary and secondary engagement strategies may have positive effects on trait development, whereas their regular use of disengagement strategies may have negative effects.

One particular means through which coping may affect temperament and personality trait development is through its effects on emotion processing and regulation (Frydenberg, 2014; Wang et al., 2020). The use of particular coping strategies is likely to affect youth's daily experience of emotions. For example, a daily diary study in adolescents found that youth with higher self-control experienced lesser negative emotional responses to daily stress because of their use of problem-focused coping (Galla & Wood, 2015); it seems plausible that the regular use of problem-focused coping could in turn contribute to lower neuroticism over time because of its effects on

negative emotions. Similarly, an experience sampling study with a sample of youth and adults demonstrated distinctive effects of particular coping strategies on changes in positive and negative affect (Pavani et al., 2016). Interventions that target coping skills in youth have significant impacts on emotion regulation, demonstrating the causal role of coping in youth's capacities for managing their emotions successfully (Compas et al., 2014). The chronic use of particular coping strategies may thus affect youth's daily experience of emotions, which in turn may affect the development of their personality traits.

Despite the plausibility of the role of coping in shaping temperament and personality trait development in youth, we found almost no studies examining this sort of process. Perhaps developmental researchers largely think of traits as a cause of coping strategies, rather than as a product of coping strategies, and thus they do not consider traits as an outcome of coping in longitudinal studies. A study by Zimmer-Gembeck (2015) on emotional sensitivity and coping demonstrates the value of examining coping as a potential cause of personality trait change over time. This study examined youth in grades 5–7 three times over the course of 14 months in terms of potential transactions between emotional sensitivity (depression and social anxiety symptoms, plus rejection sensitivity) – a tendency likely related to personality trait neuroticism – and the negative coping strategies of social avoidance and rumination. Results indicated bidirectional effects between emotional sensitivity and the negative coping strategies over time, in which each domain of personality predicted changes in the other over the course of the 14-month study. This study demonstrates the value of examining the impact of particular coping strategies on youth's personality traits in longitudinal studies; future studies should examine the impact of coping strategy use on personality trait development in childhood, adolescence, and early adulthood.

Narrative Identity as an Emerging Means of Coping in Adolescence and Early Adulthood

In this chapter, we have focused primarily on coping as conceived of as the use of conscious coping strategies in response to stress. However, we want to suggest that coping with stress may also take place in later adolescence and adulthood via the development of a narrative identity that helps young people integrate their stressful, painful, or otherwise challenging life experiences into their life stories. As we mentioned previously, the third level of personality in McAdam's (2013) personality model is narrative identity. Adolescents face the developmental task of beginning to construct an identity (Erikson, 1968). Identity includes a sense of a person's self-defined goals, motives, values, and identifications (Klimstra & Denissen, 2017). But identity also includes a *narrative* identity, which is a life *story* that integrates a person's previous experiences with their current goals, values, meaning, and expected future (McAdams & McLean, 2013). Narrative identity thus adds to a person's sense of identity by serving an integrative function that weaves together a person's experiences into a more coherent whole. Narratives help young people begin to figure out who they are, how they came to be that person, what provides them with a sense of meaning, and who they imagine becoming in the future (McLean & Lilgendahl, 2019). Life narratives are assessed through oral interviews or written formats. Participants are asked to describe particular life experiences, and the resulting narratives can then be coded for a number of dimensions (Adler et al., 2017).

Narrative identity is likely to be one important means through which adolescents and young adults cope with stressful life experiences. After young people experience a stressful event, they still need to process, analyze, and make sense of those experiences. In other words, youth face the task of creating meaning out of the stressful episodes in their lives, and it is the way that they process these stressful experiences that will affect their coping with future stressful encounters. Youth's "post-coping assessments" involve the processing of both the events themselves and their own actions and emotions during the events. Through crafting a narrative about those experiences, youth may derive life lessons and may begin to integrate those experiences into their emerging narrative identity.

Research with adults has demonstrated that life narratives play an important role in helping people to maintain positive mental health and well-being when they encounter significant adversities (McLean & Lilgendahl, 2019), particularly life events that are emotionally significant (Pals, 2006). Conversely, there is increasing evidence that different types of psychopathology are associated with particular narrative themes, less coherent narratives, or an absence of meaning-making (Adler & Clark, 2019; Shiner, Klimstra, et al., 2021). Younger adults seem to be at a higher risk for narrating their negative life experiences in terms of contamination sequences (Dunlop et al., 2016) – sequences in which positive experiences become spoiled in some way – and for seeing their narrative selves as damaged by traumas (Lilgendahl et al., 2013). It may thus be particularly important for young people to find more helpful ways of narrating their negative life experiences.

Research points to several aspects of narrative identity as being important for young people in coping with difficult life experiences. Across several studies in which adolescents and young adults from diverse cultures wrote about significant autobiographical memories or turning points, a narrative dimension called *causal coherence* was predictive of greater well-being and/or lower psychopathology (Mitchell et al., 2020; Reese et al., 2017; Waters & Fivush, 2015). Although these narratives did not necessarily address stressful life experiences, turning point narratives often do address life experiences that are challenging in some way. Causal coherence refers to the extent to which the narrator explicitly describes their personality changing as a result of the event; thus, these results suggest that young people who can articulate ways that they have been affected by their significant life events are likely to experience greater well-being and lower levels of psychological symptoms. A narrative study of a small group of high-risk adolescents and young adults from Australia, who had experienced significant family and community adversity, found that it was difficult for these youth to construct a positive sense of identity and meaning from their negative experiences (Noble-Carr & Woodman, 2018). Research with adults, however, suggests that several features of narrative identity may promote more positive coping with stress, adversity, and trauma, including the ability to perceive growth from difficult experiences and to see oneself as having some agency or control over those experiences (Adler et al., 2016; McLean & Lilgendahl, 2019; Tappenden et al., 2022). Narrative research on youth's coping with stress and adversity holds considerable promise for better understanding this later emerging aspect of coping.

Summary and Directions for Future Research

We have made the case in this chapter that temperament and personality traits and coping

strategies are two distinct sets of individual differences by middle childhood and that they continue to develop and mutually affect each other throughout childhood, adolescence, and adulthood. Meta-analytic results demonstrate that the associations between the two domains are typically modest in size, although the links may be stronger in childhood and adolescence than later in life. Research on normative patterns suggests that, across both domains, children may experience growth in self-regulation in middle childhood, followed by a dip in self-regulation in early adolescence and then gradual improvements in later adolescence; however, there may be disjunctions across the two domains in other aspects of mean-level change. We have suggested five ways that temperament and personality traits, stress, and coping may be related developmentally (see Table 16.1 and Figure 16.1): traits affect exposure to stressors; traits affect the appraisal of stressors; traits shape which coping strategies are used; traits and coping interact to shape adaptation; and the chronic use of coping strategies may affect stability and change in traits. Finally, narrative identity – another domain of personality that begins to emerge in adolescence and early adulthood – may also play an important part in helping young people cope with stress and adversity.

The most striking aspect of the developmental research on temperament and personality traits and coping strategies in youth is simply how limited it is! Thus, much remains to be learned about the joint development of traits and coping in the first two decades of life. Each of the big topics reviewed here – the normative patterns of development in both domains, the processes linking the two over time, and the development of narrative identity as a coping strategy – has received far less research than their inherent importance warrants. We were particularly struck by how few studies using high-quality methods and longitudinal designs have examined the five processes linking temperament and personality traits, stress, coping, and various outcomes.

For research on temperament and personality traits and coping strategies to advance, it will be important to attend to two overarching issues. First, both traits and coping should be measured using a variety of different, high-quality methods. Temperament and personality traits are often measured using parent-report questionnaires in children and with self-report questionnaires in adolescents and young adults. In contrast, coping strategies are typically assessed using self-report questionnaires. The study of temperament and personality traits would benefit from the use of a broader range of informant reports, as well as the use of other methods of assessment (e.g., thin-slice assessment, self-report in younger children using creative methods) (Shiner, Soto & De Fruyt, 2021). The field of coping research would benefit from greater consensus about the structure of coping strategies across different age periods, as well as further investigation of informant reports to complement self-reports, and the use of in-the-moment measurements to complement reliance on retrospective reports (Compas et al., 2017). At this early stage of research on traits and coping in childhood and adolescence, the use of self-reports or parent-reports in longitudinal or intensive repeated measures designs would be of great value. But with greater progress in understanding the joint development of traits and coping in youth, the study of these two constructs together would benefit from the assessment of the two domains through more complex methods than simply administering questionnaire measures of both domains to the same informant.

Second, the study of temperament and personality traits, stress, and coping would benefit from the use of designs that could better investigate the developmental processes underlying

the links among these domains. In particular, longitudinal designs with repeated measures of the relevant constructs are needed to test many of the processes outlined in this chapter and in Table 16.1 and Figure 16.1. Longitudinal designs could better determine whether temperament and personality traits shape the coping strategies adopted by youth, whether temperament and personality traits shape exposure to stressors, and whether the chronic use of particular coping strategies affects temperament and personality trait development. Lab-based studies, experimental designs, experience sampling studies, or designs using neuroscience methods could all be used to investigate how temperament and personality traits shape youth's reactivity to stress – including their appraisal processes and other aspects of emotional and cognitive reactivity – as well as the interactive effects of traits and coping strategies on various outcome measures. Intervention studies could also be used to investigate whether temperament and personality traits affect coping and vice versa. All of these strategies have the potential to illuminate the links between these two critical emerging aspects of personality.

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Part V

Social Contexts and the Development of Coping

17 Coping Development as an Everyday Interpersonal Process

Broadening Definitions and Investigations of Coping

Sunhye Bai and Rena L. Repetti

Introduction

Despite a parent's best attempts to protect their offspring from harm, stress is unavoidable and, given supportive circumstances, is even desirable in moderation. The long-term effects of minor stress exposure on health and well-being can be shaped by how children cope with those experiences. We define coping as both volitional and nonvolitional behavioral, emotional, and cognitive responses that manage one's reactions to stress. This chapter presents our rationale for a coping conceptualization that encompasses the unintentional responses that other scholars separate out as involuntary emotion regulation. Children practice coping every day in response to stressors big and small. Coping develops iteratively with repeated exposure to developmentally normative stressors, such as conflict with a sibling over a toy or social rejection at school. We focus on the development of coping, broadly defined, in response to such stressors. By practicing intentional and nonintentional coping strategies daily, children build a foundational set of skills that can promote health, and even help to protect them from the detrimental effects of severe but rare major life stressors or traumatic events in the future.

As summarized in Table 17.1, the first half of our chapter describes how coping is activated in response to emotional and physiological reactions to everyday stressors. Our conceptualization of coping centers on its functions in the moment. The immediate goal of a coping response, whether behavioral, emotional, or cognitive, is to promote recovery from those short-term reactions. Age-appropriate everyday stressors present important opportunities for children to develop effective coping strategies through trial-and-error and practice. We discuss the implications of this research for the conceptualization and measurement of coping. The second half of the chapter describes an interpersonal perspective on coping. Coping frequently involves close others and this is especially true for young children who are still developing the cognitive abilities needed to cope independently and to use complex strategies, such as problem-solving and reappraisal (Eschenbeck et al., 2018; Johnson et al., 2019; Skinner & Zimmer-Gembeck, 2006). Family members and peers can support or interfere with children's attempts to cope. We synthesize research and provide examples that demonstrate how close others are involved in specific coping responses. The implications of an interpersonal perspective for the conceptualization and measurement of coping are then discussed. Our chapter concludes with thoughts about what our perspectives on coping might mean for clinical interventions and the direction of future research on coping development.

Coping in Daily Life

Reactivity and Recovery from Everyday Stressors

Individuals can expect to encounter stressful events nearly every day of their lives. Some face significant adversity such as trauma, natural disaster, or poverty. But daily challenges

Table 17.1 *Three central takeaway messages about coping development as an everyday interpersonal process*

1. **Coping develops iteratively with repeated exposure to developmentally normative stressors.**
   - Daily challenges, such as rejection by peers or difficulty with academic tasks, generate mild distress, as evidenced by temporary increases in negative affect and activation of physiological stress response systems.
   - Coping is activated in response to emotional and physiological reactions to everyday stressors.
   - Coping can mitigate the immediate effects of these stressors, with some strategies being more effective than others in promoting recovery from the stressor, depending on the characteristics of the stressful event, the individual, and the broader social context.
   - Through exposure to a variety of everyday stressors, children acquire a repertoire of diverse coping strategies, gradually learn how to flexibly deploy those strategies, and ultimately improve their ability to recover in a wide range of stressful situations or prevent them entirely.

2. **Coping is a repertoire of skills that facilitate immediate recovery from stress.**
   - Individuals may not necessarily be aware of the connection between their behavior, thoughts, or emotions, and the stressor to which they are responding.
   - A coping response may be experienced as volitional or nonvolitional, or automatic or nonautomatic.
   - A broader definition of coping, that encompasses coping efforts that are used regularly but are not noticed or acknowledged by the individual as a coping response to particular precipitating events enables a more comprehensive assessment of the development of coping.

3. **Coping is a dynamic interpersonal process.**
   - Children often face stressors in a social context, accompanied by peers, family members, and other significant people in their lives.
   - Coping is a set of responses to stressors that often implicate and rely on close others.
   - Family members and peers can support or interfere with a developmental process whereby children become more adept at coping as they encounter and learn to deal with different types of stressful events.
   - Beyond the role that parents play in the socialization of coping, the adaptiveness of various coping strategies depends on how parents, peers, and other coping partners respond in that moment.

are commonplace: failure to capture a caregiver's attention in infancy, rejection by peers in childhood, difficult academic tasks in adolescence, or tensions with romantic partners in young adulthood. Such stressors often generate mild distress, as evidenced by temporary increases in negative affect, arousal in physiological stress response systems, and activation in specific regions of the brain (Bai et al., 2017; Santiago et al., 2017; Vijayakumar et al., 2017). Short-term patterns of stress reactivity and recovery can be captured in the laboratory. In the popular Trier Social Stress Task, children typically exhibit an increase in the stress hormone, cortisol, when confronted with a social evaluative threat, and a decline when debriefed about the true intent of the task (Kirschbaum et al., 1993; Seddon et al., 2020).

More recently, studies using intensive longitudinal methods have examined reactivity to, and recovery from, naturally occurring stressors in the context of daily life. Many investigations have shown that children react to these quotidian stressors with temporary elevations in negative affect, declines in positive affect, and elevations in physiological markers of

stress assessed within minutes or hours (Bai et al., 2017; Lippold et al., 2016; Santiago et al., 2017). Some may continue to experience higher levels of negative affect and lower levels of positive affect at bedtime or the next day, suggesting slower stress recovery, while the short-term effects of stress dissipate quickly for others (Bai & Repetti, 2018; Ha et al., 2019; Santiago et al., 2017). The magnitude of children's reactivity to and recovery from stressors is associated with individual differences in internalizing and externalizing symptoms (Bai & Repetti, 2018; Bai et al., 2020; Ha et al., 2019; Moore et al., 2019; Uink et al., 2018; Yang et al., 2019). Research evidence suggests that coping can mitigate these effects (Lennarz et al., 2018; Sladek et al., 2016, 2017). Some forms of coping may be more effective than others in promoting recovery from the stressor (Sladek et al., 2016). However, the adaptiveness of a particular coping strategy, whether immediately or over the long term, depends on the characteristics of the stressful event, the individual, and the broader social context (Santiago et al., 2016; Tolan & Grant, 2009; Wadsworth, 2015).

Coping with Everyday Stressors

There is no reason to expect that children learn how to manage emotional reactions to stressful events differently than they acquire other skills; trial-and-error, practice, and observation of others are fundamental learning processes. Common everyday stressors that generate mild distress provide frequent opportunities to experiment with different behavioral, cognitive, and emotional strategies and to find that some work better than others (Repetti & Robles, 2016). Because the usefulness of a response varies as a function of the nature, severity, and chronicity of the stressor, over time children learn to respond in different ways to recover from stressors. Thus, through exposure to a variety of quotidian stressors, children acquire a repertoire of diverse coping strategies, gradually learn how to flexibly deploy those strategies, and ultimately improve their ability to recover in a wide range of stressful situations or prevent them entirely (Zimmer-Gembeck & Skinner, 2016).

Characteristics of stressful events help to shape children's coping responses and resources. Different types of events encourage different coping strategies, such as acceptance in uncontrollable situations and active coping (e.g., problem-solving) when events are controllable. A meta-analysis found that children with greater social competence and fewer externalizing symptoms use active coping to manage controllable stressors, such as an argument with a peer. But, children who show poorer psychosocial functioning use the same coping strategies to deal with uncontrollable stressors, such as responding to a conflict between parents (Clarke, 2006). These findings are consistent with the idea that the adaptiveness of a coping strategy depends on the controllability of the stressor that the child is facing. Not only do children learn to pair certain types of responses with particular stressor types, they may also develop a propensity to use coping strategies that are adaptive in the stressful situations they encounter most frequently (Wadsworth, 2015). The corollary is that they are less likely to rely on responses that are suited to the characteristics of situations that they experience less often. Biases to use particular coping strategies constitute the individual differences that are the focus of much coping research.

The kinds of stressful events to which children are regularly exposed can also influence the development of coping resources, which are relatively stable individual differences in factors such as optimism, a sense of mastery, positive emotion, self-esteem, and social support. Tolan and Grant (2009) note that

chronic, uncontrolled stressors, such as growing up in urban poverty, can diminish the development of coping resources like optimism and self-esteem. The match between a stressor and a coping strategy also depends on contextual factors. For example, under conditions of chronic stress, responses that facilitate temporary escape may be prioritized, even though those coping strategies may be less adaptive in the long run (Tolan & Grant, 2009). Coping also changes with child age. Evidence suggests, for example, that as children age, problem-solving increases in response to academic stressors, and avoidant coping declines in response to social stressors (Eschenbeck et al., 2018).

Exposure to daily stressors and the development of coping strategies have multiple downstream effects on later stress and coping. Just as stressors shape coping, coping can shape stress exposure. On the one hand, coping can promote stress generation if it exacerbates emotional reactions to minor events or further complicates an existing problem. An experience sampling study found that college students' negative emotional reactions to stressors were amplified by avoidant coping responses (e.g., spending time alone, ignoring thoughts about a problem, drinking alcohol, or using drugs) and they experienced more social stressors, such as conflict, rejection, criticism, or teasing, shortly after reporting increases in emotional distress (Sears et al., 2018). In contrast, coping responses that help to manage negative emotional reactions or directly change the stressful situation may reduce the frequency and intensity of future stressful events. For example, discovering effective studying strategies, perhaps with the help of an older sibling, can alleviate distress associated with an upcoming exam. Whereas the motivation for this coping response was to reduce distress about a specific exam, the coping response of finding new and effective study strategies (i.e., problem-solving) may prevent exam-related distress, or perceived stress, in the future. Moreover, successful coping experiences such as these would build a sense of mastery and coping efficacy, the belief that one has dealt with stressful events well and will do so again in the future (Zimmer-Gembeck & Skinner, 2016).

Implications of an Everyday Perspective for the Conceptualization of Coping

We conceptualize coping as a repertoire of skills that facilitate immediate recovery from stress. Coping responses are shaped by a child's exposure to stressors as well as the broader context in which those events occur. Thus, everyday stressors present essential learning opportunities for building a supply of coping responses. According to our definition, the adaptiveness of a coping response depends on the degree to which it facilitates short-term emotional and physiological recovery following the stressor. Our view is consistent with Tolan and Grant's (2009, p. 66) distinction between local coping adaptability – "the extent to which a coping method reduces distress immediately regardless of whether it prevents its continuation, recurrence or its long-term effects" – and coping effectiveness (i.e., developmental adaptability) – "the extent to which a coping method is likely to prevent or curtail a given stressor or . . . limit its impact on long-term adjustment." A particular coping response (e.g., withdrawing from others) may be adaptive in the short term by facilitating recovery, even though repeated use of that coping strategy over the long term may be associated with poor outcomes like emotion dysregulation and greater stress exposure.

The distinction between short-term and long-term outcomes is fundamental to how coping is operationalized in research investigations. Our conceptualization focuses on the

functions of coping in the moment. When examining connections between a stress exposure and indicators of mental, physical, or behavioral health (e.g., depression, substance use), researchers generally characterize coping as a more or less stable individual-difference variable. Most commonly, a questionnaire asks individuals to describe their tendency to respond to stressors in particular ways (Carver, 1997; Connor-Smith et al., 2000). This approach has led to the finding that efforts to directly control or adapt to stressful events and related negative affect predict fewer symptoms of psychopathology, whereas attempts to avoid or deny them predict more symptoms (Compas et al., 2017). When the focus is instead on momentary or daily outcomes, such as mood or physiology (e.g., heart rate, diurnal cortisol), other approaches to assess coping are also used. Though some investigators use the familiar method of self-reported dispositional coping (Slatcher et al., 2015), others conceptualize coping as an immediate behavioral, cognitive, or emotional response to a stressor (Santiago et al., 2016; Sladek et al., 2016). A study conducted with low-income Latino 7th and 8th graders found that all students reported more engagement coping (i.e., problem-solving, deriving benefit) on high-stress days. However, a tendency to use engagement coping strategies was even greater in youth who strongly identified with and were attached to their families, suggesting that identification and attachment with one's family could be a coping resource (Santiago et al., 2016).

Our chapter focuses on coping as an immediate or short-term process, but we are also interested in combining short-term responding with an individual differences approach by assessing the patterning of children's immediate responses to stressors. In two different samples, we found reliable differences in how children responded in the short term to minor stressful events. The studies tracked how a child's mood changed following naturally occurring events; individual-level indices representing those patterns were related to mental health in cross-sectional and prospective longitudinal analyses (Bai & Repetti, 2018; Bai et al., 2020). Children who reported higher levels of negative mood and lower levels of positive mood on days when they experienced more school problems had more internalizing symptoms both concurrently and 3 years later (Bai & Repetti, 2018; Bai et al., 2020). Although those studies assessed mood reactivity and recovery, the same approach could be used to assess individual patterns of short-term cognitive and behavioral responses to stressors.

In the same way that short-term emotion reactions to minor stressful events can accumulate to foster individual differences in mental health, children's experiences with various coping strategies in the moment shape the development of coping over the long term. With developmentally appropriate levels of practice, children learn how to flexibly deploy coping strategies in various stressful situations. With time, children may become more inclined to use specific coping strategies that they found adaptive in the past. The transition from coping as an immediate response to the development of a coping style as an attribute of an individual is moderated by characteristics of the environment and the child, including their biological, cognitive, and socioemotional development. Specifically, the types of immediate coping responses that are available to children vary with age. For example, executive functioning, which significantly increases during adolescence, allows youth to inhibit their impulses, plan ahead, and consider multiple perspectives (Kuhn, 2009). Thus, as children develop, they gain access to a greater array of strategies, and their early experiences likely influence age-related shifts in coping tendencies (Zimmer-Gembeck & Skinner, 2016).

Our conceptualization of coping does not assume that the individual is necessarily aware of the *connection* between their behavior, thoughts, or emotions and the stressor to which they are responding. This contrasts with a view of coping as consisting only of "conscious and volitional efforts" (Compas et al., 2017). One could argue that it is reasonable to expect individuals to be aware of their responses to situations that are out of the ordinary, such as major life stressors or traumatic events. Rare events are likely to be salient and memorable, and therefore perhaps responses to those events are also more likely to be intentional, purposeful, noticed, and recalled. In contrast, common daily stressors, such as an interaction with an irritable parent, a disappointing score on an exam, or feeling left out of a peer group activity, are by definition, events that are encountered with some frequency over the course of an average week. It seems likely that coping responses to these events are less intentional and less noticed. Following a minor daily stressor like those mentioned, a child might engage in any number of responses without consciously linking it to the stressful event. Coping responses might include changing the topic of conversation, thinking reassuring thoughts, checking social media, clowning around with friends, gossiping, acting out with aggression, calling or texting a friend, telling a joke, getting something to eat, going for a walk, playing a video game, deciding that the event wasn't important, playing basketball, or not feeling anything. Thoughts, feelings, and behaviors like these might be categorized by psychologists in any number of ways – such as distraction, social support-seeking, secondary control, escape, or avoidance. But would the child make a similar attribution?

Whether a coping response is experienced by a child as volitional versus nonvolitional or automatic versus nonautomatic is separate from whether it is connected in their mind to the precipitating stressor. Consider, for example, an 11-year-old girl who checked social media following an incident that left her feeling left out of a peer group activity. Experience may have taught her that social media activity is distracting and helps her to feel better when she's down. She may experience the response as a voluntary behavior, one that was motivated by habit or pleasure. Or, she may not have any conscious thought about its motivational source or intention. The point here is that this child may not connect her decision to check social media to the recent social rejection event, even though that social media behavior was learned, and functioned, as a coping response. Many investigations overlook coping efforts that are used regularly but are not noticed or acknowledged by the individual as coping responses to particular precipitating events. Our focus on everyday stressors suggests that the more narrow definition misses an important part of the picture and that such responses should not be excluded from the study of children's coping.

Implications of an Everyday Perspective for the Measurement of Coping

A complex mental calculus is needed to detect how thoughts, behaviors, or emotions change in response to the occurrence of a particular event. First, the individual must closely monitor their experiences of minor stressors and the responses that follow them, which may be too short-lived to register in memory and be recalled. Second, and most important, the individual must connect the response to the occurrence of the stressful event. However, the same response may be a behavior that recurs (perhaps several times in the same day) and it may be difficult to connect its timing to the occurrence of any particular event. It's easy to see how the connection between the "response"

and the "precipitating event" could be lost even when the individual used it precisely because of a learning history linking it with emotional recovery. Definitions of coping that are restricted to conscious, effortful, and intentional efforts ignore responses that function to manage everyday stressors and mild emotional responses to them but are not recognized or recalled as such by the individual. Our approach broadens the definition to include coping efforts that the individual undertakes but may not connect to a particular stressor and are not necessarily intentional.

Both laboratory and naturalistic approaches can capture coping efforts that the individual undertakes but would not necessarily describe as a response to a particular stressor. Laboratory paradigms subject children to controlled stressors and allow for direct observation of their responses. The analog tasks are usually designed to represent events that children may plausibly encounter in daily life. For example, kindergarteners may participate in a play task with parents who had been instructed to enforce specific rules to provoke frustration. Trained observers may code the children's coping responses while recording children's physiological reactivity to and recovery from the stressor. Naturalistic approaches prioritize ecological validity by assessing naturally occurring stressful events and the coping strategies used in response to them. Some studies target specific situational stressors whereas others assess coping in response to diverse stressors. For example, Mahoney et al. (2010) video-recorded children during needle procedures in a hospital setting and coded observable indicators of child coping, adult coping, and child distress. Given that the data were collected naturalistically, study findings reflected the effects of the stressor context (i.e., clinical setting with real medical professionals) as well as the needle procedure on coping responses (Mahoney et al., 2010). With objective observations of children's activities obtained via audio- or video-recordings, researchers can code stressors and displays of various strategies following the stressful event to examine coping.

In studies using intensive longitudinal methods, naturally occurring stressors and coping responses are repeatedly assessed within and across days. Consistent with our view that coping includes volitional and non-volitional responses that may or may not be consciously tied in the child's mind to the stressful event, probes of coping need not specify that the participant intended the act to alleviate stress. Rather, by administrating a set of questions about stressors, a separate set of questions about emotions, and another set of questions about specific types of thoughts and behaviors, psychologists can apply inferential statistics to assess coping. For example, to study avoidant coping responses to stressful events, an experiential sampling study repeatedly assessed interpersonal stressors (e.g., "had a fight, conflict or argument"; "something happened that left me feeling ignored or rejected"; "something happened that left me feeling criticized or put down") four times a day over 5 consecutive days. The same surveys separately measured negative mood and avoidant coping behaviors (e.g., "spent some alone time"; "drank alcohol or used other drugs"; "pushed away or ignored thoughts about a problem I'm having"), without explicitly stipulating that the mood reports and coping behaviors were in response to the interpersonal stressors. The connection between the interpersonal stressor and avoidant coping behaviors was not made by the participant but through analysis of the intensive longitudinal data. The study found that when college students reported interpersonal stressors and subsequently reported avoidance coping behaviors, their negative mood was elevated (Sears et al., 2018), indicating that avoidance is not a

locally adaptive coping response to interpersonal stressors. By leveraging data analytic approaches to draw linkages between stressors and specific cognitions or behaviors – whether self-reported or observed – researchers can capture volitional and nonvolitional coping in children without relying on participants to draw explicit connections between the precipitating stressor and their responses.

Interpersonal Perspective on Coping

Coping as an Interpersonal Process

Coping is as much a dynamic interpersonal process as it is an intrapersonal one. Interactions with others are intertwined with and shape children's responses to stressful events, as demonstrated by past research on spillover. Spillover refers to how a stressful experience in one setting or situation can have a direct short-term effect on an individual's emotion, cognition, or behavior in another. Several research studies have shown that problems originating outside the home, such as problems with peers, have a short-term impact on children's interactions with family members inside the home. For example, when children and adolescents experience more problems at school, they describe themselves as more demanding and difficult at home (Lehman & Repetti, 2007) and report higher levels of social withdrawal, more conflict, and less warmth with their parents on the same and next day (Bai et al., 2017; Chung et al., 2011; Mayfield & Fosco, 2021; Timmons & Margolin, 2015). Parents corroborated these reports in adolescent but not in child samples. Likewise, stressors at home have short-term impacts on adolescents' interactions with peers. Parent–child conflict predicted greater levels of academic problems and peer conflict on the same day and the next day (Chung et al., 2011; Timmons & Margolin, 2015). Although coping is not the focus of these studies, they provide evidence that peers and family members can be implicated in children's responses to stressful events and demonstrate how conceptualizations of coping can be broadened from an intrapersonal to an interpersonal process. Moreover, they reveal a window of opportunity during the day when coping may prevent a sequalae of negative interactions that follow as a consequence of the stressor.

The participation of peers and family members in children's coping is connected to the adaptiveness of their responses in the short term, and their psychological well-being. For example, in comparison to healthy controls, adolescents with major depressive disorder were more likely to co-ruminate with peers and parents, less likely to co-problem-solve with peers, and equally likely to co-problem-solve with parents, following a negative event (Waller et al., 2014). Moreover, when faced with a stressful event, co-distracting with a parent or peer led to greater reductions in boys' negative emotions, in comparison to distracting alone (Stone et al., 2019). By simply being present, peers and family members become an integral part of the coping response. Moreover, the adaptiveness of a specific coping strategy depends on the affective tone and behaviors of both the child and the coping partner.

It is perhaps simplest to illustrate the interpersonal perspective with support-seeking, a commonly used coping strategy among children. Infants rely on social referencing to gather information and seek comfort as they tackle new problems (Striano et al., 2006; Walle et al., 2017). Whereas the tendency to seek support from adults declines from childhood to adolescence, the tendency to seek support from peers increases (Skinner & Zimmer-Gembeck, 2006), and support-seeking remains an important coping behavior throughout the

lifespan (Uchino et al., 2011). Although often characterized as approach-oriented, and thus "adaptive," the adaptiveness of support-seeking depends on (1) the nature of the child's bid for support, (2) the quality of the support provider's response to the child, and (3) the child's perception of the provider's response (Collins & Feeney, 2000). Child bids for support are not always met with a response (Sperling & Repetti, 2018), and a child may not perceive the provided support as helpful (Tian et al., 2020). Whether or not such a dyadic interaction helps the child recover from stress, depends on the quality of the relationship (Collins & Feeney, 2000), and the fit between the child's need for support and the partner's provision of support (McLaren & High, 2015; Uchino et al., 2011). Characteristics of the child's bid for support and supportive messages also predict the adaptiveness of support-seeking. People who seek support more directly (as opposed to using subtle hints) often receive higher-quality support (High & Scharp, 2015), and the support provided is most helpful when it is centered on the support recipient (i.e., when it acknowledges, elaborates, and legitimizes the support seeker) (Burleson, 2003; Cannava et al., 2018). Beginning from early infancy, children learn how to effectively seek and receive support through processes like modeling, assisting, coaching, and operant conditioning (DiCorcia & Tronick, 2011).

Coping in the Family

Family members can support or interfere with a developmental process whereby children become more adept at coping as they encounter and learn to deal with different types of stressful events. Parent socialization processes – including modeling, assisting, coaching, and reinforcing – shape coping strategies that children use in and outside the home (Gaylord-Harden et al., 2013; Peisch et al., 2020; Power, 2004; Zimmer-Gembeck & Locke, 2007). For example, mothers who provided greater support and encouraged their children to use engagement coping (e.g., think about different ways to fix a problem) had children who used more engagement coping strategies themselves (Gaylord-Harden et al., 2013). Not surprisingly, positive parenting qualities, such as an authoritative parenting style, parental warmth, and autonomy support are associated with the types of coping responses that are linked with better psychological well-being (Almas et al., 2011; Moran et al., 2018; Seiffge-Krenke & Pakalniskiene, 2011; Watson et al., 2014). Warm and supportive families provide resources such as social support and scaffolding that enable children to safely explore and experiment with various coping strategies (Tolan & Grant, 2009). In contrast, children who grow up in families characterized by conflict, aggression, and cold, unsupportive, and neglectful relationships have fewer opportunities to develop coping responses that are both locally and developmentally adaptive.

Researchers have identified an overcontrolling parenting style whereby parents intervene in potentially stressful situations before children have attempted to regulate their emotions or behavior on their own. As a result, their children experience fewer opportunities to practice and master coping responses. The negative effects of overcontrolled parenting on coping are especially well documented for early childhood when the ability to cope with frustration is rapidly developing (Kiel et al., 2020; Perry et al., 2018; Sherman et al., 2017). In one study, maternal overcontrol at age 2 predicted poorer social, emotional, and academic adjustment in preadolescence; those effects were mediated through the children's ability to self-regulate their behavior and emotions in early childhood (Perry et al., 2018). The challenge for parents is to protect children from stressors that would overwhelm their

coping capacity while also allowing exposure to manageable stressors and providing appropriate support in those situations (Power, 2004; Repetti & Robles, 2016).

In many cases, the adaptiveness of coping strategies that a child attempts should be evaluated in conjunction with their parent's emotional and behavioral responses. Consider an 11-year-old boy who was teased by peers at school. As a way of coping, the child may emotionally disclose the problem to his mother (Skinner & Zimmer-Gembeck, 2006). In turn, this disclosure can change the parent's emotional state as emotions are bidirectionally transmitted and co-regulated between parents and their offspring (Butler & Randall, 2013; Larson & Almeida, 1999). If the child's emotional distress provokes distress in the mother, it may interfere with her ability to respond in a supportive or helpful manner. The mother's negative emotional state and her behavioral response may further exacerbate the child's distress (Mancini et al., 2016; Sperling & Repetti, 2018). One naturalistic observational study of everyday parent–child interactions showed that when parents responded to 8- to 12-year-old children's spontaneous displays of negative emotion with critical statements (e.g., "I am getting tired of you"), or negative commands (e.g., "stop shouting"), children were more likely to react with continued negative emotion. Ignoring their children's negative emotion expression or changing the topic, was associated with a higher likelihood of children shifting to a neutral state or to a positive emotion expression (Sperling & Repetti, 2018).

Returning to our example of the 11-year-old boy who was teased at school, upon arriving home, he may retreat to his room and play video games in an attempt to withdraw from interactions with family members and distract himself from the events of the day. His caregivers' responses to this coping response may depend on their parenting values and the child's age. Parents who prioritize autonomy support might leave the youth alone in the room, whereas those who prioritize emotional support might attempt to engage him in conversation. A parent who prioritizes routines might instruct him to complete homework first, before playing video games. Younger children are likely to receive more supervision whereas older children may be permitted more alone time (Lam et al., 2012). The same child may also attempt to problem-solve. There are multiple problem-solving steps he might consider: talking to a parent or his teacher, ignoring the teasing, fighting back with sharp remarks, or forming alliances with a different group of peers about the teasing. Like support-seeking, withdrawal, and distraction, problem-solving can be an interpersonal process. Children often need assistance with problem-solving, as executive functioning is developing well into young adulthood (Ahmed et al., 2015). Even with the cognitive capacity to problem-solve, many solutions depend on the reliability of others. As this child evaluates each potential solution, he makes predictions about the reactions of his parent, teacher, and peers based on past experiences. In short, this youth's propensity to cope with the day's stressors by social withdrawal, distraction, or problem-solving, as well as the adaptiveness of these strategies, will rely to some extent on his parents' responses to these strategies.

Implications of an Interpersonal Perspective for the Conceptualization of Coping

The earlier example illustrates how coping is interpersonal, and how the adaptiveness of specific coping strategies depends on others. That is why we view coping as a set of responses to stressors that often implicate and rely on close others. This type of conceptualization already exists in the marital literature as dyadic coping,

defined as "a process in which the stress signals of one partner and the coping reactions of the other partner to these signals are taken into consideration" (Bodenmann, 1997, p. 138). Similarly, parents exert a strong influence on the coping responses of young children and, as children age, coping may be become more collaborative.

There is a strong interpersonal perspective in research on coping during infancy and early childhood. It is widely accepted that infants rely on parents to facilitate their coping. As they grow older, they gain the capacity to cope with stressful events with scaffolding from parents. Indeed, laboratory studies often assess parent socialization of coping, examining specific behaviors parents employ to help their young offspring cope with specific stressors (McMurtry et al., 2010; Morris et al., 2011). An interpersonal perspective can also be found in studies of older adults. This adult literature recognizes that dyadic coping is an important mitigator of stress response in the short term, as well as marital satisfaction and mental health in the long term (Martire & Helgeson, 2017; Martire et al., 2019). However, an interpersonal perspective on coping is rare in research on middle childhood and adolescence; periods when parent support remains crucial, social cognition rapidly develops, and the salience of peers increases. Research on the management of chronic illnesses during these developmental periods support our perspective (Martire & Helgeson, 2017). When coping with chronic illnesses such as diabetes and asthma, parental involvement characterized by collaborative coping efforts, wherein the youth and parent work together to handle the illness, is associated with better management of the disorder and better psychological well-being (Martire & Helgeson, 2017).

Our conceptualization of coping implies that we should think about coping adaptiveness in the context of the child's proximal social environment. Beyond the role that parents play in the socialization of coping, the adaptiveness of various coping strategies depend on how parents, peers, and other coping partners respond in that moment. For example, while generally considered to be a developmentally adaptive coping strategy, the immediate adaptiveness of support-seeking depends on the child's interpersonal communication skills and the other person's availability and willingness to provide the needed support. Thus, a coping strategy that reduces reactivity to a stressful event in the family context may not be as adaptive in the school setting or with a future romantic partner. Of course, the ways in which children depend on and relate to other people change as they develop. Infants often seek and receive support from caregivers when distressed. This type of coping is likely facilitated by the synchrony of affect and physiology between infants and their caregivers (Pratt et al., 2015). However, individuation from parents is a major developmental task for children. As children become more autonomous, parents' involvement in coping may become less autonomic and more situationally specific, intentional, or motivated by the offspring. The early years are crucial for the development of coping. However, children must continuously adapt their coping responses to new stressors, new social contexts, and new partners. Our conceptualization suggests that coping should be examined as a time-variant interpersonal process, rather than a stable individual trait.

Implications of an Interpersonal Perspective for the Measurement of Coping

Our conceptualization of coping highlights why youth self-report approaches to coping assessment shed light on only a portion of the coping process. A child may describe attempts

to cope with an academic challenge by seeking homework support. However, that report is unlikely to represent the full picture. Did the child ask for help directly or indirectly (e.g., whined and procrastinated)? Did the youth receive the support? What was the support-provider's experience? Was the parent able to provide homework help or was she preoccupied and unable to respond? The measurement of coping, as discussed in this section, should include both the child's enactment of a coping response and the coping partner's response. One strategy for assessing these aspects of coping is to obtain reports from multiple informants. In addition to the child's own reports of their coping, others can report on their observations as well as their own responses to the child's coping. Research on social support in adults has benefited from such an approach. Studies of social support exchanges in adult couples have assessed support receipt from the support-seeker and support provision from the support-provider separately (Berli et al., 2018; Shrout et al., 2006; Shu et al., 2021). This multi-informant approach led to the finding that support that is provided but not noticed by the recipient is the most beneficial (Zee & Bolger, 2019). A similar strategy in parent–child dyads may yield important insights about the development of coping across childhood and adolescence. A multi-informant approach enables researchers to better assess the adaptiveness of a coping response in the child's social context.

Observational methods, whether conducted in the laboratory or in natural settings, provide objective behavioral data on children's coping as well as their parents' responses. Laboratory paradigms are often used to examine the ways in which parents support their young children's coping. For example, Kiel et al. (2020) coded the level of comfort, distraction, and protection mothers provided their 2-year-old offspring when they were faced with a fear-inducing stimulus. However, observations of parents' coping support need not be restricted to studies of coping in young children. Despite spending more time alone as they age, youth continue to spend the majority of their time with either family members or friends (Lam et al., 2012, 2014; Larson & Richards, 1991). To fully capture the interpersonal processes that drive the adaptiveness of different coping strategies from infancy to adolescence, laboratory paradigms can be improved by more systematically including close others, such as parents, siblings, or peers (Stone et al., 2019).

Objective observations of family interactions via audio- or video-recordings in natural settings are also useful for capturing interpersonal coping processes. For example, electronically activated recorders, which sample ambient sounds as participants go about their daily lives, have been used to naturalistically assess dyadic coping among adults diagnosed with cancer and their spouses (Robbins et al., 2014). The UCLA Center on Everyday Life of Families (CELF) recorded families for 1 week as they went about their daily lives. Sperling and Repetti (2018) found that children expressed negative emotion on 10% of occasions when a parent was present on screen (with a 30-second video clip as the unit of analysis). We examined parent responses, including providing supportive statements, reflecting, problem-solving, and ignoring, in more than 1,500 spontaneous negative emotion episodes and tested the link between the particular parent response in each episode and the child's emotion reaction that followed. The parent ignoring or changing topics was the most common response observed, and it was the only parental response that curtailed the generally mild displays of child anger and sadness that were captured by the recordings; supportive statements did not have that effect (Sperling & Repetti, 2018). However, there was a

tremendous between-family variance in the data. In the median family, 47% of all parent responses were coded as ignoring, but the range of 0–71% across families indicates that some children frequently managed negative emotions on their own while, even at this age, others were rarely presented with such opportunities. How might child coping be shaped by that single family difference alone? Children who are allowed to cope independently with minor events and mild levels of negative emotion may develop more diverse repertoires of coping strategies than those who are given fewer such opportunities.

Other CELF studies have focused on positive emotion, which is considered a critical coping resource. We found that when children were already expressing positive emotion, parent expressions of positive emotion and mundane forms of physical touch increased the likelihood that the children would sustain their positive states (Bai et al., 2016). Another study found that parental expressions of compassion and gratitude were correlated with children's total expression of positive emotion (McNeil & Repetti, 2021). Research findings based on direct observations of everyday family interactions can add to our understanding of interpersonal coping processes, and may even challenge prior inferences drawn from studies that only use self-report questionnaires. Naturalistic observations such as these capture coping responses in children's social contexts and enable researchers to examine interpersonal processes that aid or hamper the development of coping.

Intervention Applications

The enhancement of coping skills, such as problem-solving or practicing mindfulness, is a common component in many prevention and intervention programs for youth suffering from mental or physical health conditions. These interventions are often delivered in individual, group, and mobile health treatment settings. Our conceptualization of coping suggests that to promote the development of coping, interventions should target both the volitional and the nonvolitional behavioral, emotional, and cognitive responses that children use to manage quotidian stressors in their daily lives. The merits of ecological momentary interventions (EMI) are numerous. They deliver interventions to people in their everyday lives and in their natural settings (Balaskas et al., 2021; Nahum-Shani et al., 2017). These interventions are brief and responsive to the specific needs of a moment or a day in the individual's life. Together with ecological momentary assessments, EMIs can promote the development of coping. Such an intervention would begin with ecological momentary assessments of the stressor, the situation, and the child's stress reactivity, in the context of daily life. In coordination with this assessment approach, the EMI can suggest specific coping strategies that match the stressor, situation, and stress reactivity, in real time. Children can select and attempt a coping strategy, based on suggestions made by the EMI, and evaluate its adaptiveness. With repetition and practice across diverse settings and situations, children can practice a wide variety of coping strategies, and learn to flexibly and intentionally employ specific ones depending on the unique needs of each situation.

No intervention is complete without the involvement of close others. Children's coping responses are rarely independent of family members or peers, and the adaptiveness of various coping strategies hinges on the responses of those around the child. Thus, an intervention that focuses on the behaviors of parents and peers is essential to promote the development of effective coping in children. A similar EMI approach that targets parent or peer behaviors in daily life is promising. For

example, parents may receive psychoeducation about an interpersonal perspective on coping and common coping strategies for children. This psychoeducation can be reinforced with EMIs that are delivered to the parents, in coordination with the intervention delivered to the child. These EMIs would mobilize parents to participate in the child's coping process. By having the youth and parent practice various coping strategies together, in real-world settings and in response to naturally occurring stressful events, parents can better support the child's coping efforts. Together, the youth and parent can identify responses that work best in their unique family context. A focus on family members and peers has potential to increase coping resources for the child (i.e., levels of social support) and scaffold the coping process itself.

Future Directions for Coping Research

We have argued that children learn how to cope, iteratively, with repeated exposure to developmentally normative stressors. With practice, children learn to pair certain coping strategies with specific types of stressors and situations. Their close relationships, including those with family members and peers, shape this developmental process. As scientists continue to investigate the development of this important skillset, future research should further examine the role of everyday stressors on the development of coping. Prior research has conceptualized stress, even mild daily stressors, as detrimental to youth. Although stressful events may provoke negative affect and arouse physiological stress response systems in the short term, they offer crucial opportunities to foster the development of coping in children (Charles et al., 2021; Repetti & Robles, 2016). In fact, adults who report no stressors across 8 days were less likely to experience positive daily events, or provide or receive emotional support (Charles et al., 2021). Examining the roles that everyday stressors play in the development of coping, and characterizing protective factors in the individual and in the social context that help children derive benefit from these potentially undesirable situations, is an important next step in research. Moreover, investigators should focus on evaluating the short-term adaptiveness of coping responses, hand in hand with their longer-term implications for child well-being, to gain a more comprehensive understanding of the development of coping. Future research should characterize proximal and distal risk and protective factors that influence the adaptiveness of the coping response, such as characteristics of the stressor and the involvement of family members. Characterizing the short-term effects of specific coping strategies and examining their links to longer-term outcomes helps to elucidate the mechanisms by which coping affects health.

Future research should also broaden the study of coping responses to include nonintentional emotional, cognitive, and behavioral responses to stressors. The field's current understanding of coping has relied heavily on youth self-report questionnaires. While easy to administer, even questionnaires with superior psychometric properties only capture coping responses of which children are aware; this rarely represents the full picture. It is unreasonable to expect a young child, or even an adult, to have the level of psychological self-awareness necessary to reliably report that they postponed a difficult task, spent alone time, or refused to go to school the next day, *on purpose* because they were trying to cope with an insult they endured from peers at school. Yet, such behaviors are common examples of avoidance coping (Sears et al., 2018). Moreover, because many self-report coping questionnaires probe coping responses in relation to a major life stressor such as a

medical diagnosis, they fail to assess responses to quotidian stressors – the foundational basis of the development of coping. Assessing coping efforts that the individual undertakes but would not necessarily describe as a response to a particular stressor allows researchers to gain a more complete understanding of the development of coping.

Any advancements in our understanding of coping must integrate an interpersonal perspective. While an interpersonal perspective is prominent in studies of infancy, toddlerhood, and early childhood, was well as middle and late adulthood, it is largely missing from studies of middle childhood and adolescence. An emphasis on the development of autonomy and individuation from family during these developmental periods may contribute to a bias toward studying coping as an intrapersonal process, but children and adolescents are no more autonomous from close others than are adults. Moreover, close parent–child relationships, such as those in which children seek support and advice from parents and tackle problems together in a collaborative manner, promote the development of youth autonomy (Allen & Loeb, 2015; Karabanova & Poskrebysheva, 2013). Interactions with family members and peers are intertwined with and shape children's coping responses even as children individuate from the family, and coping remains an interpersonal process throughout this period. Investigating the influence of others' behaviors on children's coping responses, and vice versa, will help increase our understanding of the development of coping and identify ways to enhance coping.

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18 Parenting, Socialization of Emotion, and the Development of Coping

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Introduction

Interest in the socialization of coping and emotion-related regulation has grown enormously in recent years. In this chapter, we first discuss the conceptualization of coping and the consideration of regulation and effortful control in our conceptualization. Next, we review research on the socialization of coping and regulation. In particular, we discuss several potential ways that parents foster regulation/coping, with a focus mostly on parenting from infancy through late childhood. We briefly consider interventions to promote children's regulation. Finally, complexities in the research, such as consideration of the cultural context, bidirectional and interactional relations, and methodological issues are presented.

Coping as Regulation

We (and others) view coping and self-regulation as highly related constructs (Compas et al., 2001; Eisenberg et al.., 1997; Nigg, 2017). Children's self-regulation encompasses a number of constructs including behavioral regulation, emotion regulation, effortful control, and executive functioning in both stressful and nonstressful contexts (see Eisenberg et al., 2014). Coping has been defined most commonly as a cognitive and behavioral response to stressors (Lazarus & Folkman, 1984). Compas and colleagues (2001) defined coping as effortful responses to deal with the emotional experiences in reactions to stressors, as well as cognitive, behavioral, and attentional reactions to stressful events or circumstances. That is, coping often involves controlled, volitional, and goal-directed processes. For example, children may use attentional processes such as distracting themselves (indices of effortful control) to cope with stress-inducing stimuli. Similarly, children's inhibitory control, planning capacities, and activational control – clearly aspects of self-regulation – likely contribute to the way children problem-solve during stressful situations (Compas et al., 2001). Further, the control of situations, such as preventing an emotion before it occurs (i.e., antecedent emotion regulation), also has been considered a form of coping (i.e., proactive coping). Thus, we view coping as a subset of top-down (i.e., cognitively generated) emotion-related self-regulation that overlaps considerably with effortful control (i.e., willful or effortful regulatory skills).

However, there are some aspects of coping that do not extend to research on self-regulation. Coping can be seen as a broader response to stressors, and it includes some behaviors that are unique to the coping literature, such as rumination, seeking social support, or getting information. Coping includes multiple ways to deal with difficulties or setbacks, many of which do not involve emotional processes. For the purposes of this chapter, we focus on the broad array of behaviors in the literature that are common to both self-regulation and coping. Because children

often experience negative emotions in response to stressful situations, it is likely that parents' socialization strategies, particularly socializers' emotion-related socialization strategies, relate similarly to the emotional aspects of coping and self-regulation.

The Socialization of Coping/ Regulation

The role of parents in the socialization process and in self-regulation has been a topic of considerable interest for decades. For the purposes of this chapter, we focus on three aspects of the socialization process – the quality of the parent–child relationship, discipline practices, and emotion-related socialization practices.

The Quality of the Parent–Child Relationship

A number of studies focusing on parenting and the development of children's self-regulation and coping have roots in an attachment perspective (Pallini et al., 2018). The assumption of this perspective is that securely attached infants have an attachment figure who is available, attuned to their needs, and consistent in their responses to the child. Thus, securely attached children believe their attachment figures will alleviate their distress promptly and consistently and will accept their emotions. As a result, children with a secure attachment develop effective emotion regulation strategies based on their previous positive experiences of emotional expression and regulation with their attachment figure (Cassidy, 1994).

Research supports the notion that securely attached children develop better regulatory skills compared to insecurely attached children. Pallini et al. (2018), in a meta-analysis of over 100 studies of children up to 18 years of age, found that securely attached children were higher in effortful self-regulation than were insecurely attached children. In a meta-analysis of 72 studies, Cooke and colleagues (2019) found that securely attached children demonstrated higher emotion regulation and constructive coping strategies (i.e., cognitive, social support) in children under 18 years of age than insecurely attached children. Similarly, in a review of 23 studies, Zimmer-Gembeck and colleagues (2017) reported that across both cross-sectional and longitudinal studies, securely attached children were better regulated overall than insecure children. Insecure children tended to be more dysregulated and less competent copers than securely attached children in toddlerhood, childhood, and adolescence. In a recent notable long-term longitudinal study, infant attachment security predicted a more balanced, problem-solving approach to regulation 20–35 years later (Girme et al., 2021).

Similar to the arguments underlying attachment theory, parents' sensitive and responsive caregiving, reflected in their ability to notice and respond to their child's signals promptly and appropriately, is thought to predict children's ability to cope with stressors that result in negative emotions. Indeed, researchers have found the expected positive relations between maternal sensitivity and responsiveness to infants' and young children's emotion regulation (Davidov & Grusec, 2006; Haley & Stansbury, 2003; Halligan et al., 2013), behavior regulation (Birmingham et al., 2017; Zeytinoglu et al., 2017), effortful control (Calkins et al., 2002; Eisenberg et al., 2005; Eisenberg, Spinrad, et al., 2010; Lengua et al., 2007; Li-Grining, 2007; Spinrad et al., 2007, 2012) and ego-resiliency, a measure that reflects children's ability to recover from stress (Taylor et al., 2014). Similarly, parents' mutually responsive orientation, reflecting a relationship that is mutually cooperative, has been found to predict greater effortful control, a finding that was replicated across samples

and for mothers and fathers (Kochanska & Kim, 2014; Kochanska et al., 2008). In terms of predicting children's coping strategies, parental support has been positively related to active and adaptive coping and negatively related to avoidant coping (Gaylord-Harden et al., 2013; Gentzler et al., 2005; Zimmer-Gembeck & Locke, 2007). Relations of responsiveness and self-regulation are not always found; in a meta-analysis of 41 studies, the effect size for the association between responsiveness and preschoolers' self-regulation was not significant. However, in this work, both responsiveness and self-regulation were operationalized broadly, such that self-regulation included children's compliance, and responsiveness included positive affect and involvement; and thus, conclusions from this work are likely diluted due to the lack of specificity in the measurement (Karreman et al., 2006).

The literature to date indicates that the formation of a secure attachment relationship promotes the development of competent emotion-related self-regulation and coping skills. Further, researchers have demonstrated that children who are consistently responded to, who have support in their interactions, and whose parents attend to their emotions, tend to show greater ability to regulate their emotions and cope with stressors.

Parental Disciplinary Practices

Parents' harsh disciplinary practices and over-control are thought to be negatively associated with children's regulation and constructive coping. One argument is that parenting that is harsh or punitive may be overly arousing to children, disrupting their ability to self-regulate (Hoffman, 2000). It is also possible that parents who control interactions take over problem-solving for their children and, in turn, such practices undermine the development of children's independent coping skills. On the other hand, children who receive gentle control, structure, and guidelines have ample opportunities to be responsible for their own regulation while receiving support (Grolnick et al., 2019). It is likely that gentle control supports autonomous regulation and internalization of parental rules and guidance (Kochanska & Knaack, 2003).

Indeed, researchers have found that harsh or controlling parenting, including guilt induction, love withdrawal, power assertion, and punitive punishment, are negatively related to effortful control and self-regulation in samples from toddlerhood through early adolescence (Bridgett et al., 2018; Cui et al., 2014; Kochanska & Knaack, 2003; Kochanska et al., 2008; Taylor et al., 2013). Further, in one study, school-aged children's reports of parental physical punishment were related to relatively low effortful control (King et al., 2013). Karreman and colleagues (2006) conducted a meta-analysis of 41 studies of young children (24 to 66.20 months of age) and demonstrated significant effect sizes for the inverse relation of parents' negative control strategies to children's self-regulation, regardless of children's age.

Contrary to findings for harsh and negative discipline strategies, parental control that is gentle and supportive has been found to predict relatively high self-regulation and constructive coping. Because gentle control is a discipline strategy that models regulatory behaviors, it is thought to improve children's regulatory skills (Kopystynska et al., 2016; Van Lissa et al., 2019). Similarly, mothers' limit setting and scaffolding predicted higher effortful control over time in early childhood (Lengua et al., 2007) and adaptive coping in African American adolescents (Clark et al., 2002). Further, adolescents who perceived a history of autonomy-supportive parenting were found to engage in relatively high constructive coping

behaviors (Van Petegem et al., 2017), perhaps due to their history of interacting in adaptive ways when facing challenges.

Taking a broader view, researchers also have examined global parenting style in relation to children's regulation and coping. In particular, authoritarian parenting, characterized by low warmth and high negative control, has been associated with low effortful control (Eisenberg, Gershoff, et al., 2001; Zhou et al., 2004) and coping efficacy (Zhou et al., 2008). In contrast, authoritative parenting style, characterized by warmth/acceptance, inductive discipline, democratic parenting, and responsiveness has been positively related to effortful control (Eisenberg et al., 2009; Taylor et al., 2014).

Emotion-Related Socialization Practices

In addition to the aforementioned relations, parenting that specifically promotes children's abilities to deal constructively with their own negative emotions is likely to foster self-regulation and coping skills. These practices relate to children's experience and expression of emotion. Eisenberg (2020) recently updated Eisenberg and colleagues' 1998 heuristic model delineating the processes involved in understanding emotion-related socialization behaviors and their relation to children's emotionality, regulation, and adaptive/maladaptive outcomes (see Eisenberg, Cumberland, & Spinrad, 1998; Eisenberg, Spinrad, & Cumberland, 1998). In brief, our model focused on the processes by which socializers teach children about emotions and ways to manage emotions appropriately. Children likely learn in interactions with socializers about emotional experiences and if and when emotions can be regulated. Emotion-related socialization practices may involve parents modeling how to respond to stress and validating (or invalidating) their children's feelings, as well as direct instruction. These practices can occur in several ways, such as parents' own expressions of emotions, their responses to children's emotions, and parents' discussions of emotions (Eisenberg, Cumberland, & Spinrad, 1998; Eisenberg, Spinrad, & Cumberland, 1998). We have adapted this heuristic model to demonstrate the processes involved in the socialization of emotion and coping reactions (see Figure 18.1).

Parents' Own Emotions/Regulation/Dysregulated Coping

The type and intensity of emotions expressed by parents and their own regulatory skills may provide children with models of regulation and coping. When parents express relatively high levels of positive emotion, they likely model constructive ways to manage stress, whereas parents who expose their children to high levels of negative emotions model dysregulation and maladaptive coping strategies. Consistent with these ideas, parents' positive expressivity has been related to children's relatively high effortful control/regulation both concurrently (Denham & Grout, 1993; Eisenberg, Gershoff, et al., 2001; Eisenberg, Liew, & Pidada, 2001; Speidel et al., 2020) and longitudinally (Eisenberg et al., 2005; Valiente et al., 2006). Related to these findings, children of depressed mothers, who likely express low levels of positive affect, demonstrate problems with regulation and coping (Blandon et al., 2008; Feng et al., 2008; Silk et al., 2006). Further, there is also some, albeit mixed, support for the notion that parents' own coping strategies predict their children's coping strategies (Kliewer et al., 1996; see also Bridgett et al., 2015 for a review of the relations between parent and child self-regulation). In a recent meta-analysis, Zimmer-Gembeck and colleagues (2022) showed that parents with more emotion regulation skills had

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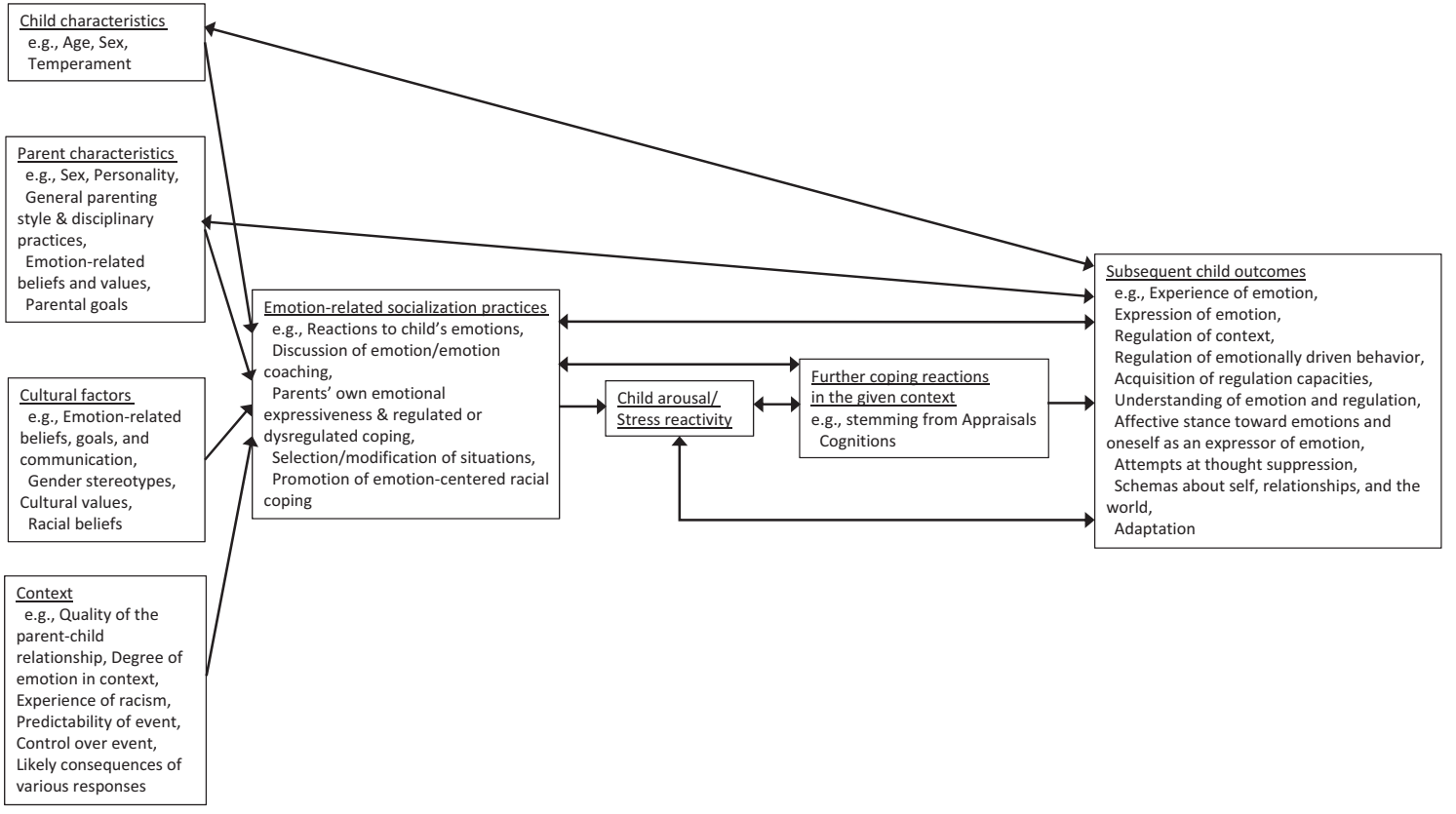

Figure 18.1 A heuristic model of the socialization of emotion-related regulation and coping.
Note: There also may be linear relations and interactions among the four predictors on the left. The four predictors on the left also can predict child subsequent outcomes. We believe there are also many moderators (e.g., type of emotion, child's temperament, child's sex) of the relations between emotion-related socialization practices and children's arousal/stress reactivity, further coping reactions, and subsequent child outcomes. For example, the child's developmental level may moderate the relations between emotion-related socialization practices and children's subsequent outcomes. See Eisenberg (2020) for a more detailed figure that includes moderators.

children with higher levels of regulation, and this result was not moderated by other factors such as children's age.

In addition, parents' negative expressivity has been linked to deficits in children's coping strategies. Specifically, Valiente and colleagues (2004) found that mothers' expression of negative dominant emotion (anger, hostility) was negatively related to children's constructive coping with stressors, although fathers' expressivity was unrelated to children's coping. Thus, exposure to intense and hostile emotions may be particularly arousing to children and undermine their coping abilities. However, it is important to note that such findings should not indicate that parents should refrain from expressing any negative emotions in front of their children. In fact, parental suppression of emotion, a coping strategy that involves hiding one's negative emotions, is thought to be detrimental to children's coping and regulation. That is, while parents' emotion suppression may be well-intentioned to protect or shield their children from their negative emotions, it likely hinders parents' ability to respond to their children's needs. Indeed, suppression has been related to punitive and dismissive parenting (Hughes & Gullone, 2010) and lower responsiveness during parent–child interactions, particularly for fathers (Karnilowicz et al., 2019). In addition, it is probably important to express, accept, and communicate with children regarding moderate levels of negative emotion (Gottman et al., 1997). Perhaps these findings suggest that when parents express negative emotions in a well-controlled way, children can learn ways to regulate their own emotions and to authentically and constructively express their feelings.

Parents' Reactions to Emotions

When children express emotions, especially negative emotions in their daily lives, parents' reactions are likely to provide rich opportunities for socialization of emotion and its regulation. Parents can teach children about their emotional experience (i.e., encouraging the expression of emotion) and ways to manage the stressful context or make the situation better (i.e., problem-focused coping), or soothe and comfort their children to help manage their feelings (i.e., emotion-focused coping). Such strategies may help children to reduce their negative emotions and contribute to their abilities to understand and accept their emotions and to learn effective regulatory strategies.

Indeed, researchers have shown that when parents use strategies that facilitate emotion regulation (i.e., problem-solving and emotion focused) as well as encouraging the expression of emotion, children have relatively strong regulatory skills (Blair et al., 2014; Cui et al., 2020; Davidov & Grusec, 2006; Godleski et al., 2020; Lengua, 2008; Perry et al., 2020; Raval et al., 2018; Spinrad et al., 2007; Valiente et al., 2007; Yap et al., 2007, 2008). These findings hold across diverse samples, including in a sample at risk due to parental alcoholism (Godleski et al., 2020) and children in non-Western countries, such as China and India (Jin et al., 2017; Raval et al., 2018). Similarly, *emotion coaching*, characterized by emotion labeling, responsiveness, and problem-solving, is associated with relatively high levels of regulatory skills (Criss et al., 2016; Cunningham et al., 2009; Gottman et al., 1996; Miller et al., 2015; Morris et al., 2007; Shipman et al., 2007; Shortt et al., 2010). On the other hand, parents who minimize their children's emotions or who respond punitively to their negative emotions may induce more negative emotion and dysregulation (Blair et al., 2014; Eisenberg, Spinrad, et al., 2010; Perry et al., 2020). As one example, Lunkenheimer and colleagues (2007) found that parents' emotion-dismissing responses during a family interaction task, such as invalidating the child's feelings or

criticizing the child in response to their emotions, predicted children's poor emotion regulation.

Parents' responses to their children's distress also appears to be linked with children's coping strategies. For example, parental structuring (scaffolding) in response to toddlers' negative emotion was positively associated with increases in children's attempts to distract themselves during a delay task (a highly effective coping strategy) from 18 to 48 months of age (Ravindran et al., 2021). In addition, parental supportiveness and scaffolding in response to children's distress has been related to children's constructive coping (Chan, 2011; Valiente et al., 2009) and understanding of strategies to cope with anger and sadness (Cole et al., 2009).

Discussion of Emotion

Parents who discuss emotions with their children likely teach them about the meaning of emotions, which may allow them to better understand emotions, circumstances in which they should be expressed, and ways to regulate their distressed feelings. Gottman and colleagues (1996, 1997) characterized parental philosophy of emotions as either an *emotion-coaching* or *emotion-dismissing* meta-emotion philosophy. An *emotion-coaching* philosophy is reflected when parents discuss emotions, validate and label emotions, and instruct children on strategies to manage emotions. On the other hand, emotion dismissing is reflected in parents who view emotions as something to be avoided and minimized. In a review of the literature on parents' meta-emotion philosophy, Katz and colleagues (2012) demonstrated support for the notion that emotion coaching leads to improvements in children's and adolescents' emotional competence, psychosocial adjustment, and peer relations, whereas emotion dismissing showed the reverse relations.

Similarly, researchers have shown the importance of discussing emotions during parent–child interactions. In one study, Eisenberg and colleagues (2008) found that during a parent–child conflict discussion between mothers and their young adolescents, mothers' discussion of emotions was related to fewer negative conflict reactions. Similarly, sensitive guidance during discussions about emotions (including structure and support of emotions) was linked to relatively high emotion regulation in a sample of maltreating and nonmaltreating mothers (Speidel et al., 2019, 2020). Thus, when parents discuss emotions with their children, their children tend to be better regulated and use more adaptive coping strategies (Gentzler et al., 2005). In a recent study, Curtis et al. (2020) reported that Chinese American mothers' discussion of emotion with their 6- to 9-year-old children predicted higher effortful control 2 years later, even after controlling for initial levels of effortful control. Although not causal relations, these findings point to the benefits of parental emotion talk for improvements in children's regulatory abilities.

In sum, research on emotion-related socialization practices has demonstrated that parents' reactions to children's emotions, parents' own emotional expressiveness and/or regulated (or dysregulated) coping, and their discussion of emotions predict children's emotion-related regulation and coping responses to stressors. Researchers should consider the important role of additional emotion-related socialization practices, such as parents' selection or control of situations to prevent an emotion or stressor from occurring (i.e., arrange situations to be less stressful in ways that prevent an emotional reaction).

Promoting Children's Coping and Regulation through Intervention

Although the research is somewhat limited, there is evidence that interventions can

promote children's ability to cope with stress and regulate their emotions. For example, one school-based intervention, the Promoting Alternative Thinking Strategies (PATHS) curriculum, demonstrated effectiveness in improving children's executive functioning and inhibitory control (Bierman et al., 2008; Riggs et al., 2006). In one recent study, however, the Tools of the Mind preschool curriculum, designed to support and train executive functioning skills, did not improve children's executive functioning or self-regulation (Nesbitt & Farran, 2021). Thus, school-based programs aimed to enhance children's regulatory skills need to be adequately tested to examine their efficacy.

On the other hand, some recent research has examined parenting intervention programs targeting parental emotion socialization and found some improvements in both parenting and child outcomes (see England-Mason & Gonzalez, 2020, for a review). As one example, the Tuning into Kids program (Havighurst et al., 2010, 2013), which teaches parents how to recognize and manage their children's emotions and strategies for emotion coaching, has been found to improve parental emotion socialization and to reduce children's problem behaviors and emotional negativity. Parenting intervention programs have also shown promise for participants who are "at risk" due to increased stress on the family. Programs that teach emotion coaching skills and sensitive parenting have been effective in improving parental emotion socialization for survivors of intimate partner violence (Katz et al., 2020), post-deployed military families (Zhang et al., 2020), and families in the context of child maltreatment (Speidel et al., 2020). This work is encouraging for improving children's self-regulation through promoting change in parenting practices (Speidel et al., 2020).

Next Steps for Research on Socialization of Coping and Emotion-Related Regulation

Although the literature already discussed indicates that children's coping and regulation are related to socialization practices, there are a number of important considerations for this work. Specifically, a greater focus on culture and diversity, changes with development, bidirectional and interactive relations, and measurement and conceptualization of coping is needed.

Cultural and Racial Considerations of Emotion-Related Regulation and Coping Socialization

The majority of research on the socialization of emotion regulation and coping has been conducted in the United States. This research may not generalize to other non-Western cultures. For example, Eisenberg, Liew, and Pidada (2001) reported that parental positive expressivity was not related to children's regulation in Indonesia, unlike research findings in the United States. This result may be due to the cultural norms regarding expressing emotion in Indonesia – where parents value emotional control, compliance, cooperation, and harmonious relationships. Interestingly, Raval et al. (2018) found that in Asian countries, parents' encouraging the expression of emotion loaded on the same factor as punitive and scolding socialization strategies in response to children's distress, indicating that in Asian countries, the expression of emotions has different cultural meaning than the USA. That is, encouraging the expression of emotion

(particularly for negative emotions, such as anger) may be maladaptive in these cultures because this strategy is viewed as in opposition to the broader socialization goal of regulating any emotions that could disrupt relationships.

Importantly, even within the United States, there is evidence that culture and race norms should be considered. For families of color living in the USA, the context of racism and discrimination in which they navigate must be highlighted when examining the process of parental socialization of children's self-regulation and coping. A robust body of literature demonstrates that Black and Brown children's normative emotional and behavioral expressions are sometimes vigilantly monitored and interpreted with racial bias (Goff et al., 2014; Halberstadt et al., 2018; Lozada et al., 2022). Accordingly, the extent to which children of color are able to regulate their overt behavioral and emotional responses to distress can have dire long-term social and academic consequences. For example, Thomas and colleagues (2009) found that Black boys were viewed more negatively by teachers when they engaged in less anger suppression and greater anger expression. Such impressions are impactful as teachers' perceptions of Black youth's behaviors are linked with lower graduation rates and a higher likelihood of involvement in the criminal justice system (Okonofua & Eberhardt, 2015).

Theory and research around the impact of racism on parental socialization of self-regulation has been most systematically developed in research among Black American families. In their integrative model of racial and emotion socialization (IMRES), Dunbar and colleagues (2017a) proposed that Black parents engage in *emotion-centered racial coping* socialization strategies. These strategies refer to a balance of discussions about race, emotion-validating, and emotion-suppressing practices that help promote children's competent and flexible emotion regulation skills. Specifically, a balanced strategy helps children suppress emotions in situations in which emotion expression can have detrimental consequences while allowing them to express and manage their emotions in the context of a warm parent–child relationship. Research suggests that Black parents' use of emotion-centered racial coping strategies are most prominent when they themselves have experienced racism, perhaps raising their consciousness for the need to prepare their children for similar experiences. For example, Dunbar and colleagues (2017b) found that Black mothers who experienced institutional and interpersonal racism when their children were in kindergarten were more likely to believe that their children would experience negative social consequences for their displays of negative emotions once their children were in first grade, and these beliefs were associated with mothers' greater use of racial coping strategies in first grade. Further, specific Afrocultural values (e.g., spirituality, orality, communalism, affect) also remain salient among Black American emotion-related parenting practices (Lozada et al., 2022). Such values are embedded within cultural parenting practices such as conveying messages about spirituality and religious coping (e.g., Stevenson et al., 2002), elevated use of emotion labels during storytelling (e.g., Odom et al., 2016), and the use of storytelling to teach youth how to cope with emotions (Lozada & Riley, 2019).

Regarding parent–child relationship quality, disciplinary practices, and emotion-related socialization practices, some

literature has found that African American parents demonstrate lower sensitivity (Malda & Mesman, 2017), utilize harsher discipline (McLoyd & Smith, 2002), and endorse higher use of punishing and minimizing responses to children's emotions compared to European American families (Labella, 2018). Yet support for these ethnic-racial differences in parenting is not always replicated (Labella, 2018) and have been attenuated when accounting for socioeconomic status (Malda & Mesman, 2017). Applied to the consideration of families of color more broadly, findings of parenting differences across ethnic-racial groups should be interpreted with parents' cultural and protective goals in mind, particularly in a socially stratified context such as the USA. For instance, a closer examination into the nuances of practices among Black American families demonstrate a balanced use of punishing and corrective practices with a high level of supportive responses to children's emotions (Dunbar et al., 2021). As such, among Black American families, the use of punitive and minimizing responses in response to children's emotions has been linked to more competent behavioral and emotion regulation, but only when these practices are paired with parents' simultaneous use of high levels of emotion-validating practices and contextualized by discussions about racism (Dunbar et al., 2021, 2022; Thomas & Blackmon, 2015). These findings further support the need to understand racial and cultural socialization parenting practices in addition to emotion-related parenting practices to gain a more accurate understanding of the development of coping among youth of color. Thus, it is critical that culture, racial norms, and cultural socialization practices be considered in future research focusing on the socialization of emotion-related regulation and coping.

Developmental Changes, Direction of Effects, Mothers and Fathers, and Measurement Considerations

Another important consideration is how parental socialization practices may change with children's development. As one notable example, Spinrad and colleagues (2004) found mothers decreased their attempts to regulate their child's emotions between 18 and 30 months. Further, the specific types of strategies that mothers used differentially predicted children's regulation and emotions at age 5, suggesting that the effectiveness of particular strategies (i.e., comforting, distracting) may depend on their children's self-regulatory abilities as they mature. In addition, during later childhood or adolescence, the role of parents is likely to change due to the increased role of teachers and peers, and youths' own cognitive advances. Thus, it is expected that parents' strategies not only change with age, but the relations of socialization to children's self-regulation and coping likely weaken (see Valiente et al., 2006).

Studies focusing on the socialization of children's self-regulation and coping most often assume that parents shape children's development; however, children's characteristics, such as temperament, gender, or health status, undoubtedly elicit different parenting behaviors (Bell, 1968; Belsky, 1984). Specifically, with relation to regulation or coping, children who are dysregulated or fall apart when challenged may create a stressful environment that unfolds into parental negativity, harsh control, or ineffective parenting. Indeed, there has been some evidence that parenting behaviors are predicted by children's self-regulation and coping (e.g., Eisenberg et al., 1999, 2015; Merz et al., 2017; Moilanen et al., 2015; Mortensen & Barnett, 2018). For example, researchers found that children's earlier self-regulation predicted relatively high levels of

parents' sensitivity, warmth, support, and cognitive assistance (Clark et al., 2018; Eisenberg, Vidmar, et al., 2010; Otterpohl & Wild, 2015; van der Voort et al., 2013; Van Lissa et al., 2019), and relatively low levels of parents' subsequent negative control, rejection, and inconsistent discipline (Baron & Malmberg, 2019; Hong et al., 2015; Lengua, 2006; Van der Giessen et al., 2014).

Further, in a recent meta-analysis, Li et al. (2019) found bidirectional relations between parenting and adolescents' self-control, with no significant difference between the longitudinal associations from parenting to youths' self-control compared to the other direction of effects. Moreover, bidirectional relations have been found between parenting stress and children's coping competence (Cappa et al., 2011). In another study, when boys used caregiver-focused behaviors, such as running to or reaching for their caregivers during a novel task, mothers reported fewer minimizing/punitive responses to toddlers' negative emotions a year later, but these relations did not hold for girls (Premo & Kiel, 2014). In contrast, in some studies, child effects have been tested but were not found (Eisenberg et al., 2005). Thus, it is critical for researchers to consider bidirectional and transactional relations between parenting and coping or self-regulation.

There also has been a call for additional research to examine both mothers' and fathers' unique roles in children's emotional regulation and coping. In particular, it is important to not only include fathers in studies of regulation and coping, but also to determine whether fathers make unique contributions to the development of children's regulation. Further, researchers should continue to examine whether the association of mothers' and fathers' parenting to children's regulation differs for sons and daughters (see Bernier et al., 2012; Bridgett et al., 2018; Feldman & Klein, 2003; Kochanska et al., 2008; Mathis & Bierman, 2015).

Finally, studies focused on regulation and coping often use different measures, categories, and labels, even though there is conceptual overlap between the constructs. For example, the coping literature often includes categories that overlap considerably with effortful control, such as problem-solving and distraction, but coping also can include some behaviors that may not be considered particularly regulatory, such as delegation (i.e., whining, self-pity) or rumination. Thus, it can be difficult to synthesize the research on the socialization of regulation and coping, given that researchers sometimes operationalize the constructs differently. Researchers should assess both constructs in the same study to examine whether parenting practices differentially predict coping and self-regulation.

Conclusions

In this chapter, we have explored relations between socialization practices and children's regulation and coping (see Table 18.1 for an overview). Although the coping literature is generally treated as a separate body of research than the work on self-regulation, we (and others) see the constructs as highly related (Compas et al., 2001). One of our goals was to review the literature on the relations of parental socialization strategies, including the parent–child relationship, discipline practices, and emotion-related socialization practices to children's coping and regulation. In addition, we argued that more research is needed to develop interventions to improve children's regulation and coping. We also offered additional considerations for future study. Specifically, we propose a more nuanced approach to studying the socialization of coping and regulation with regard to culture and diversity, as well as a focus on development, bidirectional approaches, and measurement issues.

Table 18.1 *Overview of the socialization of emotion-related regulation and coping*

Focus of research	Main research findings
Parent–child relationship quality	• Securely attached children have been found to have better regulatory skills compared to insecurely attached children • Parents' sensitive and responsive caregiving has been positively related to children's emotion-related regulation and adaptive coping strategies
Parental disciplinary strategy	• Harsh or overcontrolling parenting has been inversely related to children's emotion-related regulation • Gentle control (i.e., supportive, regulated control) has been found to predict children's higher regulatory behavior and adaptive coping • Parenting styles that are warm and supportive have been associated with higher effortful control and coping efficacy in children
Parental emotion-related socialization practices	• Parents' own positive expressivity (or low negative expressivity) has been positively associated with children's regulation and coping strategies • Children have relatively strong regulatory and coping skills when their parents respond to their emotions with problem-solving and emotion-focused reactions and who encourage their children to express their emotions (rather than minimizing or punishing their children's negative emotions) • Parents' discussion of emotions and emotion coaching has been related to children's higher levels of emotion-related regulation
Intervention	• Although research is limited, parenting intervention programs have shown promise for both parenting and child outcomes
Areas for further research	• A focus on cultural and racial considerations, and particularly on the socialization of emotion for youth of color, is needed • Researchers should consider issues regarding how socialization practices change with children's age, the potential for bidirectional effects, the unique role of various socializers, and additional measurement issues when examining regulation and coping

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19 Temperament, Family Context, and the Development of Coping

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Introduction

A number of factors contribute to the development of coping in childhood, including experiences of economic disadvantage, stress and adversity, family conflict, parental mental health, parenting, as well as individual factors such as temperament, executive function, and emotion regulation. However, to understand children's coping development, it is important to account for the complex interplay among these factors, and in particular between children's temperament and their family contextual experiences. It is further useful to consider protective family experiences that might support the development of effective coping and moderate the potential impact of temperament and risk on coping development. In addition, it is critical to consider the early foundations of children's emerging coping strategies by considering early and middle childhood influences on later coping.

In this chapter, we present a model and review research supporting the proposal that children's temperamental negative reactivity and lower effortful control in early and middle childhood contribute to heightened emotional arousal in response to experiences of family stress and adversity, increasing the likelihood that children will use less effective coping strategies that contribute to adjustment problems over time. Thus, temperament is expected to moderate the effects of stress on coping. Additionally, experiences of stress and adversity predict increases in negative emotionality and decreases in effortful control over time, which in turn would directly impact coping. In this pathway, changes in temperament expression mediate the effects of stress, increasing the likelihood of children's use of coping that contributes to adjustment problems (see Figure 19.1). Taken together, we purport that temperament in early and middle childhood both mediates and moderates the effects of family contextual factors in shaping children's coping. This complex interplay between family context and child temperament is proposed to contribute to patterned coping responses or styles that influence children's adjustment.

This chapter briefly reviews the development of coping in early and middle childhood to highlight how coping during these developmental periods might be shaped by experiences and temperament. We then discuss the role that temperament plays in concert with experiences of adversity in shaping children's emotional and cognitive responses to stress. We review how temperament may mediate and moderate the contributions of family contextual experiences to the development of coping and children's adjustment. Most of this research is conducted with preadolescent and adolescent samples, which we review as providing support for the proposed model.

Different conceptual approaches to coping use different terms for coping strategies that have overlapping or similar definitions (Band & Weisz, 1988; Carver et al., 1989; Compas

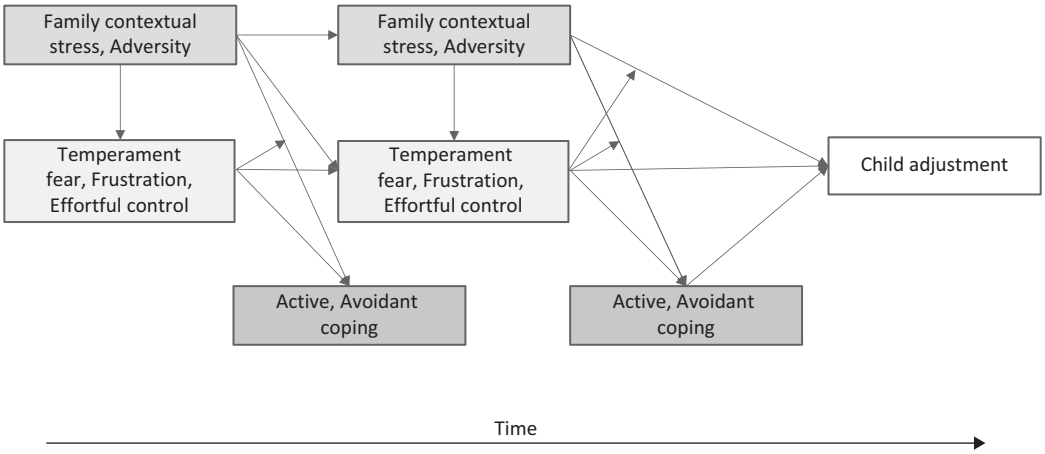

Figure 19.1 Conceptual model of temperament mediating and moderating the effects of family contextual risk on the development of coping and children's adjustment problems.

et al., 2001; Eisenberg et al., 1997; Skinner et al., 2003). It is beyond the scope of this chapter to clarify the distinctions among these definitions. Therefore, we interchangeably use the terms engagement, approach, and active coping, which tend to include strategies such as problem-solving, cognitive decision-making, reframing, and acceptance. The terms disengagement and avoidant coping tend to refer to suppression, wishful thinking, and cognitive and behavioral avoidance.

Development of Coping during Early and Middle Childhood

Research suggests normative patterns in children's use of coping coincide with developmental transitions. In early childhood, young children appear to almost exclusively rely on behavioral coping (Zimmer-Gembeck & Skinner, 2011). These strategies primarily include social support-seeking, an engagement strategy, and behavioral escape or avoidance, a disengagement strategy. Younger children depend on external sources to assist with coping as they have limited resources to handle stressors (Kenny, 2000). Children seek support from adults (e.g., parents and teachers) as a strategy to aid in supporting other overt, instrumental actions or in regulating emotions in the face of overwhelming stressors (Zimmer-Gembeck & Skinner, 2011). Parents, in particular, are critical in the development of children's coping skills, explicitly through means such as modeling and coaching, and implicitly via actions like comforting (Holodynski & Friedlmeier, 2006; Skinner & Zimmer-Gembeck, 2007). Between the ages of 3 and 6, children's regulation shifts from reactive to volitional and becomes a more self-directed process. Child coping processes transition from depending on *both* child and caregiver resources to being increasingly child-dependent with continued scaffolding and socialization from trusted adults (Eisenberg et al., 2009; Holodynski & Friedlmeier, 2006; Zimmer-Gembeck & Skinner, 2011, 2016). Experiences of stress or adversity within the family context are likely to impact this socialization process and the development of children's coping.

During middle childhood, in addition to engagement behavioral strategies, the use of engagement cognitive strategies increases, and

use of behavioral disengagement strategies decreases (Zimmer-Gembeck & Skinner, 2011). For example, strategies like behavioral escape are increasingly replaced by cognitive avoidance (Compas et al., 2001; Kenny, 2000; Zimmer-Gembeck & Skinner, 2011). Coping in middle childhood hinges on growing flexibility in selecting and implementing appropriate coping strategies from an expanded range of options (Compas et al., 2001; Zimmer-Gembeck & Skinner, 2016). This transition coincides with children's internalization of regulation skills and ability to incorporate self-reflection and cognitive strategies (Sameroff & Haith, 1996; Zimmer-Gembeck & Skinner, 2016). Children's temperament negative reactivity and effortful control might limit or facilitate, respectively, the requisite flexibility in coping strategies employed. Both individual difference in temperament and development of executive function, language abilities, and metacognition contribute to advances in coping such as self-driven soothing and advanced problem-solving. It is during this normative developmental shift from disengagement to engagement strategies that children's experiences of family context, stress, and adversity, together with their temperament, might shape a tendency toward or reliance on the use of disengagement strategies proportionally more than engagement strategies, and potentially the development of a coping style.

Coping and Adjustment

Typically, higher engagement coping, such as problem-solving and cognitive reframing, is associated with lower internalizing symptoms and externalizing problems, and higher social and academic competence (Compas et al., 2017; Sandler et al., 2000; Santiago et al., 2017). In contrast, higher disengagement coping, such as social withdrawal and cognitive avoidance, as well as higher involuntary engagement and involuntary disengagement coping, such as rumination and emotional numbing respectively, are associated with more internalizing and externalizing problems, and lower social and academic competence (Compas et al., 2001, 2017; Dempsey, 2002; Santiago et al., 2017).

However, there are conditions under which these general patterns do not hold. For some children who are exposed to more chronic and/or uncontrollable stressors, such as chronic illness or economic strain, engagement strategies have been found in some studies to be associated with increased internalizing and externalizing problems, whereas disengagement strategies have been found to be associated with better adjustment (Aldridge & Roesch, 2007; Carothers et al., 2016). Findings demonstrating this pattern support the hypothesis that coping responses are most effective when they match the controllability of the stressor. Coping efforts that involve direct engagement with or attempts to resolve uncontrollable stressors may be ineffective, frustrating, or discouraging in circumstances that are beyond an individual's control. Thus, rather than considering some strategies universally appropriate, aligning the coping response with the stressor is paramount (Carothers et al., 2016; Compas et al., 2001; Kliewer et al., 2006; Zimmer-Gembeck et al., 2016).

In general, the effect sizes in studies that evaluate the links between coping and adjustment are small to moderate in magnitude (effect size absolute values ranging from r = 0.02 to 0.30; Compas et al., 2017). When there is inconsistency in findings across studies it is likely due to varying definitions and measurement of coping, varying nature of stressors (e.g., acute vs. chronic), controllability of stressors, and population differences (e.g., normative vs. at-risk; Compas et al., 2017). Inconsistency across studies might also be

due to the effects of moderating factors that differentiate children's responses to stress, such as temperament individual differences in reactivity and regulation, which might facilitate or constrain the development and/or deployment of coping strategies.

Temperament and the Development of Coping

Temperament is defined as stable, physiologically based individual differences in reactivity and self-regulation, including motivation, affect, and attention characteristics (Rothbart & Bates, 2006). Reactivity includes individual differences in the arousal and intensity of fear and frustration, which are known to predict internalizing and externalizing problems (Rothbart & Bates, 2006). Temperament self-regulation, most often conceptualized as effortful control, refers to executive attention regulation and inhibitory control of thoughts and behaviors, and is negatively related to adjustment problems (Eisenberg et al., 2000; Rothbart & Bates, 1998). Temperament individual differences in reactivity and regulation are genetically based, present early in life, and malleable, shaped throughout childhood by experience (Rothbart & Bates, 1998).

Aspects of temperament are known to elevate risk for adjustment problems or psychopathology (Nigg, 2006). Some research suggests that greater reliance on avoidant coping and less use of active coping may partially account for the association of temperament with psychopathology (Hong et al., 2017; Taylor et al., 2018; Thompson et al., 2014). Further, temperament has been shown to exacerbate the negative effects of adversity (Lengua & Wachs, 2012), and coping might mediate the stress-exacerbating effects of temperament.

The fear and frustration aspects of temperament reactivity are most often studied in relation to child psychopathology. Fear reactivity arises from activation of the behavioral inhibition system, associated with responsiveness to cues of threat or punishment and freezing or passive avoidance responses. Hence, fear reactivity is expected to increase avoidant coping (Mogg & Bradley, 2005), and in turn, anxiety and depression (e.g., Trew, 2011). Frustration reactivity arises from activation of the behavioral activation system, which is associated with responsiveness to reward cues, frustration in nonreward contexts, active avoidance of punishment, as well as the fight-flight system responsible for defensive aggression (Rothbart et al., 2011). Therefore, frustration reactivity is also expected to increase avoidant coping, and in turn, aggression and conduct disorder. For example, studies examining negative emotionality, often a combination of fear and frustration reactivity, have shown that higher negative emotionality predicted greater use of avoidant coping or less use of active coping, and in turn, internalizing and externalizing problems (Lengua & Long, 2002; Miller et al., 2009; Thompson et al., 2014).

Effortful control operates to modulate reactivity, either facilitating or inhibiting a physiological, affective, or behavioral response. High effortful control is expected to facilitate attention shifting away from threatening or hostile stimuli as well as cognitive inhibition of automatic biases, which would reduce avoidant coping (e.g., Taylor et al., 2018; Thompson et al., 2014) and increase the use of active coping strategies (e.g., Thompson et al., 2014), thereby reducing anxiety, depression, aggression, and conduct problems (Kertz et al., 2016). For example, one study found that the relation of attentional control and internalizing was mediated by active coping strategies, suggesting that greater control over attentional processes facilitates the use of more complex coping strategies (Compas et al., 2017). In addition,

childhood experiences of stress and adversity might shape temperament expression such that children show increases in negative emotionality and decreases in executive control (Lengua et al., 2014; Taylor et al., 2018), which might account for the effects of stressful family contexts on coping and psychopathology. These associations suggest that temperament might mediate the association of contextual family experiences with children's coping.

Family Context, Temperament, and the Development of Coping

Children's coping development in early and middle childhood is responsive to their environments, particularly their family context, with the potential for both positive and negative influences. Most evidence points to the impact of family contexts characterized by elevated, chronic stress (Evans & Kim, 2013). Factors such as income-related adversity, high levels of family conflict, parental mental health problems, and parental substance use are thought to shape, strain, and potentially damage self-regulatory capacities such as coping (Wadsworth, 2015). Further, these contextual stressors are likely to co-occur. While the toll of income-related adversity is experienced by millions of children a year, little is known about how children cope with these circumstances (Wadsworth & Berger, 2006). There is some evidence that higher levels of cumulative risk are associated with higher levels of avoidant but not active coping in middle childhood (Thompson et al., 2016) and similarly, that high chronic economic strain and high family conflict (Wadsworth & Compas, 2002) as well as stressful life events (Seiffge-Krenke et al., 2009) are associated with greater use of avoidant coping among adolescents. These findings make sense conceptually, as income-related adversity, exposure to violence, etc. are exceedingly difficult for children to cope with using problem-solving-based approaches (Wadsworth, 2015).

In addition, temperament is expected to interact with family contextual experiences to predict children's coping and adjustment. An individual's temperament influences the likelihood of reacting to situational demands in a particular way, for example, with greater negative emotional arousal or less regulated emotions or behaviors, and thus, also predisposes them to being more or less likely to engage particular types of coping (see Compas, 2009). As children develop, both their temperament and coping styles are shaped by their family contexts, which may either support or inhibit abilities that allow for more nuanced engagement with their environments and skilled responses to stressors (Zimmer-Gembeck & Skinner, 2011). For instance, children who grow up in contexts of poverty are often exposed to greater variety and frequency of stressors in their family lives, though they may have fewer models for effective coping (Evans & Kim, 2013). Conversely, children who grow up in higher socioeconomic status environments often have parents or other adults who experience less adversity, and thus, potentially have greater emotional bandwidth to model effective coping.

There are a number of studies demonstrating temperament moderating the relation between family context and child coping. Hilt et al. (2012) found that children who were high in negative affect and who had experienced over-controlling parenting when they were 3–4 years old were the most likely to engage in rumination when they were 13–15 years old. Further, this study found that risk for rumination was highest for children low in negative affect who experienced greater family displays of sadness and guilt, as well as for children who were high in effortful control and who experienced overcontrolling parenting. In another study of children 3–8 years old,

negative reactivity moderated the effects of maternal negativity on children's coping, such that children with greater negative reactivity and more maternal negativity engaged in more avoidant coping, and children with less reactivity and less maternal negativity engaged in more social support-seeking behaviors (Goodvin et al., 2006).

It is important to note that coping strategies may relate differently to adjustment when implemented by children living in certain high-risk contexts. Wadsworth (2015) articulates that early functional adaptations, such as the use of avoidant coping, come with concurrent trade-offs and long-term consequences. Taken together, avoidant coping strategies may be adaptive in the context of chronic and uncontrollable environments such as those often observed in low-income contexts but be deleterious over time. In support of this framework, while greater reliance on active coping strategies was associated with decreased aggressive and anxious/depressed behaviors among adolescents managing high levels of economic strain and family conflict, avoidant strategies were not associated with poorer functioning, as has been observed in less adverse contexts (Wadsworth & Compas, 2002). However, other studies have found avoidant coping to account for the effects of cumulative risk on changes in children's positive adjustment and adjustment problems in middle childhood (Thompson et al., 2016) and for disengagement coping to exacerbate symptoms in adolescents living in a low-income context (DeCarlo Santiago & Wadsworth, 2009). These findings highlight the need for further consideration of the nature of specific stressors (Compas et al., 2017).

Income

Although temperament, coping, and income are thought to influence adjustment and mental health outcomes, there is mixed evidence for the mechanisms of these effects. Disengagement coping has been found to mediate the relation between chronic poverty and the development of psychopathology in adolescence (Kim et al., 2016). However, avoidance may only be problematic when it is used in isolation. Aldridge and Roesch (2008) found that low-income adolescents who engaged in both active and avoidant strategies fared better than those who used just avoidant strategies, and that those who used active strategies saw the greatest personal growth and greatest decrease in psychopathology. One study investigated potential moderation effects of temperament on the relation between cumulative risk and changes in active and avoidant coping in preadolescent children. This study found that children low in effortful control utilized less active coping relative to avoidant coping, and that the use of both active and avoidant coping increased as cumulative risk increased. However, children who were higher in effortful control used more active coping relative to avoidant coping, suggesting that effortful control represented a resource facilitating the deployment of a variety of coping strategies (Parrish et al., 2021). Taken together, these findings may suggest that children who have greater regulatory capacities may employ a broader range of efforts to find the most effective coping strategy to meet the demands of the particular stressor.

Family Conflict

Children who witnessed or experienced interpersonal conflict have a greater likelihood of attending to potential threats, exhibiting more extreme emotional responses to threatening stimuli, and engaging in ruminative coping (McLaughlin & Lambert, 2017). Between mothers and their children, there is a higher risk for conflict and maltreatment in higher-

risk environments and for children who exhibit temperaments characterized by less adaptability, predictability, and soothability (MacKenzie et al., 2011). Given this, it is plausible that family conflict might shape how children cope. One study noted a modest association between child-perceived interparental conflict and avoidant coping among youth aged 9–12 (O'Hara et al., 2019), and a second study of children aged 8–11 found support for an association with active coping (Nicolotti et al., 2003). However, other studies examining family conflict as a predictor of coping in children in middle childhood and adolescence fail to support an association between parental or family conflict and children's coping (DeCarlo Santiago & Wadsworth, 2009; Langrock et al., 2002; Shelton & Harold, 2008; Tu et al., 2016).

Although there is mixed evidence that family conflict predicts child coping, across studies, coping is a predictor of children's adjustment in response to conflict (DeCarlo Santiago & Wadsworth, 2009; Nicolotti et al., 2003; O'Hara et al., 2019; Shelton & Harold, 2008). For example, higher levels of problem-focused coping were associated with lower levels of internalizing symptoms and past-year marijuana use for adolescents experiencing high levels of postdivorce interparental conflict (O'Hara et al., 2019). Supporting the research that coping is an important mediator and moderator of stressful experiences for children (Compas et al., 2017; Grant et al., 2003), one study found that, in the context of marital conflict, higher levels of engaged coping were related to lower risk for externalizing problems, whereas higher levels of engaged coping increased risk for internalizing symptoms in 8-year-old children (Tu et al., 2016). A second study found that more secondary control coping, a coping approach that includes strategies aimed at adaptation to the stressor, buffered the effects of family conflict on concurrent adolescent internalizing symptoms, and greater use of avoidant coping exacerbated the effects of family conflict on later internalizing symptoms (DeCarlo Santiago & Wadsworth, 2009).

Temperament also plays a role in children's adjustment in response to family conflict in the form of interpersonal violence. Children with "easy" temperament characteristics, that is lower negative emotionality and higher self-regulation, demonstrated greater resilience when exposed to interpersonal violence in the home (Martinez-Torteya et al., 2009), while interpersonal violence is also associated with more difficult temperament in early childhood (Burke et al., 2008; Martinez-Torteya et al., 2009). This suggests both potential moderating and mediating effects of temperament in the relations of family conflict or violence exposure to children's coping and adjustment.

Violence Exposure

Findings examining children's exposure to violence outside the home suggest increased exposure is associated with increased reliance on avoidant coping in preadolescents (Reid-Quiñones et al., 2011), thus shaping coping approaches. In addition, there is evidence of interaction effects between violence exposure and coping, with stronger associations of avoidant coping with children's externalizing problems at high levels of exposure compared to low levels of exposure observed in adolescence (Brady et al., 2008; McGee et al., 2019). In contrast, there is a greater impact of active coping on externalizing problems at low levels of violence exposure (McGee et al., 2019). Notably, exposure to violence also engenders beliefs about the acceptability of aggression as an effective method for solving disputes (Reid-Quiñones et al., 2011). One study found that there was no longitudinal association between violence exposure and violent behavior among youth who employed effective coping

strategies such as problem-solving and positive reappraisal (Brady et al., 2008).

Maltreatment

Maltreatment may also influence coping (Arslan, 2017). Maltreatment includes sexual, physical, and emotional abuse, as well neglect, and it is conservatively estimated that 1 in 10 children will experience maltreatment (Finkelhor et al., 2009). A recent meta-analysis found that maltreated adolescents rely on more avoidant coping, whereas associations between active coping approaches and child maltreatment were nonsignificant (Gruhn & Compas, 2020). Avoidant coping has been found to mediate the association between self-reported sexual abuse and stress-related symptoms in adolescents (Bal et al., 2003). Other studies fail to find evidence for coping mediating the effects of child sexual abuse (Shapiro & Levendosky, 1999; Tremblay et al., 1999). Over one third of children experiencing sexual abuse are under the age of 12 (Bureau of Justice Statistics, 1997) making it critical to understand the impact of sexual abuse on coping. In a study of 7- to 12-year-olds who had been sexually abused, Chaffin et al. (1997) found that avoidant coping was related to parent-reported child externalizing behaviors whereas active/social coping, angry coping, or internalizing coping were not. In the same study, angry coping was associated with teacher-reported child internalizing, externalizing, and social problems among other issues. Together, these studies suggest that coping may function similarly across middle childhood and adolescence, such that avoidant coping leads to greater stress-related problems.

Parental Mental Health

Parental mental health is thought to affect children through not only its impact on parenting practices (e.g., greater reliance on punitive and inconsistent parenting) but also through greater associated risk for child experiences of adversity and greater modeling of maladaptive coping (Blanco et al., 2017; McDonald et al., 2019). Children with temperaments characterized by higher negativity and low effortful control may be the most susceptible to the negative impacts of poor parental mental health, as they are already at greater risk for internalizing and externalizing problems (Chen et al., 2014).

Parental mental health symptoms, central to family stress models, have not been systematically examined as predictors of children's coping strategies, and research on children living in the context of parental substance misuse is largely qualitative (Holmila et al., 2011; Kroll, 2004). In the small literature examining the association of maternal depression with children's coping styles, parental depression has been associated with adolescents' increased reliance on involuntary disengagement (i.e., escape or inaction), similar to avoidance (Jaser et al., 2005; Langrock et al., 2002), as well as decreased utilization of active coping (Langrock et al., 2002). This dearth of research belies estimates that 1 in 8 children live in a household with at least one parent with a past year substance use disorder (Lipari & Van Horn, 2017), and that parental depression demonstrates an incidence rate of roughly 6% in mothers and 2% of fathers among children 1–12 years old (Davé et al., 2010). Further, depression is disproportionately experienced by mothers who experience other adversity (Ertel et al., 2011), suggesting potential compounded effects of adversity and depression on children's coping development.

Summary

Perhaps the clearest takeaway from this research is support for the role of coping as a

mediator of the relation between risk and adjustment, as well as the potential for coping to moderate risk experiences. These findings are well in line with conceptual representations of stress, which emphasize that the relations among stressors, moderators, mediators, and psychopathology are dynamic, that mediators of stress may become fixed response patterns that function as moderators later in life, that context matters, and that the interplay and interaction of these factors predicts psychopathology (Grant et al., 2003). Children experiencing contextual risk factors such as low income, family conflict, parental mental health symptoms, and maltreatment may rely more on avoidant coping strategies. While typical associations between coping and adjustment were often observed, there is also some evidence that avoidant coping in these uncontrollable contexts may not have comparable effects on adjustment. The recursive influence of stable risk contexts and experiences likely becomes a patterned way of cognitive processing and behavioral responding (Grant et al., 2003) that, while adaptive in the short term, become a liability over time (Wadsworth, 2015). The vast majority of this research is conducted on youth in adolescence, not middle childhood. Thus, longitudinal studies of children growing up in these contexts of persistent and pervasive risk are warranted.

Protective Family Contexts

Although research on coping prompts a focus on children's experiences of stress and adversity, it is important to also recognize that certain family (e.g., Kaeppler & Lucier-Greer, 2020; Rosario et al., 2003) and contextual factors (e.g., Theron & Theron, 2013) can provide promotive and protective effects in the development of effective coping, particularly in the contexts characterized by adversity. For example, while high cumulative risk predicts lower self-efficacy in children, turning to family as a coping resource has been shown to buffer this effect of cumulative risk (Kaeppler & Lucier-Greer, 2020). Similarly, support from caregivers has been shown to buffer the relation between girls' victimization by community violence and delinquent behaviors (Rosario et al., 2003). A resilience lens represents a fruitful direction for further research.

Positive Parenting

Parents are most often children's first models for how to cope. In contexts of risk, parenting can buffer the effects of adversity and provide protection against the development of maladaptive behaviors that can canalize and increase propensity for later psychopathology. Autonomy granting by parents has been shown to support greater use of active coping (Seiffge-Krenke & Pakalniskiene, 2011). Further, an intervention targeting parents with depression and their adolescents demonstrated that both positive changes in parenting practices and increases in adolescents' secondary-control coping reduced externalizing problems (Compas et al., 2010). Similarly, positive parenting has been inversely associated with negative emotionality in early childhood (Paulussen-Hoogeboom et al., 2007), and negative emotionality has been predictive of adaptive coping in adolescence (Yap et al., 2011). Parents are instrumental in providing the scaffolding needed for children to develop effective coping, which is especially true for children who have temperaments characterized by greater negative emotional reactivity and lower effortful control. While positive parenting practices promote adaptive coping in children characterized by "easy" temperaments, these practices show greater benefits for those with "difficult" temperaments (Slagt et al., 2016), hence showing that temperament

might moderate the effects of parenting on children's coping. In addition, given evidence that temperament characteristics can elicit different parenting behaviors (Kiff et al., 2011), the transactions between parenting and temperament can be expected to shape children's coping over time.

Family Support

Family support broadly encompasses family functioning in domains of expressiveness, conflict, and cohesiveness (Seiffge-Krenke, 1995). Perceived family support has been extensively researched in relation to drinking to cope in adolescents, but has not been examined in younger children. Catanzaro and Laurent (2004) found that only individuals who had less perceived family support were more likely to use drinking as a coping strategy as their expectations about the positive benefits of drinking increased. This suggests that there is a protective effect of family support that may reduce the likelihood of engagement in harmful coping. Similarly, for girls involved in the juvenile justice system, having a stronger family support system was related to less avoidant coping (Goodkind et al., 2009). In addition, when family cohesion is high, children tend to be better protected against depression (Erdem & Slesnick, 2010), externalizing behaviors (Tung et al., 2018), and from the psychological consequences of health problems (Mendes et al., 2016). Further, negative emotionality has been found to moderate the association between family cohesion and internalizing and externalizing symptoms in adolescence, such that family cohesion was a protective factor among youth with high negative emotionality (Rabinowitz et al., 2016). Another path through which family cohesion may provide this protective effect is through parenting that promotes children's effortful control (Crawford et al., 2011) and their ability to cope. Yap and colleagues (2011) found that effortful control positively predicted adaptive coping responses, which mediated the association between effortful control and depressive symptoms in early adolescence.

Social Support

Social support can act as a buffer for stress and can foster the use of more effective coping. One study found that children high, but not low, in surgency (approach-oriented temperament) were less aggressive when they showed greater support-seeking behaviors (Dollar & Stifter, 2012). Instrumental social support-seeking can lead to engagement in other forms of active coping like problem-solving and emotion modulation. Indeed, some evidence suggests that both support-seeking and active coping share small to moderate correlations (r's = 0.16–0.39) with effortful control and emotionality (Boo & Spiering, 2010). Instead of potentially relying solely on internal resources to react to a problem, relying on others may reduce both the cognitive and emotional burdens related to stress.

Family Socialization of Coping

There is a substantial literature on the socialization of coping that converges on the importance of parental involvement and modeling in the development of children's coping responses. For instance, children tend to engage in less skillful means of coping if their parents employ involuntary disengagement, whereas children exhibit more sophisticated and effective coping strategies when parents demonstrate greater primary control (strategies to directly address the stressor or emotions related to it) or secondary control (strategies to change one's relation to the stressor; Santiago et al., 2012). The adverse impact of racism and racialized stressors is

increasingly being examined in relation to children's adjustment, and parental racial socialization is shown to contribute to engagement coping in Black youth, with the implication that culturally specific practices for successful coping are important (Anderson et al., 2018) as discussed further later on in the chapter.

Siblings may similarly impact an individual's coping repertoire. This may especially be the case in situations where, due to necessity or cultural norms, older siblings adopt parental responsibilities for younger siblings (Walsh et al., 2006). One study found that older siblings had an indirect effect on younger siblings' social and cognitive skills through the younger sibling's improved self-regulation (Brody et al., 2003). Another study showed that siblings may increase the likelihood of engaging in substance use as a form of coping (Rende et al., 2005). Although there is little research examining this, family socialization of effective coping might be particularly important for children who are high in temperament negative emotionality or low in effortful control, providing them with tools for managing their emotional and behavioral responses to stress. For example, one study of children in middle childhood found that parents' coping suggestions related differently to children's depressive symptoms for children who were both higher in negative emotionality and higher in exposure to peer victimization (Abaied, 2010).

Taken together, children's temperament and family contextual experiences of support and adversity shape and moderate children's effective use of coping strategies. However, in considering family context and temperament effects on coping, it is critical to address the role of children's multiple and intersecting identities.

Intersecting Identities and Coping

Coping can be different in individuals of varying intersectional identities and based on situational contexts and cultural norms. How children develop coping styles depends on their gender, racial, ethnic, and cultural background, and specific stressors faced. According to Aldwin's (2007) sociocultural model of stress, coping, and adaptation, an individual's pattern of coping depends on their appraisal of stress, coping resources, cultural resources, and received reactions from others. This implies that attention is needed on the complex intersections of identity (gender, race, and culture), experiences of family contextual adversity, and temperament in understanding children's development and effective use of coping.

Though findings are mixed, patterns of coping may vary between boys and girls. Girls appear to use more support-seeking coping than boys, whereas boys have been found to rely more on avoidant coping (Eschenbeck et al., 2018; Jenzer et al., 2019). However, both boys and girls use engaged coping more often than disengaged coping (Persike & Seiffge-Krenke, 2012). Lengua and Stormshak (2000) explored the association of gender role orientation (relative masculinity and femininity) with coping in college students. They found that greater femininity predicted more avoidant coping and less active coping, whereas greater masculinity predicted the opposite. Although the pattern of findings is mixed, taken together, they suggest that individuals' coping behaviors may be influenced by gender norms.

Similarly, while there are predominant similarities in coping styles across cultures, there are also notable differences. For example, people from non-Western cultures tend to engage in emotion-focused and avoidance coping more than people from Western cultures (Oláh, 1995). Those from Western cultures tend to utilize more support-seeking and negotiating types of coping than those from Eastern cultures (Persike & Seiffge-Krenke, 2012). This difference may be explained by cultural expectations with Western cultures valuing assertiveness, and

Eastern cultures often conveying that reliance on others may be burdensome (Kashima et al., 1995). In addition, there is evidence of racial and ethnic differences. Within the USA, not only might people of different races and ethnicities utilize different types of coping styles (Constantine et al., 2005), but the adaptive advantage of using certain types of coping seems to depend on race and ethnicity (Chen & Kennedy, 2005).

Although research has examined the roles of gender and cultural identities on coping, it has not often examined these in intersection with family context and children's temperament. For example, Xu and colleagues (2006) proposed a "biocultural" model of coping in which children's coping resources are shaped by their cultural and family contexts, individual differences, and the goodness of fit among them. This would suggest that the associations of temperament and coping in children's adjustment might depend on their fit with children's cultural and family contexts. This is reinforced by evidence for East-West and individualistic-collectivistic differences in infant (e.g., Gartstein et al., 2006) and child temperament, as well as gender differences in temperament across cultures (e.g., Ahadi et al., 1993). Further, there are cultural differences in what is perceived as "difficult" temperament (e.g., Super et al., 2008) and how individuals and contexts respond to children's temperament (e.g., Chen et al., 2012). Given cultural and identity differences in both coping and temperament, research examining more complex models assessing goodness of fit of temperament and coping across intersecting identities and family contexts is needed.

Summary, Conclusions, and Future Directions

In this chapter we presented evidence for the interplay between children's temperament and family contextual experiences, with temperament both moderating and mediating the effects of stress on coping development. However, it is important to note that the evidence in many cases is sparse, although suggestive. Children's negative emotionality and low effortful control exacerbate the effects of contextual risk on children's coping, increasing the likelihood of avoidant coping and decreasing the likelihood of active coping. Further, temperament expression is shaped by contextual risk, and in turn, predicts coping development. However, there is a need for more research into these complex associations, particularly in contexts of intersecting gender, racial, and cultural identities. Children experiencing contextual risk and those with higher negative emotionality and lower effortful control rely on more avoidant coping strategies. However, the majority of this research is conducted with adolescents, not younger children, and as a result there is little understanding of how coping strategies and styles develop in relation to contextual risk and temperament, and developmental studies are needed.

Additionally, while typical associations between coping and adjustment are often observed, there is also evidence that active and avoidant coping in contexts of pervasive or uncontrollable stress may not have the typical effects on adjustment. These associations mirror research on children coping with cancer, where active coping styles led to more positive adjustment in the face of more controllable, chronic stressors, whereas strategies such as disengagement and distancing/distraction were associated with better outcomes for children who faced less controllable, acute stressors (Aldridge & Roesch, 2007). Mixed findings for the effects of engagement and disengagement strategies in contexts of chronic and uncontrollable stress suggest the need for more careful examination of specific strategies. It might be important to delineate more clearly

that some engagement strategies, particularly secondary control strategies such as cognitive reframing, acceptance, and emotion support-seeking, are beneficial in these contexts (consistent with typical expectations) while others, such as some active attempts to changes the situation, are detrimental to children's adjustment. Similarly, some disengagement strategies that facilitate some distance and recovery of personal resources, such as distraction, can be beneficial in high-risk contexts, whereas others, such as cognitive avoidance and wishful thinking, may be detrimental.

Another important consideration is that temperament may moderate the effectiveness of different coping strategies in supporting positive adjustment. As differences in temperament translate into differences in emotional or behavioral regulation, interactions between coping and temperament may result in differential associations with outcomes. For example, one study found that active coping predicted lower internalizing symptoms only when children had lower levels of frustration (Smith et al., 2022). Another study found that children's temperament self-regulation moderated the association of active and avoidant coping with anxiety symptoms. Active coping was associated with lower anxiety for children who were better regulated, but was unrelated for those who had lower self-regulation, whereas avoidant coping was positively related to anxiety for children who were less well regulated, but unrelated for children who were better regulated (Lengua & Sandler, 1996). Alternatively, coping strategies might moderate the association of temperament with adjustment as acquired strategies might offset the effects of a child's negative emotional arousal or lower self-regulation (e.g., Blair et al., 2004; Miller et al., 2009). Given these potentially complex associations and limited research, such interactions between temperament and coping should be investigated further.

There is also a need for more research into these complex associations, particularly in contexts of intersecting gender, racial, and cultural identities. Aldwin's (2007) model of coping posits that children's coping is influenced by culture as well as perceptions of the stressor and learned coping strategies. Xu et al.'s (2006) biocultural model of coping adds that children's temperament individual differences also play a role. This implies that additional research is needed on the complex intersections of gender, racial, and cultural identities with experiences of family context and temperament in understanding children's development and effective use of coping.

The complex associations among family contextual, individual temperament, and intersecting identities appear essential to understanding how children's coping develops, and importantly, whether coping efforts are effective in supporting positive social, emotional, and behavioral adjustment. This has critical implications for intervention. For younger children, parents can be important sources for learning coping, but the family context of risk and the broader context of economic and/or racialized stress might impact parents' effectiveness (Anderson et al., 2018), necessitating greater attention to parent well-being, parenting, and coping. In promoting effective coping in older children, addressing issues related to experiences of persistent or uncontrollable risk, as well as racial, ethnic, and gender discrimination is essential, potentially requiring matching of coping strategies to contexts. Beyond encouraging engagement coping over disengagement coping, access to multiple coping strategies and flexibility in use of strategies seems most effective (Parrish et al., 2021). Finally, consideration of children's temperament and tailoring coping strategy use to their characteristic strengths and challenges might enhance the effectiveness of coping

interventions (Smith et al., 2022). In sum, interactions and transactions between children's family context and their temperament appear to shape children's coping and have implications for coping effectiveness.

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20 Interparental Conflict, Parental Relationship Dissolution, and the Development of Children's Coping

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Introduction

This chapter takes a contextual approach to discussing children's coping with interparental conflict (IPC, i.e., frequent and intense conflict) in the context of parental separation/divorce. We highlight the importance of identifying the nature of the adversity with which the child is coping and the processes through which children's coping strategies affect adaptation to the adversity. Although we focus on parental separation/divorce, this approach applies to children's coping with other stressors, such as parental bereavement and incarceration. Take-home messages in this chapter are summarized in Table 20.1.

IPC and Parental Separation/Divorce Confer Risk for Children

Many children in the United States and around the world experience the separation or divorce of their parents. In the United States, an estimated 20 million children under 21 live with a custodial parent while their other parent lives elsewhere (Grall, 2020), and roughly 1 million children experience parental divorce every year (Kreider & Ellis, 2011). Parental separation/divorce and IPC go hand in hand for many families as the dissolution of relationships nearly always involves some degree of conflict. Parents' complicated feelings about the separation/divorce and their disagreements over a wide range of issues (e.g., parenting time, child support) regarding the reorganization of family life can lead to IPC. Although IPC often diminishes as a function of time after the separation/divorce (Fischer et al., 2005), IPC continues for several years after the separation/divorce for a sizable group (Hetherington & Kelly, 2002; Johnston, 1994; Sbarra & Emery, 2005). A recent study (N = 240) showed that 39% of children were exposed to frequent and intense IPC within 2 years following the divorce (O'Hara et al., 2019). This study found that 62% of the sample had an initially low level of IPC that declined further over the 6-year follow-up. A second group (30% of the sample) had an initial high level of IPC that gradually declined. In contrast, a third group (9% of the sample) also had an initial high level of IPC, but the conflict escalated over the following 6 years.

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Table 20.1 *Take-home messages in this chapter*

- Postdivorce interparental conflict poses a risk to children's development and well-being.
- Coping with interparental conflict is a context-specific and developmentally driven, motivated response to threats to a child's basic psychological needs.
- A contextual coping model provides a framework for studying and understanding children's strategies for coping with postseparation/divorce interparental conflict.
- The proposed contextual coping model posits that coping is influenced by both person-specific and contextual factors, is motivated by threats to basic psychological needs, and involves a combination of appraisals, emotions, and behaviors.
- Multiple intervention targets might strengthen children's ability to cope adaptively with IPC after parental separation/divorce, including helping children articulate adaptive coping goal(s) and identify and then use coping strategies that are likely to reduce the threat to basic need(s) in the situation.

Decades of research show that IPC is one of the leading factors that explains the well-established link between parental divorce and an elevated risk for children's maladjustment. Exposure to postseparation/divorce IPC is associated with multiple types of mental health disorders and problems, including depression and anxiety (Amato, 2000; Buchanan et al., 1991; Fauber et al., 1990; Kalmijn, 2016; Kelly, 2000; O'Hara et al., 2019), conduct problems (Amato & Cheadle, 2008; Hetherington et al., 1982; O'Hara et al., 2019), physical health problems (Fabricius & Luecken, 2007), and risky health behaviors (O'Hara et al., 2019; Orgilés et al., 2015). A recent study found that children with trajectories of postdivorce IPC that started high and either increased or decreased gradually over time had greater mental health and substance use problems than those who had continuously low levels of IPC (O'Hara et al., 2019). Even children whose parents had high levels of initial IPC that decreased gradually over time were still 2.7 times as likely to have a mental disorder diagnosis about 6 years later than those whose parents had consistently low levels of IPC. Thus, a high level of IPC soon after the divorce posed risk for children, whether it increased or decreased over time.

An Integrative Conceptualization of Children's Coping with IPC – Contextual Coping Model

Building on multiple models of coping, including transactional (Lazarus & Folkman, 1987), motivational (Skinner & Wellborn, 1994), ecological (Sandler, 2001), developmental (Zimmer-Gembeck & Skinner, 2011), and child/adolescent (Compas et al., 2017) perspectives, we constructed an integrative model focused on children's coping with IPC. Our contextual coping model proposes that coping with IPC is a context-specific and developmentally driven, motivated[1] response to threats to a child's basic psychological needs (see Figure 20.1).

The Coping Process Is an Interplay of Person-Specific and Contextual Factors

The first assumption of the contextual coping model is that coping involves an interplay

[1] We focus on the motivational aspect of coping in response to adverse events. This is broader than Compas et al.'s definition, "Conscious [and] volitional efforts. . ." (2001, p. 89), because we consider circumstances in which coping strategies are not only planful and conscious, but can be overlearned, automatic, emotion-driven reactions.

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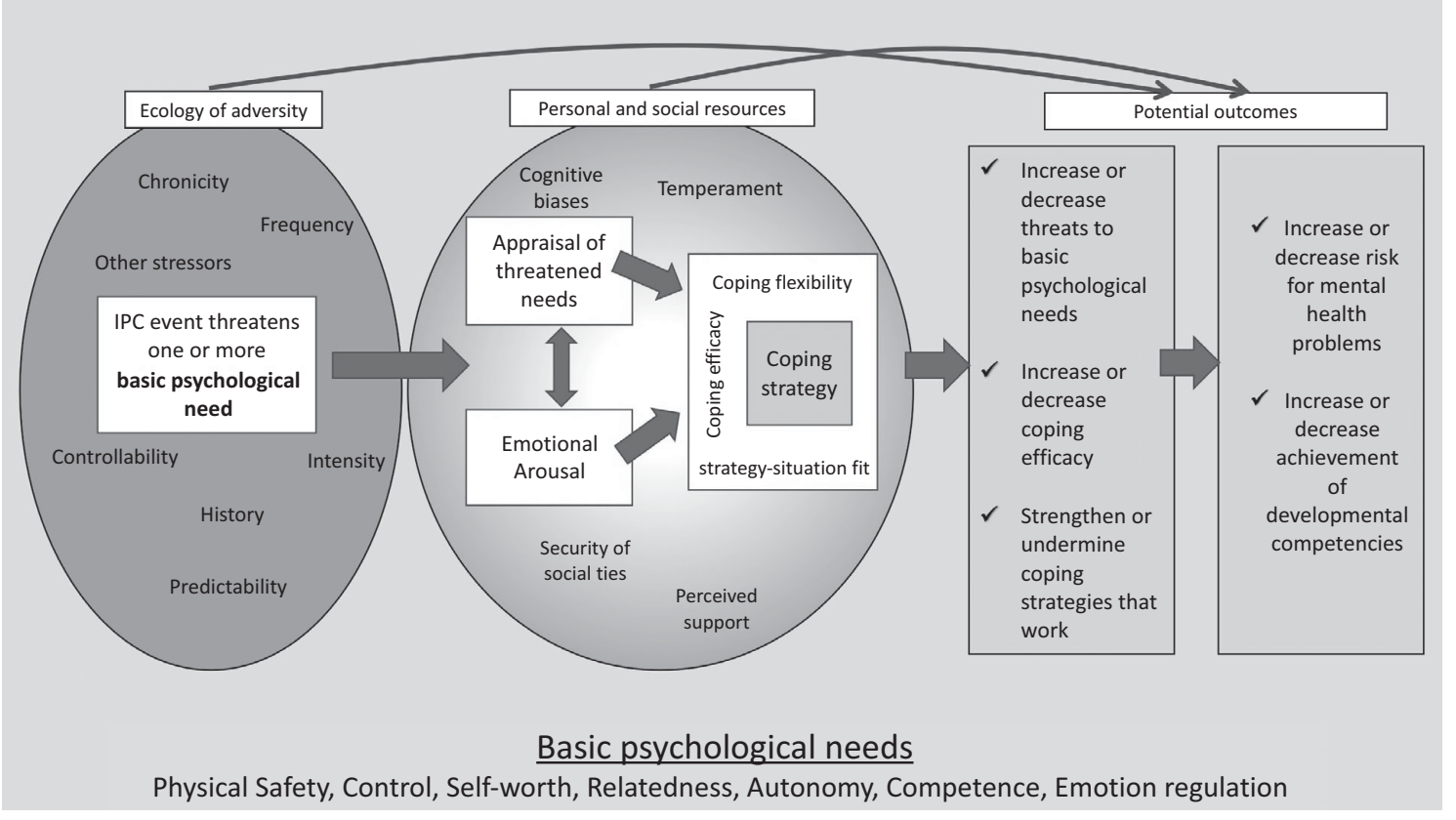

Figure 20.1 Contextual coping model for IPC.

between the individual (e.g., their stage of development) and the situation. Lazarus and Folkman (1984) posited that person-specific and environmental factors interact to set in motion a process that unfolds over time following an encounter with a situational stressor. Sandler (2001) also highlighted the centrality of ecological aspects (e.g., chronicity, predictability, intensity, social context) of adversity in shaping the short- and long-term consequences and the adaptiveness of different coping strategies. For example, distraction may be adaptive to manage affect for acute adversities but may be maladaptive and have serious costs to well-being as an approach to dealing with chronic adversities. Like Lazarus, Sandler posits that ecological and qualitative features of adversity exert their effects through subjective appraisals, which in turn impact the child's emotional and behavioral response to the adversity. Drawing on these models, we argue that understanding a child's coping with IPC requires special attention to ecological aspects of the IPC itself (e.g., chronicity, controllability, predictability, and intensity), in addition to the child's characteristics (e.g., developmental level) and social resources (e.g., perceived support).

The Coping Process Is Motivated by Threats to Basic Psychological Needs

The second assumption of the contextual coping model is that coping behavior is motivated by stressful events that threaten basic psychological needs. Skinner and Welborn's (1994) motivational model is rooted in the assumption that people have three basic psychological needs, including *relatedness*, or "the need to have close relationships with other people"; *competence*, or "the need to be adaptive in interactions with the environment"; and *autonomy*, or "the need to freely determine one's course of action" (Skinner & Welborn, 1994, p. 103). Stressful events are appraised as threatening or damaging to these psychological needs. Neglect threatens the need for relatedness, chaos threatens the need for competence, and coercion threatens the need for autonomy. Sandler (2001) applies the concept of competence differently to refer to accomplishing developmental tasks that enable successful enactment of social roles (e.g., academic, peer) in the face of adversity. From this perspective, coping with a stressor (e.g., IPC) that threatens one basic psychological need (e.g., relationship with one or both parents) may have consequences that undermine developmental competencies (e.g., academic or social). There may also be developmental differences in salient motivational needs and developmental tasks. In addition, we argue that emotion regulation to avoid overwhelming negative affect is a basic psychological need often threatened by IPC. For example, children often report feeling intense anger and anxiety when parents fight or argue (Cummings & Davies, 2010). Chronic emotional dysregulation puts children at risk for a host of negative outcomes (Zeman et al., 2006).

The Coping Process Involves Appraisals, Emotions, and Behaviors

The third assumption of the contextual coping model is that coping is a complex process that involves cognitive appraisals, subjective emotions, and regulatory behaviors. In line with Lazarus' model (2006), the contextual model posits that the coping process involves primary appraisal of the stressful situation (i.e., is it threatening to basic psychological needs?) and secondary appraisals about response options (i.e., what cognitive and behavioral coping strategies can I use?) to deal adaptively with the stressor, and, finally, an appraisal of their effectiveness (i.e., which strategy is most

likely to work?). We add the assumption that appraisals and emotions influence one another bidirectionally. In turn, appraisals and emotions motivate coping behaviors that are most likely to reduce threats to basic psychological needs.

Selection of Coping Strategies

The fourth assumption of the contextual coping model is that coping involves selecting strategies that align with one's motivation to fulfill basic psychological needs. Compas defined coping as volitional, rather than automatic, responses to stressful situations and developed a multidimensional model of responses to stress that highlights the role of control in the face of stressful events (e.g., Compas et al., 1991, 1997, 1999; Connor-Smith et al., 2000; Rothbaum et al., 1982). Coping behaviors are seen as motivated, purposeful, and conscious attempts to either change the situation or one's emotional reaction to it (i.e., primary control coping), adapt to the situation (i.e., secondary control coping), or avoid the situation (i.e., disengagement coping) (Connor-Smith et al., 2000). Lazarus and colleagues described coping strategies in terms of their functions to manage negative emotions (i.e., emotion-focused coping) or to solve the problem at hand (i.e., problem-focused coping) (Lazarus & Folkman, 1987). In later writings, Lazarus (2006) urged readers not to view emotion-focused and problem-focused coping as distinct and orthogonal options for managing stressful conditions but rather to consider multiple interacting coping strategies as they function to help the individual adapt to a stressful situation. This view highlights that individuals may use multiple coping strategies across time and that these coping strategies can complement, compensate for, or even counteract one another. Importantly, the use of certain coping strategies may change throughout development as the child can view the stressor from different perspectives and has more sources of support (i.e., peers or adults beyond the family) and as they learn from prior experiences in using different coping strategies.

Applying the Contextual Coping Model to Understand Adaptive Coping

Adaptive coping involves regulating behavior, emotion, and future orientation to reduce threats to basic psychological needs in the face of a stressful situation. According to Sandler (2001), the adaptiveness of coping strategies in any given situation depends on whether they reduce a threat to basic psychological needs. However, adaptiveness of coping is complex because reducing a threat to a basic psychological need in the short term may or may not be adaptive in terms of the long-term satisfaction of needs, achievement of developmental competencies, or mental health. Also, multiple needs may be threatened by IPC, and which psychological needs are most salient may vary across development. For example, younger children are more likely to report fears of abandonment by one or both parents in response to postdivorce IPC than older children (O'Hara et al., 2021). Older children can understand the causes of IPC and thus interpret conflict in conceptually more complex ways than younger children, resulting in them attributing less self-blame for the conflict than younger children (Cummings et al., 1991; Grych, 1998). Salient developmental tasks (e.g., autonomy) and the resources for satisfying these tasks (e.g., social support from parents, peers, or other adults) also have implications for the nature and degree of threat children experience from IPC.

We posit two other key elements are required to understand a child's ability to cope adaptively with IPC, including their: (1) level

of perceived coping efficacy and (2) degree of coping flexibility. Coping efficacy reflects one's perceptions of how well coping strategies worked in past situations and how well they are likely to work in future situations (Sandler et al., 2000) and has been found to mediate the effect of coping strategies on children's mental health problems after divorce (Sandler et al., 2000). In the context of IPC, a child may reflect that leaving the house to be with friends worked well to help them feel safe and calm during their parents' last argument, thereby reducing the extent to which the argument threatened their physical and emotional safety. Given that experience, when thinking about the future, they are likely to feel ready and equipped to handle future instances of IPC, an indication of high coping efficacy. Another child may recall that when they tried to intervene in their parents' last argument, it led to both parents yelling at them to stay out of it; they are likely to feel a low level of coping efficacy. They may believe that maintaining a sense of relatedness to both parents in the face of their ongoing argument feels impossible. Certain coping strategies may increase coping efficacy in the short term but may have long-term costs. For example, supporting one parent during the conflict may make a child feel close to that parent in the moment (i.e., reducing the threat to relatedness) but could have the long-term cost of impairing the child's ability to accomplish developmentally appropriate tasks over time (e.g., such as developing strong peer relationships, academic achievement, healthy romantic attachments). It is important to note that the way children make judgments about coping efficacy changes across development as they acquire skills to problem-solve the possible consequences of different coping strategies and the metacognitive skills to consider different perspectives on the situation, think about long-term consequences, and reflect on their thoughts and emotions (Skinner & Zimmer-Gembeck, 2011).

Coping flexibility captures the variability with which individuals deploy different coping strategies depending on the situation. Coping flexibility was found in a meta-analysis to generally be a strong predictor of psychological adjustment (Cheng et al., 2014). Coping flexibility requires a particular mindset and sufficient resources. The foundation of highly flexible coping is an optimistic, confident, and "up for the challenge" attitude (Bonanno, 2021). It also requires that a child have various coping strategy options at their disposal (i.e., "repertoire"; Bonanno, 2021) to fulfill the most salient need or needs threatened by the IPC event. In other words, coping flexibility enables a needs-based coping response given the specifics of the situation. During exposure to IPC, a child might be particularly motivated to reduce a threat to their need for relatedness and take sides with one parent to protect their relationship. Or they may feel a strong need to reduce a threat to their emotional safety by engaging in a calming activity, trying to stop the conflict, or removing themselves from the situation. Alternatively, as they can think about the situation from multiple perspectives and observe their own thoughts and emotions, they may reappraise the conflict as something that they cannot control and actively seek to pursue their own developmentally appropriate tasks. In using these strategies, the child is striving to reduce the threat to the most salient need in the situation. As the child acquires more coping strategies in their repertoire, they can "make the best bargain" when there are competing needs in the situation. For example, in middle childhood, a child may be able to avoid the situation where conflict is most likely to occur but may continue to worry about the security of their relationship with one or both parents. In adolescence, they may be able to take multiple perspectives on the conflict and

be aware that their parents' conflict does not reflect on their relationship with their parents and that they cannot control how their parents feel about each other. Concurrently, IPC can threaten a child's need for relatedness by arousing fears of abandonment or loyalty conflicts between two loved caregivers and undermine self-worth and/or sense of control in a difficult situation. Coping strategies that satisfy one basic psychological need may ignore or even exacerbate threats to another.

Coping flexibility requires skills that increase with development. As children accumulate experiences, their coping repertoire expands, and they gain an increased understanding of the nuances and complexities of different situations. Indeed, some studies have found that coping flexibility increases between childhood and early adolescence. However, some studies find that aging may also be associated with increased reliance on "tried and true" strategies that have been perceived to work in the past (see related discussion in Zimmer-Gembeck & Skinner, 2011). Coping flexibility requires that the child be skilled in evaluating the situation (i.e., "context sensitivity"; Bonanno, 2021), recalling past experiences with similar stressors, and selecting among coping strategies available based on their costs and benefits. For example, when parents are arguing loudly, children may select several coping strategies (yell at parents to stop fighting, close their door and distract themselves with another activity, go to a friend's house, etc.). Their selection depends on their evaluation of what is possible (Can they leave the house? Will closing the door drown out the argument?) and how well each strategy has worked in the past. They may also weigh their choices knowing that although each option may decrease the threat to one need, it may come at the cost of a different need, thus highlighting the requirement to evaluate the most salient need in the situation. For example, leaving the house may increase a sense of control but come with the consequence of threatening their relationship with one or both parents. Finally, coping flexibility requires that children monitor the outcomes of their coping strategies and be able to abandon strategies that were ineffective in the past (i.e., "feedback monitoring"; Bonanno, 2021). Perhaps they remember that when they intervened in the IPC (i.e., interrupted an explosive phone call between their parents by getting very upset), it escalated the situation (i.e., parents started yelling at them in addition to each other). Hence, they decide to stay out of the IPC this time.

Children's flexible coping is also shaped by personal and social factors that facilitate or impede the acquisition or use of different coping strategies across situations. As noted by Skinner and Zimmer-Gembeck (2007), a child's coping strategies in any given situation are influenced by the social context (e.g., whether the environment is supportive vs. neglectful, whether parents are supportive of adaptive or maladaptive coping), individual self-system processes (e.g., perceived control, attachment, and autonomy), and the child's emotional, attentional, and behavioral capacities, which change across time due to developmental maturity. A child's coping repertoire and habits are shaped by support from coaching or modeling by parents, family members, other supportive adults, and peers (Kliewer et al., 1994). For example, in a sample of over 300 children, children's coping efforts were associated with parents' modeling of coping and recommendations for coping (Kliewer et al., 1996). Coping strategies are also influenced by temperamental differences (e.g., positive or negative affectivity). For example, children higher in negative emotionality endorsed higher levels of both active and avoidant coping behaviors whereas children higher in positive emotionality endorsed

higher use of active coping behaviors (Lengua et al., 1999).

The capacity to use certain coping strategies (e.g., support-seeking from peers, cognitive distraction; Skinner & Zimmer-Gembeck, 2007) and deploy strategies that are likely to be effective in a particular situation improves across development (Zimmer-Gembeck & Skinner, 2011). Skinner and Zimmer-Gembeck highlighted that the coordination of systems influences the development of children's coping for regulating emotion, attention, and behavior and is related to the child's social, cognitive, and emotional capacities and an expanding repertoire of possible coping strategies across developmental stages. In their review of nearly 60 studies of children's coping, they found that coping capacities and deployment of situation-specific coping strategies increased as a function of age (Zimmer-Gembeck & Skinner, 2011). For example, as children age, they shift from parent-supported coping to a higher degree of self-reliance, from action-focused problem-solving to purposeful planning of problem-solving options, and from primary reliance on behavioral coping strategies to include cognitive strategies as well (Zimmer-Gembeck & Skinner, 2011). In addition, the child's options for coping strategies may change as they gain more independence. For example, adolescents may be better able to regulate their exposure to IPC events by spending more time away from home when IPC occurs or is likely to occur, versus younger children who may not have such agency (Goeke-Morey et al., 2013).

Viewing Children's Responses to Postseparation/divorce IPC through a Coping Lens

Our contextual approach to understanding children's coping with IPC integrates prevailing models of children's coping and two predominant theoretical frameworks for understanding children's responses to IPC – the emotional security theory (EST; Cummings & Davies, 2010) and cognitive contextual framework (CCF; Grych & Fincham, 1990). Although they have slightly different foci, both models characterize how IPC threatens children's basic psychological needs. The EST posits that emotional security, or a felt sense of protection, safety, and security in family relationships, is the core psychological need threatened by exposure to unresolved and destructive IPC. In turn, threats to a child's emotional security drive their emotional, cognitive, and behavioral responses to conflict. These responses may serve to restore a sense of security in the short term but have negative effects on mental health in the long term. The CCF, on the other hand, highlights the role of children's appraisals in processing the IPC and shaping coping strategies. The child perceiving the IPC as negative, threatening, and self-relevant sets in motion appraisals about who is to blame, what the consequences may be, and whether they will be able to handle the resultant stress. In our contextual coping model, both cognitive and emotional responses to IPC are critical drivers of the child's coping strategies. For example, children who blame themselves for IPC or fear deleterious outcomes, such as physical or emotional harm to oneself or loved ones, may be most likely to engage in maladaptive coping strategies, such as trying to control a situation beyond their control.

Prior Research on Children's Coping with IPC

The contextual coping model provides a useful framework for empirically evaluating children's coping with IPC. Next, we describe examples of qualitative and quantitative studies that used a contextual approach to

examine children's coping with and adaptation to IPC.

Qualitative Research

A qualitative study by Miller and his colleagues (2017) used a social information processing framework adapted from research on child coping with peer conflict (Crick & Dodge, 1994) to study children's coping with IPC. They posited that children are motivated to achieve multiple goals following exposure to IPC and that they use multiple coping strategies to try to accomplish each of their goals. Through the lens of our contextual model, a coping goal is another way to conceptualize a child's motivation to reduce threats to basic psychological needs. Miller and his colleagues interviewed 50 preadolescents from divorced families to ascertain their goals and coping strategies following IPC. They identified 10 goals (e.g., solve the problem, distract oneself, maintain relationships or self-boundaries, regulate emotions, help others) and found that children typically used four or more coping strategies for each goal. Illustratively, emotion regulation (reducing negative affect or increasing positive affect) was the most common goal, and children described multiple coping strategies (e.g., distraction, avoidance, seeking assistance) for achieving this goal. They also reported that coping strategies were often used to accomplish multiple goals. For example, seeking assistance was the most common strategy, and it was used to satisfy multiple goals, including social support, emotion regulation, and problem-solving. Finally, they found that the degree of match between children's goals and coping strategies varied across goals. Children with the goal of problem-solving used active coping strategies 33% of the time, whereas those with the goal to disengage used avoidance strategies 44% of the time, and those with a goal of distraction used distraction strategies 67% of the time. This qualitative study richly illustrates how children use multiple coping strategies to accomplish various goals as they cope with postdivorce IPC.

Quantitative Research

Profile and cluster analysis approaches provide useful quantitative methods to studying children's coping following IPC (Davies & Forman, 2002; Fosco & Bray, 2016; Zimmer-Gembeck et al., 2009). These methods are distinct from approaches that assess the relations between single-threat appraisals or coping strategies and outcomes. Profile and cluster analyses assume that children can be characterized by the multiple appraisals, coping strategies, and emotions involved in responding to IPC. Researchers have used this approach to identify profiles that characterize individuals' responses to IPC and study how profiles are differentially related to children's outcomes. In one study, researchers assessed how adolescents from married and divorced families felt threatened, at fault, and caught in the middle of their parents' conflict (Fosco & Bray, 2016). They observed three categories of appraisals to IPC including threat (i.e., worries about the implications of parental conflict, e.g., "something bad will happen" or "they will yell at me too"), self-blame (e.g., "it is usually my fault when my parents argue"), and triangulation (feeling involved in, caught in the middle of, or drawn into the conflict, e.g., "When my parents argue I end up getting involved somehow"). Their latent profile analysis resulted in five profiles. Three had distinct combinations of appraisals (Threat–Self-blame; Threat–Triangulation; Self-blame–Triangulation). The fourth profile was characterized by low levels of all three appraisals whereas the fifth profile was characterized by high levels of all three appraisals. Adolescents who reported

high levels of all three appraisals reported the highest emotional distress, behavior problems, and academic impairment. In line with prior research (Grych et al., 2003), those with elevated self-blame showed greater behavior problems, whereas those with elevated threat showed greater emotional distress.

Davies and Forman (2002) identified patterns of appraisals, emotional responses, and coping strategies in response to IPC that reflected different ways children preserve their sense of emotional security in the family. They found that the largest group of children, classified as "secure," showed low levels of emotional distress, reported few hostile and threatening appraisals (i.e., negative consequences for their family or concern that conflicts will negatively impact them or their relationships with parents), and did not rigidly regulate their exposure to their parents' affect (i.e., either through extreme involvement or avoidance). They also evidenced the lowest levels of internalizing and externalizing problems. The two other groups displayed "insecure" patterns of responding to IPC. In both groups, children exhibited high levels of emotional distress, threat appraisals, avoidance, and involvement, but the "insecure-preoccupied" group showed behavioral signs of emotional distress and reported high levels of subjective emotional distress, whereas the "insecure-dismissing" group showed only behavioral signs of emotional distress. These patterns were differentially related to children's mental health; those in the "preoccupied" group showed higher internalizing problems, whereas those in the "dismissing" group showed higher externalizing problems.

These studies highlight that children use multiple coping strategies to achieve a variety of goals in the context of exposure to IPC and coping behavior is motivated by a complex set of cognitive appraisals and emotional experiences that vary between individuals. Children who react to IPC events with relatively low emotional distress, few threat and/or self-blame appraisals, and flexible behavioral responses are most likely to adjust well after exposure to IPC.

New Research on Children's Coping with Postdivorce IPC

We built on previous research, which focused primarily on how children generally coped with exposure to conflict over a specified time period, by studying coping with specific postdivorce IPC situations. Illuminating a situational understanding of how children cope with IPC can help us understand the nuances of children's cognitive, emotional, and behavioral responses.

These analyses are based on our contextual coping model outlined in Figure 20.1. Specifically, we first identified groups of children who used different profiles of coping with a postdivorce IPC event. We then studied path models linking ecological factors of IPC to profiles of coping through threat appraisals and emotional responses to IPC. Finally, we tested coping profiles as moderators of prospective relations between IPC exposure over the last month and outcomes a year later. Although these analyses were largely exploratory, based on our contextual coping model, we expected that children exposed to more frequent and intense IPC would be more likely to report high threat appraisal and distress in response to IPC events, which would, in turn, influence their selection of coping strategies (i.e., their profile of coping).

Our sample consisted of 126 children ages 9–12 from divorced families who reported experiencing at least 1 of 11 IPC events (e.g., parents argued in front of you, Mom said bad things about Dad) in the last month. These data were from a larger intervention study (Wolchik et al., 2000); we controlled for intervention condition in analyses. At baseline, the most

Table 20.2 *Coping strategy items*

How much did you...
1. Try to make the situation better?
2. Think of things to handle the situation?
3. Try to think about it positively?
4. Try to keep from thinking about it?
5. Think about how much it was up to you to make the situation better?
6. Try to calm yourself down?
7. Try to tell other you felt?

Note: Response options: (1) not at all, (2) a little, (3) somewhat, (4) a lot.

common IPC events were hearing one parent badmouth the other parent (54%) and witnessing parents arguing (29.4%). Children described how they coped with one IPC event (randomly selected for children who reported on coping with two IPC events) using an abbreviated version of the Children's Coping Strategies Checklist (Ayers et al., 1996), which included seven coping strategies, such as how much they tried to make the situation better and how much they tried to calm themselves (see Table 20.2). Children selected all the coping strategies they used. They also rated their cognitive response to the event (i.e., threat appraisals of harm to others, rejection by others, negative evaluation, criticism of others, negative self-evaluation, and loss of valued objects) as well as their emotional response (i.e., upsetness) and perceived coping efficacy related to the event. Additional measures included children's report of the frequency and intensity of IPC in the past month, global coping efficacy, and self-worth, and children's and mothers' reports of developmental competencies and parent–child relationship quality (Table 20.3).

Profiles of Coping with IPC

Latent profile analysis was used to identify subgroups of children with different coping profiles. The best solution identified four distinct profiles from baseline reports of coping strategies used in response to a specific IPC event (see Figure 20.2). The profile that represented the largest proportion (39% of the sample) was characterized by low-frequency use of all coping strategies (*Low Copers*). Two profiles included children who had reported high levels of multiple coping strategies. However, these groups differed in whether they believed that it was up to them to make the situation better. One group did not feel it was up to them to improve the IPC situation (32% of the sample; *High Copers – Low Obligation*) whereas the other felt it was up to them to make the situation better (21% of the sample; *High Copers – High Obligation*). The least common profile (13% of the sample) was characterized by moderate use of most coping strategies, including direct problem-solving, cognitive decision-making, and optimism but relatively low use of self-calming (*Moderate Copers – Low Calming*). These profiles show that children can be grouped by the number and types of coping strategies they employ to deal with IPC and their sense of obligation to make the situation better.

Coping Profile Differences on IPC Exposure, Level of Threat, and Distress and Coping Efficacy

We first tested differences among the profiles in IPC exposure, and perceived treat and distress to the IPC event. Children in the *Low Copers* profile reported the lowest frequency and intensity of past-month exposure to IPC and felt least threatened and distressed by the IPC event. Conversely, children in the *High Copers – High Obligation* profile reported higher levels of exposure to IPC, perceived threat, and distress than the children in the *Low Copers* profile (IPC and distress) and the *High Copers – Low Obligation* profile (perceived threat).

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Table 20.3 *Study measures*

Construct	Measure	Items	Example item	Assessment
1. Cognitive response to IPC event	Threat and Worry Appraisal Scale (Sheets et al., 1996)	6	I thought someone I like didn't care about me.	Baseline
2. Emotional response to IPC event	Distress rating	1	How upset were you?	Baseline
3. Coping efficacy for IPC event	Coping Efficacy Scale (Sandler et al., 2000)	4	How satisfied I am with the way I handled the situation.	Baseline
4. IPC frequency and intensity	Children's Perception of Interparental Conflict Scale (Grych et al., 1992)	13	My parents argue/disagree a lot. My parents get really mad when arguing.	Baseline
5. Global coping efficacy	Coping Efficacy Scale (Sandler et al., 2000)	7	Overall, how good do you think you will be at making things better when problems come up in the future?	Baseline; 12-month follow-up
6. Academic competencies and peer relationships	Coatsworth Competence Scale (Coatsworth & Sandler, 1993)	18	Your teachers said you did good work; You had a lot of friends.	6-month follow-up
7. Self-worth	Self-Perception Profile for Children (Harter, 1995)	6	I'm more like [first or second statement] . . . some kids are happy with themselves; others are not happy.	12-month follow-up
8. Parent–child relationship quality	Adapted Children's Report of Parenting Behavior Inventory; Acceptance and Rejection subscales (Schaefer, 1965; Teleki et al., 1982)	20	Mom sees your good points more than your faults; Mom isn't very patient with you.	12-month follow-up

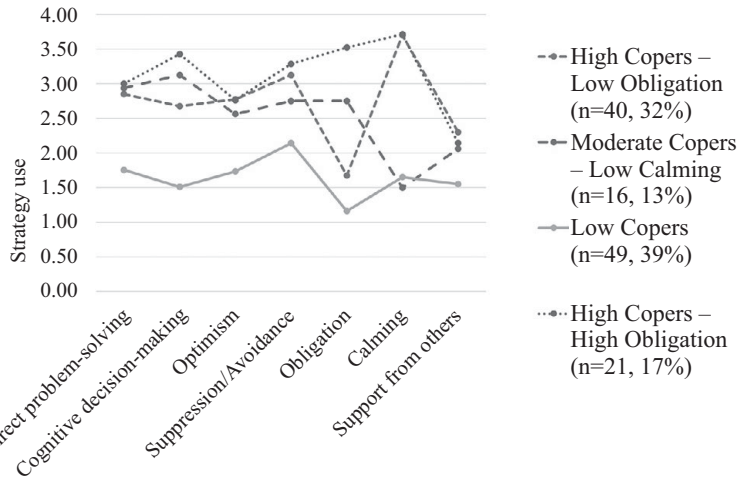
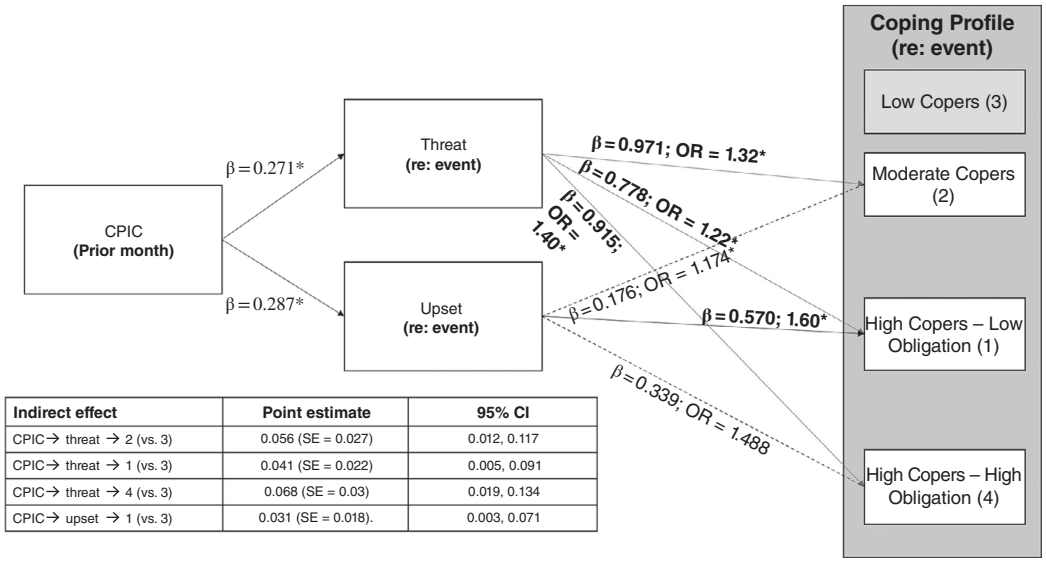


Figure 20.2 Profiles of coping with IPC events.
Note: IPC = interparental conflict; Strategy Use, 1 (*not at all*), 4 (*a lot*).

We also assessed whether coping profiles were associated with coping efficacy concurrently (i.e., situational coping efficacy for the IPC event) and over time (i.e., global coping efficacy; all stressors; 12-month follow-up). We found that children in the *High Copers – High Obligation* profile had the highest concurrent situational coping efficacy, significantly higher than children in all other profiles. Follow-up analyses showed that this effect was largely driven by one situational coping efficacy item, which assessed how the coping strategies they used worked to help them feel better. Children in the *High Copers – Low Obligation* profile had the highest global coping efficacy a year later, significantly higher than those in the *Low Copers* profile and marginally higher than those in the *High Copers – High Obligation* profile. Thus, the extent to which the child feels obligated to improve the IPC situation may influence their coping with IPC differentially in the short and long term. Although feeling obligated to improve the IPC situation may help a child feel better in the short term (perhaps by meeting the proximal need for perceived control), in the long term, using multiple coping strategies but not feeling obligated to make the IPC situation better is associated with a greater sense that one can handle the stressors they experience. These results are consistent with the contextual coping model, which predicts that profiles of coping with IPC are associated with coping efficacy and that certain strategies may have different short- and long-term effects.

Finally, we analyzed whether indirect effects linked IPC and certain coping profiles through the threat appraisals and distress level the child experienced in response to the IPC event (see Figure 20.3). We found that more frequent and intense IPC during the past month significantly predicted higher threat and more distress in response to the specific IPC event. Higher threat significantly increased the odds that children were in a profile distinguished as moderate or high in coping responses (i.e., *Moderate Copers*, *High Copers – Low Obligation*, or *High Copers – High Obligation* profiles versus the *Low Copers* profile). In contrast, higher levels of distress significantly increased the odds that children would be in



Indirect effect	Point estimate	95% CI
CPIC→ threat → 2 (vs. 3)	0.056 (SE = 0.027)	0.012, 0.117
CPIC→ threat → 1 (vs. 3)	0.041 (SE = 0.022)	0.005, 0.091
CPIC→ threat → 4 (vs. 3)	0.068 (SE = 0.03)	0.019, 0.134
CPIC→ upset → 1 (vs. 3)	0.031 (SE = 0.018).	0.003, 0.071

Figure 20.3 Indirect effects.
Note: CPIC = Children's Perception of Interparental Conflict Scale (frequency, intensity subscales); event = IPC event. Profile 1 (Low Copers) is the reference group.

the *High Copers – Low Obligation* profile versus the *Low Copers* profile. These results are consistent with our contextual coping model that predicts ecological factors (in this case, the frequency and intensity of prior exposure to IPC) influence a child's cognitive and emotional responses to a specific stressful event, which in turn predict their coping strategies with that event.

Interaction Effects of IPC and Coping Profiles on Children's Outcomes

To examine whether ecological factors of IPC interacted with coping profiles to predict adjustment outcomes prospectively, we conducted moderation analyses. In these analyses, we assessed whether profiles of coping moderated the relation between exposure to frequent and intense IPC and a variety of children's outcomes a year later, including self-worth, developmental competence, and the quality of the child's relationship with their mother (children in this sample lived primarily with their mothers). We found that children who were exposed to frequent and intense IPC and were in the *High Copers – High Obligation* profile had lower levels of self-worth (self-report) and competence (self- and mother-report) a year later, controlling for their initial levels of self-worth and competence, as compared to children in the *Low Copers* profile. Conversely, children exposed to frequent and intense IPC and in the *High Copers – High Obligation* profile had higher-quality relationships with their mother than children in the *Low Copers* and the *High Copers – Low Obligation* profiles, according to both children's and mothers' reports. It may be that feeling obligated to make the situation better led them to side with their mother and reduce threat to their need for a close relationship with her. These results are consistent with our contextual coping model that proposes that ecological factors of the IPC influence how a child copes, which predicts the

extent to which they can reduce threats to basic psychological needs, such as relationships with important others, self-worth, and competence.

Overall, results suggest that feeling obligated to improve the situation may be an important aspect of coping with postdivorce IPC. Children who reported feeling obligated to make the IPC situation better (i.e., *High Copers – High Obligation* profile) had the highest level of exposure to frequent and intense IPC in the past month and reported the highest level of threat to the specific IPC event. Although these children reported high coping efficacy in the short term, they were more likely than other children to report lower general coping efficacy, self-worth, and competence, but a higher quality mother–child relationship a year later.

It is important to acknowledge that these analyses are largely exploratory and have their limitations, including a relatively small sample, the use of some measures that were abbreviated adaptation of more comprehensive measures, and the lack of assessing change in children's cognitive, emotional, and behavioral responses to IPC events over developmental periods. However, these exploratory analyses illustrate one way of using a contextual approach to analyze data on children's coping with IPC. The results illustrate several important issues. One is that low use of coping strategies may not reflect a low capacity for coping but may reflect low levels of stressful events and perceived threat to basic needs, as illustrated by Zimmer-Gembeck and colleagues (2013). Second, the differences observed between children with a high versus low perceived obligation to make an IPC situation better, who were otherwise similar in their high use of various coping strategies, indicate that a difference in appraisal may affect the adaptiveness of their coping strategies. These analyses also highlight the importance of accounting for the complexity of children's multiple coping strategies and studying both short-term and long-term outcomes associated with different coping profiles.

Directions for Future Research

There are two main directions for using a contextual approach to advance our understanding of children's coping with IPC. First, it is critical to conduct generative research that tests theoretical propositions outlined in this chapter and prior literature (e.g., Sandler, 2001; Zimmer-Gembeck & Skinner, 2011). Much of the research on children's coping has focused on broad domains of strategies (e.g., avoidant coping, active coping), leaving us with little knowledge about which patterns or profiles of strategies children employ in specific situations (Compas et al., 2017) and which strategies are associated with more adaptive short- and long-term outcomes. There is a growing body of theoretical work on the developmental course of coping (e.g., increasing capacity for planful problem-solving and use of cognitive strategies to reappraise or distract; Zimmer-Gembeck & Skinner, 2011) but as noted by Compas et al. (2017), the field lacks critical information on longitudinal effects of coping across developmental periods. Leveraging intensive longitudinal data collection methods (e.g., ecological momentary assessment; Mehl & Conner, 2011) may be particularly useful to furthering our understanding of coping patterns and situational use of coping strategies in children's daily lives.

Second, it is important to apply the contextual coping model to optimize and evaluate coping interventions for children who experience postseparation/divorce IPC. A few child-focused coping interventions have been shown to reduce children's postdivorce mental health

problems (e.g., Boring et al., 2015; Pedro-Carroll & Cowen, 1985; Stolberg & Garrison, 1985), but none has tested program effects for children who experience high postseparation/divorce IPC. The contextual coping model can be used to develop and test adaptations of these programs to target the needs of this high-risk subgroup. In tests of intervention effects, it will be important to examine whether modifying children's coping strategies in response to IPC events reduces threats to children's basic psychological needs, improves their coping efficacy, reduces mental health problems, and improves competence.

A Contextual Coping Approach to Intervention

The contextual coping model suggests that multiple intervention targets might strengthen children's ability to cope adaptively with IPC after parental separation/divorce. Most existing interventions teach children various specific coping strategies with the assumption that children will apply those strategies as needed given a particular situation. Indeed, some strategies may be robustly effective across situations whereas others may be helpful in one situation but counterproductive in another (e.g., direct problem-solving of controllable versus uncontrollable stressors). In the context of postseparation/divorce IPC, helping children distinguish between controllable and uncontrollable stressors is critical. As the analyses we have presented illustrate, when children engaged in high coping levels and believed it was up to them to make an IPC situation better (i.e., high obligation), they reported higher situational coping efficacy in the short term but lower global coping efficacy a year later. Teaching the reappraisal we call "not my job" can help children remind themselves that IPC is not their job to fix. This reappraisal may help children figure out which coping strategy can help by addressing the problem in other ways than trying to fix the conflict. Although they do not have the power (and it is not their job) to stop their parents' conflict, they can control other aspects of the situation. For example, regulating their emotions by calming down in the moment may help them select other coping strategies that minimize additional exposure to the conflict, like taking a walk or listening to music.

As articulated in our contextual coping model, coping strategies are driven by the overarching goal of reducing threats to one's basic needs. And, as we have already discussed, coping with IPC often involves making trade-offs among reducing threats to different basic psychological needs (e.g., control vs. relatedness). The key to selecting the most helpful coping strategy is identifying the most important need and allocating resources to reduce its threat. Although children may not be able to articulate the basic psychological need that is being threatened, they can identify their coping goals (Miller et al., 2017), which can be seen as a manifestation of children's motivation to reduce threats to basic psychological needs. Thus, interventions should focus first on helping children articulate adaptive coping goal(s) and then help them identify and use coping strategies that are likely to reduce the threat to basic need(s) in the situation (i.e., situation–strategy fit). When children set adaptive, achievable goals that are personally valued, their coping strategies are more likely to succeed, and the positive feedback they receive will increase their coping efficacy. Similarly, when children appraise that those unachievable goals (e.g., reduce their parents' conflict) are not their job, they may experience a sense of efficacy even though conflict persists. Having children identify their goal (e.g., feel better) and the strategies they can use to accomplish it (e.g., talking to a friend) provides a useful framework to teach

children to appraise how well their coping strategies are working and the potential need to try something different. It is important to note that the strategies children use for coping with stressful events, including with IPC, are likely overpracticed and thus may not be easily modifiable without extensive practice. With practice, children will develop a toolbox of coping strategies and learn to choose strategies that work, discard ones that do not work, and choose among their options as needed (i.e., coping flexibility). It is important that coping interventions are tailored to children's developmental stage. For example, strategies for self-calming may be appropriate across development, although the specific methods used likely differ. Reducing adolescents' sense of obligation to reduce parental conflict may employ more cognitively sophisticated approaches that include understanding the perspective of others but may involve the simple direction to remember that it is "not your job" for preadolescents.

Another implication of the contextual coping model relevant to intervention is that children use multiple coping strategies in response to IPC. When they are effective, these coping strategies likely work in tandem to reduce the threat posed by the conflict. For example, positive reappraisal, distraction, and avoidance may be helpful coping strategies to reduce negative affect when followed by effective problem-solving of ways to reduce exposure to the IPC or maintain ties to one or both parents. Coping interventions may need to go beyond teaching single strategies and instead focus on the use of multiple strategies to address the specific needs that the IPC threatens. For example, children may be taught first to help themselves calm down by using breathing techniques, then pause to notice what they are feeling, appraise whether the situation is their job to fix, and identify their coping goal(s). Then, children can practice generating possible solutions, and deploying the coping strategy(ies) most likely to help.

Summary

We described a contextual coping model that synthesizes multiple theoretical approaches to understanding children's coping with IPC. This model posits that coping with IPC is a context-specific and developmentally driven, motivated response to threats to a child's basic psychological needs. The process underlying children's coping, which unfolds over time, comprises cognitive appraisals, emotional reactions, and coping strategies in response to the IPC event. Coping is influenced by aspects of the IPC event itself and the individual and social resources available to the child. We illustrated the value of this contextual approach by describing a study of children's coping with postseparation/divorce IPC. Finally, we described implications for interventions to help children cope with IPC after separation/divorce.

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21 Autonomy, Self-Determination, and the Development of Coping in Adolescence

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Introduction

Like a bird on the wire,
Like a drunk in a midnight choir,
I have tried in my way to be free.
– Leonard Cohen

For decades, scholars in the field of psychology and related disciplines have studied the dynamics of autonomy and its fundamental importance for human development and psychological growth throughout the entire lifespan (e.g., Ryan et al., 2006; Soenens et al., 2018). However, relatively few studies have addressed the role of autonomy-related dynamics in the development of coping (Skinner & Edge, 2002). This is surprising because throughout development, children and adolescents frequently experience constraints in their autonomy, such as when certain desired behaviors are prohibited, when one is requested to engage in dull or demanding activities, or when certain goals, preferences, or desires cannot be pursued or met. From a very young age on, children may cope in various ways with such constraints, for instance by protesting verbally or by openly rejecting parents' requests, by passively submitting to the situation, by actively negotiating or bargaining, or by willingly accepting the situation (Kuczynski & Kochanska, 1990; Kuczynski et al., 2018). These responses to autonomy-related experience gain further prominence during adolescence, as autonomy and identity become increasingly important developmental themes, and as adolescents seek to renegotiate the boundaries of what falls under their personal jurisdiction and what falls under the authority of their parents or other adults (Smetana, 2011; Soenens et al., 2019; Zimmer-Gembeck, Van Petegem, & Collins, 2018).

Throughout this chapter, we review why it is important to study autonomy-related processes for a better understanding of the development of coping throughout the lifespan, with a particular focus on adolescence. Thereby, it should be stressed that the relation between processes of autonomy and coping is very transactional and dynamic in nature, with both processes reciprocally shaping each other (Skinner & Edge, 2002; Zimmer-Gembeck & Skinner, 2016). On the one hand, autonomy may affect coping, as a general sense of autonomy and self-determination are important resources for dealing with specific demanding or stressful situations. In addition, autonomy-constraining situations may be experienced as stressful and may trigger particular coping responses, such as opposing or willingly accepting the constraint. At the same time, processes of coping may also have both short-term consequences and long-term implications for individuals' experiences of autonomy.

In this chapter, we first define autonomy and discuss its importance for development during adolescence and throughout the lifespan. Then, we discuss how autonomy frustration may trigger a set of specific coping responses, and we consider the implications of these

coping responses for individuals' autonomy and psychosocial development. We then review how specific characteristics of a constraining situation may have implications for the unfolding of a coping episode. We end by discussing how the social context also shapes the broader development of coping process, thereby particularly focusing on the parents' role, and we discuss how individual traits such as self-determination and mindfulness also may serve as coping resources.

For the conceptualization of the coping process, we rely upon the motivational theory of coping (Skinner & Wellborn, 1994; Skinner & Zimmer-Gembeck, 2007, 2016), which defines coping as action regulation under stress. According to this theory, coping refers to the way people "mobilize, guide, manage, energize, and direct their behavior, emotion, and orientation, or how they fail to do so" (Skinner & Wellborn, 1994, p. 113). This approach to coping involves a multilevel conceptualization in which coping is conceived of both as a process that occurs over time within specific episodes, but also as a process that unfolds throughout development, offering opportunities for potential learning and the development of regulatory capacities (Skinner & Zimmer-Gembeck, 2016; Zimmer-Gembeck & Skinner, 2016). Figure 21.1 depicts an overarching model of the developmental and transactional relations between autonomy and coping. A coping episode starts to unfold when one is confronted with a constraining situation, that is, when a goal, desire, or interest cannot be met or pursued, such as when a certain behavior is prohibited, when choices are limited or taken away, or when one is asked to engage in an unpleasant activity. People likely differ in the degree to which they experience this constraint as autonomy-frustrating (i.e., coercive and illegitimate). These differences in the appraisal of the episode as autonomy frustration depend, in part, upon the (situational) nature of the constraint as well as upon the presence of personal and contextual resources. These appraisals of autonomy frustration elicit specific coping responses that, in turn, have both short-term implications for how the coping episode further unfolds over time as well as long-term consequences for processes of adaptation and development. These short-term and long-term consequences feed back and shape the unfolding of future coping episodes; in other words, these processes of autonomy and coping are highly transactional and their development reciprocally shapes each other. The different parts of the model are discussed in greater detail throughout the chapter.

Autonomy: Conceptualization and Implications for Psychosocial Development

Before moving to our discussion of the role of autonomy in the development of coping, it is important to first clearly define autonomy. Within this chapter, we rely upon the conceptualization within self-determination theory (SDT; Ryan & Deci, 2000, 2017). In SDT, autonomy is defined as *volitional functioning*, that is, as the degree to which one acts upon one's personally endorsed values, goals, or interests. When acting autonomously, one experiences a sense of personal choice and psychological freedom, as one's actions are congruent with the self (Hodgins & Knee, 2002; Ryan & Ryan, 2019). Autonomy, defined as volitional functioning, is contrasted with controlled functioning, where one acts in a certain way because one feels coerced or pressured to do so. In this case, the behavior is experienced as inauthentic and alien to the self (Deci & Ryan, 2000; Kernis & Goldman, 2006).

According to SDT, autonomy is a universal human need, the satisfaction of which is

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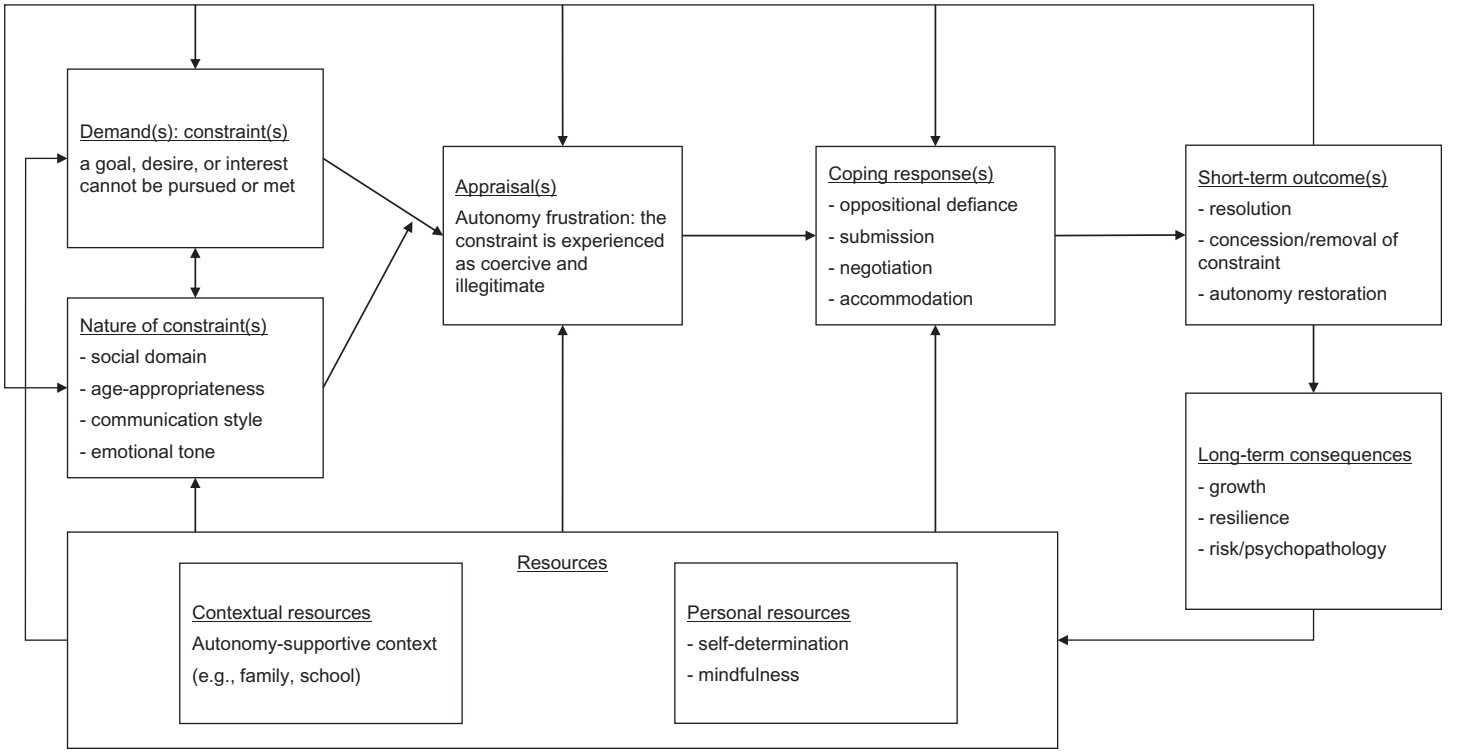

Figure 21.1 A developmental model of the relation between autonomy and coping.

essential for optimal human functioning and psychosocial development. Autonomy frustration, by contrast, would put people at risk for maladjustment and psychopathology (Ryan & Deci, 2017; Vansteenkiste et al., 2010). In line with this assertion, there is extensive research showing that experiencing a sense of autonomy relates to better psychosocial adjustment and more optimal development during adolescence (e.g., Soenens & Vansteenkiste, 2005; Van Petegem et al., 2012, 2013) and young adulthood (e.g., Skhirtladze et al., 2019), but also during other developmental periods, as shown in studies conducted in early childhood (Bernier et al., 2010; Grolnick et al., 1984) and among elementary school children (e.g., van der Kaap-Deeder et al., 2017; Veronneau et al., 2005). It should be noted, however, that the manifestation of autonomy may depend on the specific developmental period, with autonomy for instance primarily taking the form of skillful resistance against parental rules and personal initiative-taking in early childhood, and taking the shape of personal identity formation in adolescence (Soenens et al., 2018; Soenens & Vansteenkiste, in press). Further, the findings regarding the beneficial effects of autonomy have been replicated using longitudinal and experimental designs (e.g., Grolnick & Ryan, 1987; Jang et al., 2012), and they generalize to non-Western cultures as well (see, e.g., Yu et al., 2018, for a meta-analysis). A significant number of studies have also shown that autonomy disturbances are often a critical factor underlying psychopathology (for a review, see Ryan et al., 2016). Thus, all of this work attests to the premise that autonomy denotes a universal psychological human need, which is essential for optimal development throughout the lifespan (Vansteenkiste et al., 2020).

Further, experiences of autonomy have a critical function during stressful interactions with the environment (Weinstein & Ryan, 2011). People with resources that contribute to dispositionally high levels of autonomy (e.g., self-determination, mindfulness) are likely to appraise stressful events in more benign ways and to respond to many types of stressors in more constructive ways. This is outlined at the end of this chapter, when discussing coping resources. However, experiences of autonomy also play an important role at a more situational level. When people's need for autonomy gets frustrated in constraining and stressful situations in daily life, they will engage in coping responses to overcome such autonomy frustration. Indeed, throughout development, children and adolescents often encounter constraints or blockages in the pursuit of specific goals, desires, preferences, and interests, for instance, because of a parental request for an undesired activity (e.g., attending a boring family gathering instead of seeing friends), because school regulates certain behaviors (e.g., no cellphone use during class), or because the law prohibits certain behaviors or activities (e.g., age constraints for alcohol consumption). Children and adolescents can experience and appraise these constraints as impinging upon their autonomy, which may elicit specific coping responses, as is outlined in the next section.

Different Ways of Coping with Autonomy Frustration

Appraisals of autonomy frustration may activate a set of coping families that are linked to the need for autonomy. That is, these families of coping are organized around the adaptive function of coordinating one's preferences with the options available in the situation (Skinner et al., 2003; Skinner & Zimmer-Gembeck, 2007). The following four coping families are typically discerned in the context of coping with autonomy frustration (see

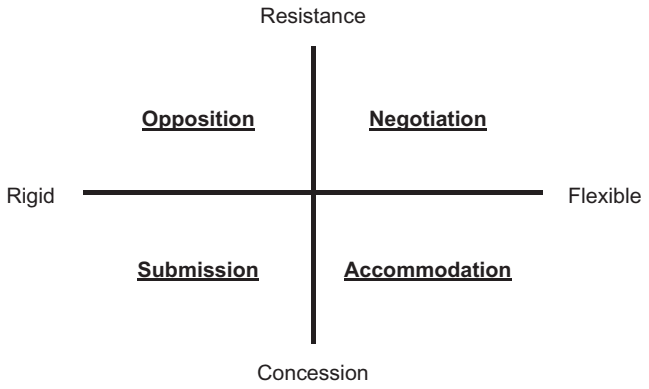

Figure 21.2 Families of coping with autonomy frustration.

Figure 21.2): submission and opposition, which are more rigid in nature and which are theorized to foreshadow long-term negative outcomes with detrimental consequences for development, and negotiation and accommodation, which are more flexible in nature and which are hypothesized to generally have more positive long-term consequences and to foster resilience (Skinner & Edge, 2002; Skinner & Zimmer-Gembeck, 2016).

These families of coping are higher-order categories that cluster together specific instances and ways of coping when people are confronted with particular stressful situations. In addition, they help to meaningfully link specific situations and coping episodes to both their short-term implications and their long-term consequences for processes of adaptation and development. In terms of short-term implications, the coping process pertains to the real-time transactional episode that unfolds over time as an iterative process where (re)appraisals, coping (re)actions, and context (re)actions eventually lead to a short-term outcome of the coping episode (e.g., concession, or removal of barrier; Aldwin, 2007; Folkman & Lazarus, 1985; Skinner & Zimmer-Gembeck, 2016). At the same time, the coping process also has long-term consequences and impacts individual functioning and development, hence becoming part of a developmental cascade toward resilience or psychopathology (Masten & Cicchetti, 2010; Zimmer-Gembeck & Skinner, 2016). In what follows, we briefly discuss each of the four families of coping in terms of their nature, their developmental trajectory, and their short-term and long-term consequences. Thereby, it should be noted that most of this research is fairly scattered and that more systematic and in-depth research is needed. For instance, with regards to developmental patterns, children and adolescents tend to develop more sophisticated and skillful coping strategies across time, as they are intertwined with shifts in cognitive and emotional development as well as with changes in self-regulatory capacities and the social environment (Skinner & Zimmer-Gembeck, 2016; Zimmer-Gembeck & Skinner, 2011). However, more comprehensive research is needed to gain better insight into these developmental processes, thereby moving beyond an individual differences perspective by considering children's and adolescents' developmental trajectories.

Submission

A first family of coping involves submission, which involves relinquishing one's personal

goals and priorities, by conceding to the constraining situation (Skinner & Edge, 2002). Importantly, it denotes an unwilling, rigid, and resigned surrender to the situation, and therefore should be distinguished from the flexible strategy of accommodation, which involves a willing acceptance of the constraints (Morling & Evered, 2006; Skinner, 2007; see later in the chapter for a detailed discussion). Submission comes with the activation of involuntary stress responses that are not under volitional control (Connor-Smith et al., 2000), such as emotional and physical arousal, intrusive thoughts, and rumination (i.e., a passive and repetitive focus on negative aspects of the situation; Koster et al., 2011; Nolen-Hoeksema et al., 2008). Thus, submission involves conceding to the constraints of a situation in a way that is rigid and grudging, where one is unable to disengage attention and mental resources from goals that are no longer possible or unattainable.

As for the developmental pattern of this coping strategy, research is rather sparse and inconclusive. Few consistent normative developmental trends seem to emerge; if anything, it seems that children tend to increasingly rely upon submissive and ruminative strategies as they enter adolescence (Skinner & Saxton, 2019; Zimmer-Gembeck & Skinner, 2011). For instance, in one study (Hampel & Petermann, 2005), it was found that early adolescents (aged 11–13 years) relied more often upon ruminative coping strategies compared to younger children (aged 9–10 years). However, more systematic research is needed to be able to draw more firm conclusions as to how submissive coping develops across childhood and adolescence, as well as to what extent these changes are associated with biological and cognitive maturation processes and/or with social and emotional changes that are linked to the transitional phase of adolescence. Thereby, it is important to consider that individuals may change not only in terms of frequency of reliance upon submissive coping strategies, but also in the form that such submissive strategies may take, potentially shifting from behavioral forms (such as passive compliance) to more cognitive forms (such as rumination; Zimmer-Gembeck & Skinner, 2011).

As for the consequences of this coping strategy, submission is supposed to be maladaptive in the short term, as one concedes to the situation by sacrificing one's personal goals and priorities, thus generating feelings of autonomy frustration (Patall & Hooper, 2018). Also in the long run, it may lead to negative outcomes and developmental difficulties, due to the pressured and rigid nature of this coping strategy, in combination with the draining of energy resources caused by one's difficulties in letting go of the situation and moving on to other priorities (Skinner & Edge, 2002; Skinner & Zimmer-Gembeck, 2016). In line with this assumption, there is a considerable body of research documenting how rumination puts people at risk for the development of depression and other forms of psychopathology among adult samples (e.g., Nolen-Hoeksema, 2000; Nolen-Hoeksema et al., 2008), but also among children and adolescents (e.g., Abela et al. 2002; Nolen-Hoeksema et al., 2007). Similarly, in a sample of both clinically referred and nonreferred adolescents, Brenning et al. (2019) found that adolescents who respond through submission when facing rules with which they disagree, were more likely to report more internalizing difficulties. Also in a study on adolescents' coping with parental overprotection, it was found that submission exacerbated the negative effects of overprotective parenting on internalizing distress and aggression (Flamant et al., 2022). Thus, both in the short and in the long run, the coping family of submission seems to bring about less autonomy

and it seems to set adolescents at risk for psychopathology.

Opposition

Opposition is a second family of coping with constraints, involving a tendency to eliminate the constraint or obstacle by, for instance, engaging in defiant and confrontative behavior, by rejecting or simply ignoring authority, or by doing the opposite of what is expected or enforced (Skinner & Edge, 2002; Vansteenkiste et al., 2014). Opposition is self-centered and reactive in nature, as the primary aim of this strategy is to oppose others' goals (Koestner & Losier, 1996; Pavey & Sparks, 2009). This coping strategy is also conceptually close to reactance, which refers to a motivational state that occurs when a person's freedom is threatened or eliminated. This threat of freedom then engenders a tendency to reestablish this freedom by engaging in the forbidden behavior (Brehm, 1966) even though this may come at the cost of one's personal preferences (Fitzsimons & Lehmann, 2004; Van Petegem, Vansteenkiste, Soenens, et al., 2015). Thus, opposition involves coping through resistance, yet unlike negotiation (which is discussed later) it involves a rigid way of expressing resistance. Opposition is a nonautonomous form of coping, as it is totally externally determined (i.e., by the constraint; Deci & Ryan, 1985; Skinner & Edge, 2002): Indeed, the very goal of opposition *is* to oppose the constraint or the constraining environment.

As opposition involves an unskillful type of showing resistance and disagreement, its frequency of use is supposed to decrease throughout development, as children and adolescents would develop more sophisticated skills for expressing resistance throughout social interactions (Kuczynski et al., 2018). These developmental trends are partly confirmed. For instance, observational longitudinal research among young children indicated that the use of unskillful resistance strategies (e.g., direct defiance, passive noncompliance) became less frequent as they grew older (Kuczynski & Kochanska, 1990). However, when entering adolescence, children seem to rely more frequently upon oppositional strategies (Skinner & Saxton, 2019; Zimmer-Gembeck & Skinner, 2011). For instance, in one study focusing on the school context specifically, Skinner and Saxton (2020) documented an increase in oppositional coping as children entered adolescence. Possibly, these increases may stem from conflicts related to changing conceptions about the boundaries of the personal domain, with imposed boundaries being perceived as increasingly age-inappropriate by early adolescents (Smetana, 2011; Soenens et al., 2019). Potentially, this increase in opposition may only be temporary, with a decrease noted again throughout the adolescent years as youth develop more skillful strategies. In one longitudinal study we indeed found decreases in oppositional defiance to parental rules from middle to late adolescence (Van Petegem, Vansteenkiste, Soenens, et al., 2015). Likely, these developmental changes are the consequence of maturational processes in combination with actual changes in the demands posed by the social context. However, future research is needed to determine how this unfolds dynamically across time, taking into account both the role of key socialization figures and adolescents' agency in shaping their own development (Kuczynski, 2003).

As for the outcomes of this coping strategy, opposition may be effective in the short run as one may be successful at removing the constraint, hence leading to a certain restored sense of independence and freedom from external interference (Brehm, 1966; Miller et al., 2007). However, this may come with an immediate relational cost, as opposition may strain

relationships and/or instigate a coercive cycle of escalating conflict with others (e.g., Dishion & Andrews, 1995). In addition, this coping strategy is likely to bring about difficulties in the long run as well. For instance, in the previously mentioned longitudinal study among adolescents (Van Petegem, Vansteenkiste, Soenens, et al., 2015), we found that oppositional defiance predicted increases both in emotional distance vis-à-vis the parents and an increased alienation from one's personal values and goals. Thus, in addition to negative relational consequences, opposition also fails to bring about more autonomy in the long run. This is likely due to the fact that such oppositional behavior is reactive in nature and, therefore, externally driven, hence interfering with the pursuit of one's genuinely valued goals and interests (Deci & Ryan, 1985; Pavey & Sparks, 2009). In other words, even though oppositional behavior seeks to bring about more *freedom from* constraints, at the same time it seems to bring about less *freedom to* actualize one's potential (Ryan & Deci, 2006; see also Fromm, 1941, 1947; Gescinska, 2011). Because opposition is expected to bring about more autonomy frustration in the long run, it seems to increase children's and adolescents' risk for developing psychopathology. In line with this, research indeed showed that adolescents' oppositional defiance is predictive of both internalizing and externalizing problems (e.g., Flamant et al., 2020; Van Petegem, Soenens, Vansteenkiste, & Beyers, 2015).

Negotiation

Opposition should be differentiated from negotiation as a coping family, which pertains to more skillful ways of expressing resistance and disagreement. This family of coping generally involves a tendency to work out a compromise between one's personal preferences and priorities and the constraints imposed by the situation (Skinner & Edge, 2002; Skinner & Zimmer-Gembeck, 2016). Thus, as in the case of opposition, the goal is to defend and prioritize one's personal goals and to express disagreement. But unlike opposition, it involves a more flexible strategy where others' points of view are considered as well; this active and positive engagement does not necessarily result in one party "winning" over the other; rather, negotiation often involves an iterative process where the outcome involves a synthesis where one is able to maintain one's personal high-priority goals, while at the same time conceding to high-priority goals of others (Skinner & Edge, 2002; see also Kuczynski & Hildebrandt, 1997; Kuczynski et al., 2014).

As for the developmental pattern of negotiation, research indicates that children may engage in negotiation strategies already from a young age, such as bargaining or offering explanations (e.g., Crockenberg & Litman, 1990; Kuczynski et al., 1987). Young children's engagement in such behavior would be a manifestation of their emerging sense of autonomy (Dix et al., 2007; Kopp, 1982). As they grow older, these negotiation strategies would become more sophisticated and differentiated (e.g., Kuczynski et al., 2018; Parkin & Kuczynski, 2012). Especially during adolescence, discussion, give-and-take, self-assertion, and other forms of developmentally appropriate resistance strategies may become increasingly common, as they are part of adolescents' active attempts to renegotiate the boundaries of their personal domain and to claim control over some issues (Robson & Kuczynski, 2018; Smetana, 2005, 2018).

Due to its flexible nature, negotiation is considered an adaptive and skillful strategy. Research on the outcomes of negotiation and related lower-order coping strategies is often qualitative in nature, due to the dynamic and singular nature of episodes involving negotiation

(Kuczynski et al., 2014). These studies, which primarily focused on adolescence, suggest that negotiation typically results in a non-exact, novel synthesis between the adolescent's goals and the constraints of the situation (e.g., certain parental expectations; Kuczynski et al., 2014; Parkin & Kuczynski, 2012). Thus, in contrast to oppositional coping, negotiation does not come at a relational cost, as others' wishes and perspectives are also taken into account (and potentially accommodated; Kuczynski & Hildebrandt, 1997). In addition, it allows one to articulate, prioritize, and coordinate one's personally important goals and preferences, while at the same time learning about others' values and priorities (Skinner & Edge, 2002). Thus, especially in the long run, negotiation yields a greater sense of autonomy and integrative functioning.

There is some indirect evidence for the claim that negotiation in the family realm contributes to more independent decision-making throughout the adolescent years, with studies indicating that the boundaries of the personal domain gradually expand through parent–adolescent negotiations and discussions (Smetana, 1989, 2018). Other longitudinal studies have shown that, as adolescents grow older, increases in decision-making opportunities about personal issues are associated with better psychosocial adjustment (Qin et al., 2009; Smetana et al., 2004), although these studies did not examine explicitly whether these changes in decision-making result from adolescents' negotiation efforts. Thus, although more research is needed, these studies exemplify how adolescents' coping with domain boundaries and their negotiation efforts may have an important developmental function, as they may bring about more autonomy in youth's personal lives and facilitate a sense of agency and self-expression (Smetana, 2005, 2018). More generally, such research illustrates how development, autonomy, and coping are strongly intertwined.

Accommodation

A fourth coping family involves accommodation, which pertains to the flexible adjustment of one's personal priorities and preferences to fit with the constraints of the current situation (Aldwin et al., 2011; Brandtstädter & Renner, 1990; Morling & Evered, 2006, 2007). Accommodation includes cognitive restructuring and positive reappraisal (i.e., reinterpreting the situation in a positive light), acceptance and assenting to the current constraints, and redeploying attention and energy to other goals or activities (Skinner & Zimmer-Gembeck, 2016). Although accommodation may resemble submission because both strategies involve conceding to the constraints of the situation and both include an important cognitive component, the critical feature distinguishing accommodation from submission is the flexible and volitional nature of the former coping strategy. In the case of accommodation, one chooses to *go with the flow*, by assenting to the constraints of the situation and willingly accepting the circumstances as they are (Skinner, 2007).

As for the developmental pattern of this coping strategy, it is supposed that the development of language and symbolic reasoning would facilitate children's development of more cognitive-oriented coping strategies, such as accommodation (Aldwin et al., 2011; Compas et al., 2001). However, past studies documented relatively few developmental differences in accommodative coping, which suggests that accommodation is a fairly common coping response to stress throughout childhood and adolescence. Rather, specific accommodative strategies likely become more advanced and sophisticated throughout development (Zimmer-Gembeck & Skinner, 2011).

For instance, whereas during childhood, accommodation may primarily involve children's voluntary compliance with the demands of a situation, throughout adolescence, youth would increasingly rely upon positive self-talk, positive thinking, and postcoping reappraisals as accommodative strategies for coping with stress, due to the development of more advanced (meta-)cognitive and linguistic skills (Aldwin et al., 2011; Zimmer-Gembeck & Skinner, 2016).

Accommodation is generally conceived of as an adaptive coping strategy, both in the short term and in the long run. Even though accommodation involves conceding to the constraints of a situation, it does not need to come at the cost of a lowered sense of autonomy, as one more freely endorses the imposed constraints while preserving a sense of volition (Skinner, 2007). Similarly, as studies conducted among adolescent samples suggest, one can *choose not to choose*, for instance by leaving the decision up to others or by willingly abiding by rules or prohibitions (e.g., Bao & Lam, 2008; Vansteenkiste et al., 2014), which has been shown to relate to *more* autonomy need satisfaction and higher well-being (Chen et al., 2013; Van Petegem et al., 2012). In addition, by withdrawing efforts from uncontrollable situations, one reduces potential emotional and psychological pressures and one frees up energy and resources for other important goals (Morling & Evered, 2006; Skinner & Edge, 2002). Finally, it is important to also consider the interpersonal dimension of accommodation, as accommodative coping strategies may bring about more feelings of closeness within a relationship, hence serving relational goals as well. A study conducted among US and Japanese university students indeed found that the use of accommodative strategies was associated with more feelings of closeness with others in a relationship (Morling et al., 2002). For these reasons, the use of accommodative coping strategies generally should yield adaptive outcomes in the short run but also in the long run, which is generally confirmed in research among children and adolescents (see, e.g., Wadsworth & Compas, 2002, for a cross-sectional study, and Hall et al., 2010, for a longitudinal examination).

Flexibility in Coping

It is important to note that no single coping strategy is consistently the key to successful adaption: Each of these strategies may serve a certain adaptive process and therefore may be functional under particular circumstances (Skinner & Zimmer-Gembeck, 2007, 2016). Although the coping families of negotiation and accommodation generally relate to better short-term and long-term outcomes, it is important to consider characteristics of the situation (e.g., whether the stressor is controllable, that is, whether there is room for negotiation about the constraint), one's motivational orientation in that situation (e.g., whether the focus is on relational and/or autonomous goals), and one's developmental level and other personal characteristics (e.g., temperament; Eisenberg et al., 1997; Skinner & Zimmer-Gembeck, 2016). Thus, the persistent reliance upon one specific coping strategy may backfire, even when the strategy is assumed to be volitional in nature (Zimmer-Gembeck, Skinner, Modecki, et al., 2018). For instance, a one-sided and systematic reliance upon accommodative coping may come at the long-term cost of one's personal values and goals, whereas the tenacious use of negotiation strategies may eventually harm a person's relationships as well, especially in situations where constraints are unnegotiable or when there is less openness for discussion (Flamant et al., 2020).

As such, rather than relying consistently and uniquely on only one specific coping strategy, it may be more adaptive for people to have several strategies in their coping repertoire and to be able to switch flexibly between these strategies depending on the situational demands. Past research conducted in adult populations indeed suggests that accommodative coping processes complemented with assimilative coping processes (i.e., acting on the environment) yield the most optimal outcomes (Brandtstädter & Rothermund, 2002; Freund & Baltes, 2002). Thus, it seems that the strategies of negotiation and accommodation ideally are used in a complementary fashion. The positive outcome of such a coping episode, then, would reflect the co-regulated nature of these processes of accommodation and negotiation, yielding a novel synthesis between one's personal goals and the constraints of a situation (Parkin & Kuczynski, 2012). In that respect, person-centered and qualitative approaches seem particularly appropriate to gain a refined insight into these dynamics.

More recent work focused explicitly on coping flexibility, that is, the effective and flexible deployment of coping strategies that match the changing demands and characteristics of stressful episodes (Cheng et al., 2014; Kato, 2012; Zimmer-Gembeck, Skinner, Modecki, et al., 2018). This flexibility involves being adaptable in both cognitive appraisals and in coping patterns (Cheng, 2001). As past research indicates, individuals who are capable of coping flexibly tend to adopt specific strategies depending on the specific characteristics of the situation (e.g., controllability; Cheng & Cheung, 2005). In fact, a meta-analysis indicated that this strategy–situation fit is particularly predictive of psychological adjustment (Cheng et al., 2014). Further, research suggests that adolescents become increasingly flexible in their coping throughout their teenage years and even into their 20s (Zimmer-Gembeck, Skinner, Modecki, et al., 2018). This would be due to adolescents' development of executive and meta-cognitive capacities on the one hand, and their better coordination of specific demands and resources, on the other (e.g., who to turn to in what kind of situation; Skinner & Zimmer-Gembeck, 2016). It should be noted, however, that most of such research did not focus on autonomy-related stressors.

Not All Constraints Are Experienced as Equally Autonomy-Frustrating

As can be noted in Figure 21.1, the appraisal of a situation is of key importance to understand how a coping episode unfolds across time. These appraisals are, in part, dependent upon the presence of contextual and personal resources (as is detailed in a later section) but are also determined to an important degree by the nature of the constraining situation as such. A first important consideration for understanding how one appraises a situation involves the *social domain* in which children or adolescents experience constraint. According to social domain theory (Smetana, 2011), from an early age on, children reason qualitatively differently about different domains of social knowledge. Depending on the social domain at stake, children develop different conceptions about the legitimacy of authority and personal jurisdiction. The personal domain involves private aspects of one's life, such as the choice of friendships, clothes, or hairstyle, or the content of one's personal messages. These issues reflect aspects of one's personal identity and delineate the self from the social world, and are therefore matters of personal preference that fall under one's personal jurisdiction (Nucci, 2001; Smetana, 2005, 2006). The conventional domain involves contextually determined practices that structure the social interaction (e.g., family routines, how

to greet others, or how to eat during dinner), whereas the moral domain involves prescriptive rules and norms about justice, rights, and others' welfare (e.g., whether one can lie or hit others; Tisak & Turiel, 1988; Turiel, 2007). Within the conventional and moral domains, children and adolescents accept the legitimacy of authority figures more easily, as these domains involve socially regulated issues (e.g., Smetana et al., 2014, 2015). In contrast, both children and adolescents are more sensitive to constraints that pertain to the personal domain or that combine elements of the personal and socially regulated domains (i.e., multifaceted issues), thereby experiencing these constraints more easily as illegitimate and autonomy-frustrating (Smetana, 2018). Such domain-bounded differences have been documented in past research among adolescents and their parents, showing that parental interference within the personal domain is experienced as intrusive and controlling (Smetana & Daddis, 2002), suggesting they are autonomy-frustrating. Similarly, in a previous study, we found that parental prohibitions of adolescent friendships are perceived as more illegitimate and are more likely to yield opposition as a coping response, in comparison with parental prohibitions of immoral behavior, which are more easily accepted and accommodated (Van Petegem, Vansteenkiste, Soenens, et al., 2017). Thus, adolescents' appraisals of constraints partly depend upon the social domain in which authority figures intervene.

Relatedly, constraints are more likely to be appraised as illegitimate and autonomy-frustrating when they are *age-inappropriate*, that is, when there is a mismatch between adolescents' developmental needs and what is offered or imposed by their social environment (Eccles et al., 1993; Gutman & Eccles, 2007). Throughout the adolescent years, youth seek to expand the boundaries of what they believe falls under their personal jurisdiction rather than under the authority of their parents or other adults (Smetana, 2011, 2018; Soenens et al., 2019). In other words, social domain boundaries are shifting as adolescents grow older, and these changing conceptions of legitimate authority may bring about increases in conflict, due to discrepancies in adolescents' versus parents' reasoning about legitimacy and jurisdiction (Smetana, 1989, 2000; Smetana & Asquith, 1994). These developmental considerations are important for understanding how adolescents appraise and cope with constraints: When they are experienced as not attuned to their developmental level, constraints are more likely to be appraised as illegitimate and autonomy-frustrating. For instance, in a longitudinal study, Daddis (2011) found that adolescents who believed that their peers had more freedom in their personal decision-making were more likely to perceive their parents' authority as illegitimate 1 year later. Using a different approach, findings from a recent multi-informant study on overprotective parenting corroborate the importance of considering the fit between the context and adolescents' developmental needs (Van Petegem et al., 2020). Specifically, it was found that discrepancies in parental reports versus adolescents' perceptions of overprotective parenting, which reflects a mismatch between parents' involvement and adolescents' developmental needs, are linked to higher levels of autonomy frustration and more subsequent externalizing problem behaviors. More generally, these studies illustrate that it is necessary to consider the age-appropriateness and adolescents' developmental level for understanding their appraisals, emotions, and coping responses to specific situations.

A third factor shaping adolescents' appraisals of autonomy frustration involves the *communication style* used by others in the

situation, that is, the way in which constraints are communicated, discussed, and followed up upon (Vansteenkiste et al., 2005, 2014). In this regard, SDT distinguishes between an autonomy-supportive and a controlling communication style. An autonomy-supportive communication style involves showing empathy and soliciting the child's perspective, offering choice within the limits of the constraining situation, and providing a solid and meaningful explanation for the constraint (Deci et al., 1994; Grolnick, 2003; Mageau et al., 2015). By contrast, a controlling communication style[1] pertains to the use of forceful and coercive language, inducing feelings of anxiety, guilt, or shame, and threatening with punishments (Grolnick & Pomerantz, 2009; Soenens & Vansteenkiste, 2010).

Several studies have shown that adolescents experience a potentially constraining situation as autonomy-frustrating when authority figures (such as parents or teachers) rely upon a controlling, rather than an autonomy-supportive communication style. For instance, in a study using video-based vignettes of teacher–student interactions, De Meyer et al. (2016) found that teachers' experimentally manipulated controlling (vs. autonomy-supportive) communication style predicted more autonomy frustration, which in turn predicted more oppositional behavior vis-à-vis the teacher. Baudat et al. (2017) documented similar results, focusing on parental responses to a situation of adolescent alcohol overconsumption. Specifically, it was found that parents' controlling communication style predicted more autonomy frustration and a tendency to reject the parent's request to consume alcohol more responsibly. Thus, these studies indicate that adolescents' appraisals (and their responses) depend upon the degree to which the environment allows for freedom of action within the situation, as well as on the type of language that is used throughout the social interaction.

Relatedly, nonverbal factors may play an important role as well for understanding how adolescents appraise and respond to a situation. Recent work has begun to investigate how the *emotional tone* of a message (i.e., the prosody) conveys important information, above and beyond the content of the message as such. For instance, in an experimental study, it was shown that naïve listeners are able to detect whether a speaker is stressed or not while expressing the same message (Paulmann et al., 2016). Similarly, experimental research also has shown that the same message (e.g., a request to change behavior) brings about different autonomy-related appraisals when the emotional tone of the message is manipulated. Specifically, speech that is expressed more loudly and with a harsher sounding voice is perceived as relatively more controlling, and as a consequence, is experienced as more pressuring and appraised as freedom-restricting (Weinstein et al., 2018, 2020). Also in a sample of adolescents, it has been found that the manipulation of the emotional tone of a mother's voice has implications for adolescents' emotional, relational, and behavioral responses (Weinstein et al., 2019). Thus, these studies illustrate how nonverbal cues also shape and affect adolescents' appraisals of a potentially constraining situation.

The Parenting Context as a Coping Resource

The social context may play an important role in the unfolding of a coping episode, by

[1] A controlling communication style is not the same as perceived control or controllability, which refers to an individual's beliefs about how much control is available to them (Skinner, 1996; Skinner & Zimmer-Gembeck, 2011), and which is part of the appraisal process and shapes the coping process in important ways as well (e.g., Zimmer-Gembeck et al., 2016).

directly changing the nature of the constraint, as is elaborated in the previous section. For instance, when parents ask their adolescent to attend a family gathering instead of seeing friends, they can adapt their communication style or emotional tone, which will likely have implications for adolescents' appraisals and coping responses. However, the quality of the social context (and the parenting context in particular) may also shape the coping process in more indirect ways. Indeed, social contexts may also promote (vs. undermine) the long-term development of adaptive and flexible coping throughout the lifespan, as coping and self-regulation are fundamentally embedded within social relationships (Aldwin et al., 2011; Skinner & Zimmer-Gembeck, 2016). Although it is beyond the scope of the present contribution to elaborately discuss the many ways in which the context shapes the coping process, we want to briefly highlight how social contexts (and the parenting context in particular) may shape the development of coping in the context of autonomy. Not surprisingly, past research focused on the degree to which parents (and other socialization figures) are generally autonomy-supportive, that is, the extent to which they acknowledge the child's point of view, provide meaningful choice whenever possible, and offer an understandable explanation when choices are limited (Soenens et al., 2007). Other dimensions have been theorized and studied as well (e.g., Ntoumanis et al., 2009; Skinner & Edge, 2002; Skinner & Zimmer-Gembeck, 2016), including the degree to which parents are structuring (e.g., offering guidance in a predictable and consistent way; Grolnick & Pomerantz, 2009) and are responsive to emotional distress (e.g., sensitive reactions in the face of distress, such as through comforting or helping; Davidov & Grusec, 2006; Vinik et al., 2011). By contrast, past research suggests that children's and adolescents' coping development may be hindered when parents rely upon psychologically controlling parenting practices (e.g., relying upon manipulative and intrusive strategies; Barber, 1996; Dusek & Danko, 1994) or when overprotecting their child (e.g., excessively intervening when the child is confronted with difficulties; Segrin et al., 2015; Titova et al., 2021).

A number of previous studies focused specifically on how parents' general socialization style may shape adolescents' coping with autonomy frustration. For instance, in two studies that made use of a vignette methodology, we examined whether adolescents' appraisals and coping responses in a situation of rule-setting depend on parents' situation-specific communication style in interaction with their parenting history (in terms of autonomy-supportive vs. psychologically controlling parenting). We found that the general parenting context related to more positive appraisals (i.e., less autonomy frustration) and more adaptive coping (i.e., more negotiation and accommodation, less opposition and submission), above and beyond the specific communication style that was used within the situation (Van Petegem, Zimmer-Gembeck, Soenens, et al., 2017). Similarly, both Flamant et al. (2020) and Brenning et al. (2019) found that, when parents were generally psychologically controlling, adolescents were more likely to respond through opposition and submission, rather than through negotiation and accommodation, when being faced with situations of either rule-setting or parental pressure. Focusing on the school context, Zimmer-Gembeck and Locke (2007) found that adolescents' perceptions of teacher support (in terms of autonomy support, structure, and responsiveness) predicted more active coping with problems both at school and at home, above and beyond perceived parental support.

These studies illustrate that adolescents' coping with constraints is shaped not only by

the nature of the specific constraining situation as such, but also by more general features of the parenting context. However, more research is needed to further understand how the parenting context (and the social context more generally) may serve as a resource for the development of coping in the context of constraints and autonomy frustration specifically. Thereby, future research could focus on the role of different parenting dimensions simultaneously, as past research found that the combination of autonomy support with structure is particularly important among early adolescents (Raftery-Helmer & Grolnick, 2016). Further, future studies also could examine associations with children's and adolescents' flexibility in coping with constraints. We expect that, when parents are more supportive and attuned to children's needs, children are more likely to develop the ability to consider a situation from multiple perspectives and to consider multiple alternative solutions to a problem. Such an open-minded orientation allows one to identify and deploy coping strategies that are tailored to the specific demands and characteristics of the situation (Babb et al., 2010).

Another critical question is whether the expected benefits of autonomy support also emerge during other developmental periods. Although much research on autonomy support focused on adolescence and young adulthood, there are also studies attesting to the beneficial correlates of autonomy-supportive parenting among young children (e.g., Lerner & Grolnick, 2020) and toddlers (e.g., Andreadakis et al., 2019). By making use of observational research (see Laurin & Joussemet, 2017), researchers could examine to what degree autonomy-supportive parenting at a young age may set the stage for the development of more flexible and adaptive coping with autonomy constraints at a later age. Thereby, it would be interesting to consider the dynamic interplay between parents' socialization practices, children's behavior, and the child's developmental level. This is important as the context, autonomy-related expectations, and appraisals of threat also change throughout development (e.g., Smetana, 2018).

Personal Resources for Coping with Autonomy Frustration

Apart from the broader social environment (and parenting in particular), also personal resources can play a key role in the handling of autonomy threats. Although other factors are likely relevant as well, such as the child's temperament (Eisenberg et al., 1997; Skinner & Zimmer-Gembeck, 2007), we discuss the importance of two personal resources – self-determination and mindfulness – that would be particularly relevant in the context of autonomy. Although these factors are discussed as personal resources that facilitate more constructive appraisals and coping responses, it should be noted that they are themselves also shaped by the accumulated history of previous coping episodes. Thus, they are an integral part of a developmental cascade toward either more healthy development and resilience or more risk and psychopathology (Masten & Cicchetti, 2010; Zimmer-Gembeck & Skinner, 2016).

A first autonomy-related resource for adaptive coping involves individuals' level of *self-determination*. According to SDT, individuals may vary in the degree to which they experience a general sense of self-determination in life, which involves an individual's general tendency to regulate one's behavior based upon personally endorsed values, goals, and interests, and which would bring about more feelings of volition, personal choice, and psychological freedom in life (Deci & Ryan, 1985; Sheldon et al., 1996). For instance, when

choosing a new extracurricular activity, an adolescent high on self-determination would choose an activity primarily based upon its fit with their preferences and interests. By contrast, individuals low in self-determination generally regulate their behavior based upon either internal pressures or external contingencies, which would bring about feelings of alienation from one's personal values and interests. As a consequence, these individuals generally feel like "having to" (rather than "choosing to") act in specific ways (Sheldon et al., 1996). With low levels of self-determination, an adolescent may primarily wonder about the degree to which an extracurricular activity will gain social approval (e.g., from peers or parents). There is a vast body of research, relying upon diverse methodologies and conducted in various populations, showing that self-determination is related to healthy development and adaptive functioning throughout the lifespan (e.g., Weinstein & Ryan, 2011).

Importantly, it has been claimed that feelings of self-determination would play an important role in how individuals process, interpret, and respond to various types of situations (Hodgins & Knee, 2002; Skinner & Edge, 2002; Weinstein & Ryan, 2011). People high in self-determination would process information in ways that are less defensive and biased, and would be more likely to appraise potential stressors as a challenge, rather than as a threat. In line with this assumption, research among university students has shown that self-determination is associated with a more open processing of emotionally challenging situations in a written expression task (i.e., more frequent use of terms linked to self-honesty, reflecting a willingness to engage with the threatening stimuli; Weinstein & Hodgins, 2009), and less self-serving biases and less self-handicapping (Hodgins et al., 2006). Further, self-determination has been associated with less defensive coping strategies (such as denial; Knee & Zuckerman, 1998) and more constructive conflict resolution strategies (e.g., engaging in a dialogue; Knee et al., 2005). In a study focusing on the academic domain, Skinner et al. (2013) found that children who were more self-determined in their academic activities reported more adaptive and less maladaptive coping (including more commitment, and less rumination and opposition) when facing stressful academic events in school.

Further, we also expect that self-determination may be a particularly important personal resource for coping with constraining situations, where one's personal values and goals are potentially threatened. Indeed, it has been argued that even under highly coercive or controlling circumstances, highly self-determined individuals would be more likely to perceive the situation as having informational value and would be more inclined to respond through flexible and constructive coping reactions (Hodgins & Knee, 2002; Skinner & Edge, 2002; Skinner & Wellborn, 1994). In a recent study conducted among adolescents (Van Petegem et al., 2019), we made use of hypothetical vignettes to depict a potentially constraining situation, that is, a parental request to study more for school, which was formulated using either an autonomy-supportive or a controlling communication style. In response to this situation of parental rule-setting, it was found that self-determination was associated with more positive appraisals (less autonomy frustration, more legitimacy) and more constructive coping (less opposition, more negotiation), irrespective of the communication style. Moreover, self-determination moderated some of the effects of the situation-specific (autonomy-supportive vs. controlling) communication style, buffering the negative implications of a controlling communication style. This study illustrates that self-determination may

be an important personal resource for coping more adaptively with constraints. In addition, this vignette-based methodology has the important advantage in that it allows for the standardization of the stressor across participants (Aguinis & Bradley, 2014), and may be a possible avenue for researchers to study adolescents' coping with constraining and autonomy-frustrating situations in a highly standardized manner. More generally, these studies suggest that self-determination may function as a source of resilience for coping more adaptively with stressful situations, and with autonomy frustration in particular.

A second autonomy-relevant personal resource involves *mindfulness*, which refers to a receptive attention to and awareness of present moment events and experiences that are taking place, both internally and externally (Brown & Ryan, 2003). When people are mindful, they are open to experiences and moments in a nonjudging and nonevaluating way, as they occur. This receptiveness and awareness would enable more autonomous self-regulation of behavior and would bring about more experiences of volition and psychological freedom in one's life (Brown et al., 2007; Ryan & Deci, 2017). There is abundant research illustrating the salutary effects of mindfulness on a wide range of important outcomes, including mental health, physical health, and relationship outcomes, across both clinical and nonclinical populations (e.g., Hofmann et al., 2010; Keng et al., 2011). This involves research on dispositional mindfulness, but also on experimentally induced mindful states within specific situations, and on the long-term effects of mindfulness training programs. These studies suggest that individuals not only differ in their level of mindfulness, but also that mindfulness can be taught and mobilized for interventional purposes (e.g., Baer, 2003; Broderick, 2005; Shapiro et al., 2011).

Directly relevant for the present contribution, it has been hypothesized that these salutary effects can be explained by the fact that mindfulness affects the way individuals cope with stress, by both attenuating negative appraisals in stressful situations and by facilitating one's reliance upon adaptive coping strategies (e.g., Good et al., 2016; Hölzel et al., 2011). As individuals high in mindfulness tend to be less vulnerable for cognitive distortions and automatic judgments (Brown et al., 2007), potentially stressful or constraining situations are more likely to be perceived and appraised in neutral or benign ways. In addition, as mindful individuals are better at objectively observing present events, they are less likely to cope with stressful situations by engaging in distorted thinking patterns (e.g., rumination) or in reactive and defensive ways of responding (e.g., opposition). In other words, mindfulness seems an important resource for coping adaptively with stress in general. In line with this, using laboratory-based, longitudinal, and daily diary designs, Weinstein et al. (2009) demonstrated that mindful students made more benign appraisals and responded with more adaptive coping when facing stressful situations, such as the prospect of examinations or the participation in a stress-inducing mental arithmetic task. In a study focusing on aggression, Heppner et al. (2008) showed that mindfulness related to less hostile attribution biases and less aggressive behaviors in situations of social rejection, illustrating how mindfulness may be a resource in such stressful events. Further, in a study focusing on romantic relationships, dispositional mindfulness was found to relate to less conflict and more accommodative responses to relationship stress (Barnes et al., 2007). Finally, the meta-analysis of Gu et al. (2015) showed that the beneficial mental health outcomes of mindfulness-based interventions are, in part, explained through a lowered reliance upon

rumination and worry. Thus, there is solid and increasing evidence that mindfulness is an important resource for more adaptive coping with distress.

Further, we would expect that mindfulness is particularly important in the context of coping with autonomy frustration, as individuals high in mindfulness would be more aware of their authentic values and preferences, and therefore would be more likely to respond through more adaptive appraisals and coping reactions, in spite of potentially highly constraining situations (Ryan & Deci, 2017). In line with this reasoning, a questionnaire-based study focusing on employees' well-being in the workplace found that mindfulness buffered against the negative effects of a controlling managerial style in the prediction of their adjustment (Schultz et al., 2015). Future research may want to focus on autonomy-constraints, for instance by using an experimental design (such as through the use of vignettes). In addition, it would be important to make use of a developmental approach that allows for a better understanding of how mindfulness shapes, and is shaped by, coping development and the social context.

Conclusion

In this chapter we argued that autonomy-related dynamics are an integral part of the coping process and its development. Depending on the nature and the characteristics of the specific situation, a constraining situation may entail varying perceptions of autonomy frustration, thereby triggering different ways of coping with this situation. These appraisals and coping responses have short-term implications (potentially bringing about autonomy restoration) but at the same time also may have long-term implications, hence becoming a catalyst of development by becoming part of a developmental cascade toward resilience or psychopathology (Masten & Cicchetti, 2010; Zimmer-Gembeck & Skinner, 2016). Although there is an emerging body of research focusing on the role of autonomy in the context of coping and its development, we hope that the present contribution may instigate researchers to address these topics through creative and innovative approaches.

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22 Peer Stressors and Peer Relationship Dynamics in the Development of Coping

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Introduction

Coping is an organizational construct that refers to the multitude of actions individuals use to manage stressful encounters. Coping encompasses how individuals detect, appraise, react to, deal with, and learn from the actual demands, stressors, and obstacles they encounter in their daily lives (Skinner & Zimmer-Gembeck, 2016). Coping responses are multidimensional, serve many functions, and are often best when attuned to specific stressor demands (Lazarus & Folkman, 1984). Coping can involve approach or avoidance and withdrawal from stressors (Connor-Smith et al., 2000), including attempts to change the environment or change the self to accommodate to the environment (Brandtstädter & Renner, 1990; Rudolph et al., 1995).

Intraindividual subsystems, such as emotion, attention, and cognition, are foundational to coping with stress. However, coping is also a socially embedded activity, meaning that social systems are critical for the development of coping during childhood and adolescence. These social systems include families, peers (those of about the same age or maturity level), neighborhoods, and schools. Social systems bring with them threats and other emotion-provoking demands and act as filters for resources and stressors, while also providing protection and support. However, children and adolescents are themselves also influential in these processes. They can generate their own stressors, evoke reactions from social partners, and actively engage in the resources and liabilities they accrue. The simple presence of peers can make coping processes possible that would not occur without them. In addition, peers can be advisors, helpers, facilitators, role models, or even coaches when there is need to cope. As pointed out by many researchers, these influences are important, as well as bidirectional and dynamic (e.g., Chapter 2 in this volume; Aldwin et al., 2011; Compas et al., 2017; Wadsworth, 2015).

Considering social influences on coping, we know a great deal about how parents and families facilitate and interfere with or undermine the development of coping and regulation from infancy to adolescence. This knowledge about the influence of parents and families is thoroughly described across many chapters in this Handbook. As summarized in these chapters, research shows the importance and complexity of caregivers' roles in the development of coping and identifies the changes that emerge within family relationships that support or interfere with ways of coping with stress. However, beginning in early childhood, if not before, peer interactions become part of the social scene, and by middle childhood, young people begin to report how much they value friendships and groups of

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peers for the intimacy, companionship, support, and feelings of belonging they provide (Hartup & Stevens, 1999; Larson & Richards, 1994; Uink et al., 2017; Waller & Rose, 2013). They care deeply about the dramas and stressors in their peer relationships, trying to sort out and negotiate conflicts and other problems with peers, and place more and more importance on information and feedback from friends as they move into adulthood (Brown & Larson, 2009; Smetana, 2010).

What is surprising, however, is that although positive outcomes of the companionship that is formed within peer relationships during childhood and adolescence are so well documented, there has not been much direct consideration of how these relationships can influence the entire stress-coping process and the development of coping. After all, the themes of coping and support are woven through almost all papers on friendship during childhood, adolescence, and beyond. Partly, this sparse focus on peer relationships and the development of coping could be because children's ways of coping are thought to emerge from experiences with parents and from other experiences within their families; coping with the help of adults has to be a critical foundation for later coping. Yet, new stressors can be found in the peer world and coping continues to develop through the many novel interactions with, and help from, peers.

In this chapter, we first consider stressful peer events during childhood and adolescence, including such stressors as bullying, aggression, rejection, and victimization. Our primary goal in starting with a focus on peer stressors is to describe how children and adolescents are given many opportunities to cope with stress within their peer relationships, with both positive and negative developmental outcomes. Although peer stress and coping with it have substantial influence on a multitude of developmental outcomes, this is only one piece of the puzzle of how peer relationships are involved in the development of coping and responses to stress. We add to this by, secondly, addressing how peer relationships, at the group and the dyadic level, are prime settings for the development of coping in several ways. Topics include what is known about the soothing and distracting presence of peers, the selection of peers, and the socialization of emotion and coping that can occur within peer interactions and relationships via processes of support, communication, and disclosure. We end with brief notes on the theme of peer relationship quality (e.g., intimacy, antagonism) that arises from this research and the usefulness of considering gender (and cultural) differences, especially focusing on moderation effects to uncover whether these processes differ across gender and cultural subgroups. We summarize three central takeaway messages from this chapter in Table 22.1.

Peer Relationships Can Yield Stressful Experiences That Require Coping

Peer relationships can involve many stressful experiences (Casper et al., 2020; Zimmer-Gembeck, 2016) and comprise supportive as well as conflictual aspects; most youth report experiencing a great deal of support from their friends, but they also report experiences of hassles, turbulence, or conflict in friendships and other interactions with peers (Rose & Rudolph, 2006; von Salisch, 2001). Some encounter chronic experiences of rejection, victimization, harassment, or bullying, which can significantly challenge coping resources and result in heightened emotional and social problems over time. In fact, one key developmental task of youth is learning how to cope effectively with peer stressors, with these experiences then linked to coping and adjustment later in life (Compas et al., 2001; Sugimura et al., 2014).

Table 22.1 *Three central takeaway messages about peers and the development of coping*

1. **Stress appraisals and coping responses are socially embedded.**
   - ***Social systems shape the development of coping.***
     - ➢ Development and learning take place in multiple overlapping social systems, including families, peers, schools, and communities, which combine to shape the development of coping by creating unique sources of threats to well-being and by providing opportunities for protection, support, and the practice of individual ways of coping.
     - ➢ Families, parents, and early caregiving environments are direct and indirect social influences that either support, restrict, or undermine the development of coping beginning in infancy.
     - ➢ Beginning in early childhood, friendship and peer interactions become more salient as important contexts for primary sources of stress through experiences of bullying, aggression, rejection, and victimization, but also as contexts for coping development.
   - ***Children and adolescents are not passive recipients of social influences.***
     - ➢ Children and adolescents dynamically interact and engage with social systems, becoming *active agents* in acquiring resources, liabilities, and outcomes.
     - ➢ Adolescents learn active ways of coping effectively with stressors they encounter, which in turn shape learning, functioning, and adjustment later in development.

2. **Peer relationships are salient contexts for the *ongoing* development of coping.**
   - ***The presence of peers***: The presence of peers, particularly friends, can mitigate negative physiological, emotional, and behavioral reactions to stress.
   - ***The selection of peers as companions and friends***: Youth can selectively identify potential future companions based on the specific coping competencies observed or displayed when coping with specific stressful events.
   - ***The socialization of coping via peer interactions***: Once formed, peer groups and friendships become powerful influencers that shape coping responses through shared experiences, modeling, direct conversations and coaching about problems, and navigating actual friendship conflicts.

3. **Development underlies transactional linkages between peer relationships and coping.**
   - As peer relationships and friendships mature across development, the accumulation and learning within these experiences should simultaneously allow for the development of an increasingly multidimensional, organized, and flexible toolbox of possible coping responses.
   - Positive foundations in family and peer relationships earlier in development should support the ability to grow or benefit from relationship stressors by appraising them as challenges rather than threats or losses, affording opportunities to further practice, refine, and organize coping repertoires.
   - Characteristics associated with competent coping parallel those needed to identify, select, and develop close relationships. Thus, resolution of current developmental tasks will shape the challenges and supports faced in subsequent tasks.
   - The interconnections among peer relationships and coping imply that better friendships should be a resource for coping and its development, while more constructive coping appraisals and ways of coping should more readily foster the formation of high-quality friendships. These friends, in turn, can buffer against the negative effects of peer stress.

Peer Stressors: Prevalence and Impact

Aggression and bullying are two of the most widely studied and impactful peer stressors, which are often differentiated into two forms: aggression that is overt (defined as intentional efforts to harm others through direct physical

and verbal threats or assaults) versus relational or social (defined as intentional efforts to harm relationships or reputation through exclusion, rumor spreading, and manipulation; Coyne & Ostrov, 2018; Zimmer-Gembeck & Duffy, 2014). Research shows that approximately 10–15% of youth are victimized by their peers (as targets of physical or relational aggression; Troop-Gordon, 2017), and about 35% engage themselves in some form of face-to-face bullying (Modecki et al., 2014). Expanding their reach, stressful peer interactions are no longer contained to physical contexts of schools or playgrounds, but often infiltrate the online domains of youths' social media (Trompeter et al., 2018). Whether online or offline, youth who report chronic experiences of victimization are at greater risk for other social difficulties, as youth who experience peer victimization are more likely to engage in overt or relationally aggressive acts with their peers as well as to be rejected or less liked within their peer environment (Casper et al., 2020; Kochenderfer-Ladd & Skinner, 2002; Zimmer-Gembeck et al., 2007). Furthermore, various forms of peer relationship stressors have been found to significantly degrade emotional well-being across childhood and adolescence (Duffy et al., 2020; Herres et al., 2018).

Ways of Coping with Peer Stressors

Growth in the capacity to cope with stress is expected to serve as a buffer that compensates for the negative effects of stressful peer events on adjustment outcomes. Thus, by adolescence, individuals can report a variety of ways they have coped (or would cope) with peer stressors. In one study, adolescents endorsed four main categories of coping in response to situations of being teased by schoolmates and excluded from a group. These ways included active coping (e.g., "get help from another kid"), which was expected to be positive, and three negative coping responses of retribution/aggression (e.g., "come up with a way to get even"), denial (e.g., "tell myself it doesn't really matter much"), and ruminative coping (e.g., "keep thinking about it") (Sandstrom, 2004). In another study, adolescents preferred to use more active coping strategies (i.e., seeking support from others – including parents, friends, or formal sources of help and support) and internal strategies (defined as strategies that emphasize cognitive processes such as thinking about possible solutions, accepting limitations) instead of using withdrawal (retreating or avoiding through, for example, venting, giving up, or using alcohol or drugs) to cope with peer problems (Seiffge-Krenke et al., 2009).

Yet, it has not been easy to predict whether any of these expressed ways of coping with peer stress will protect against negative developmental outcomes, suggesting that no one way of coping is uniformly beneficial. For example, a study examining multiple ways of coping with peer victimization found that strategies seemed to have different effects for boys versus girls (Kochenderfer-Ladd & Skinner, 2002). In this study, greater use of distancing and venting of negative emotions were found to exacerbate the effect of peer victimization on boys' (but not girls') anxious-depressed tendencies (as reported by teachers). Differently, girls, but not boys, who reported more support-seeking and less internalizing coping (such as rumination and self-blame) were buffered against social problems (again as reported by teachers). Additional evidence for mixed outcomes of coping responses comes from a study of denial coping (Sandstrom, 2004), in which its effects depended on the outcome considered: Denial coping was protective, reducing the negative effect of poor peer acceptance on aggression when aggression was reported by peers, but denial coping was found to exacerbate the

negative effect when adolescents' adjustment difficulties were reported by their parents. Coping has also been found to moderate the effects of daily peer stress on negative mood. Santiago et al. (2016) found that, on days when peer stress was high, adolescents reported more negative mood when they endorsed high use of disengagement coping (i.e., efforts to orient oneself away from stressful events through use of avoidance, denial, or wishful thinking). However, there was no association between peer stress and negative mood when disengagement coping was low.

The specific coping responses anticipated or deployed within the context of peer stress not only buffer or exacerbate the negative effects of such stress on adjustment outcomes, but some coping responses have been found to be problematic because they act as mechanisms that prolong maladjustment across time. In a longitudinal study of early adolescents, greater rumination and social avoidance of rejection threat were the coping strategies that best identified increases in symptoms of depression, anxiety, and sensitivities to rejection across 1.5 years (Zimmer-Gembeck, 2015). Boys increased more than girls in reliance on oppositional ways of coping (e.g., seeking retribution or aggression) whereas girls showed greater increases in rumination, support-seeking, and distraction in coping with rejection threat. Another longitudinal study investigated associations between parent and peer stress and withdrawal coping; withdrawal coping was moderately stable from 13 to 17 years and positively predicted girls', but not boys', adjustment difficulties (internalizing and externalizing symptoms, somatic complaints) at 23 years (Seiffge-Krenke & Persike, 2017). Apparently, both individual and gender-based differences co-exist in how youth perceive and respond to experiences of peer stress, and how these coping responses may exacerbate, buffer, or act as mechanisms of risk for concurrent and later maladjustment.

Processes of Coping with Peer Stressors

Together, children's and adolescents' stress appraisals and coping can identify additional vulnerabilities that increase risk for maladjustment within the context of peer stress (Taylor et al., 2013; Trompeter et al., 2018), as well as more generally (Gardner et al., 2021; Zimmer-Gembeck & Skinner, 2016). Across a series of studies with different samples using short videos of stressful interpersonal events or written descriptions of peer rejection, Zimmer-Gembeck and colleagues (2009, 2011, 2013; Zimmer-Gembeck & Skinner, 2015) unpacked how attributions about the cause of peer stressors (as well as other stressors), emotional reactions, threat appraisals, and perceptions of control are relevant processes that could explain individual differences in patterns of coping with peer stress. For example, children often perceived greater threat to their psychological needs for relatedness in response to peer-related stressors than to noninterpersonal or parent-related stressors, and it was a greater feeling of threat to relatedness that was associated with more emotional reactivity to peer stressors – in particular, greater feelings of anger and sadness (Zimmer-Gembeck et al., 2009). In addition, children who were the most emotionally reactive (when asked to imagine themselves in vignettes portraying peer bullying and not being picked for a team) also reported the least productive pattern of coping and those whose emotional reactions were more moderate were the most active problem-solvers (Zimmer-Gembeck et al., 2013). However, the emotion type was important for understanding specific coping responses, with children reacting with sadness (rather than anger or fear) more likely to feel the peer stressor was a challenge (and less

threatening), which was associated with more adaptive coping (problem-solving and support-seeking) (Zimmer-Gembeck et al., 2011). In another of these studies focused specifically on peer rejection (Zimmer-Gembeck & Skinner, 2015), emotional reactivity, heightened threat appraisals, and maladaptive coping responses were linked to children's social anxiety and depressive symptom histories. Overall, children have a range of important emotional and cognitive reactions to peer stressors that come at least from their own historical social experiences, their emotional reactivity and other temperamental tendencies, and the appraisals of the cause, meaning, threat, and challenge of any single peer stressor. All of these are relevant to understanding coping responses and all are likely to feed back into children's development of stress appraisals and coping in the peer domain over time.

Summary

In summary, children and adolescents face a myriad of stressful interactions within their peer environment – ranging from daily conflicts and turbulence to more chronic experiences of bullying, harassment, or rejection. Although individual differences exist in how victimized youth appraise, cope, and otherwise respond to these stressful experiences, a developmental perspective would ask how these environmental challenges and threats can offer both risks and opportunities for development and growth over time (for a review, see von Salisch, 2001). Yet, only a few studies have considered the impact of peer stress on the development of coping (e.g., Newman et al., 2011). To consider opportunities for coping development, we next draw from multiple streams of research that suggest how peer groups, similar aged companions, and friends can serve as resources for coping responses and the development of coping.

The Development of Coping, Peer Presence, and Peer Selection Processes

Stress and coping have received only modest empirical attention in research on child and adolescent peer relationships. Fortunately, however, coping with stress is intertwined with stress reactions and appraisals, as well as with emotionality and emotion regulation. Thus, useful guidance for how to begin to consider the role of peer dynamics in the development of coping can be found in theoretical and empirical research on emotion regulation. For example, focusing on emotionality and regulation, von Salisch (2001) argued that peer relationships matter for two reasons. First, in contrast to parent–child relationships, peers usually have similar social power and access to shared historical knowledge and shared contexts, suggesting that they more readily understand the emotions of their friends and affiliates. Second, children tend to spend time with peers who have similar interests and values, creating a peer culture of shared norms. When peer groups are formed around these norms, peers can intensify or change emotional reactions, socializing members to value certain emotions and devalue other emotions. Just as peers are expected to have a powerful influence on the development of emotional responding and regulation, they should have influence on responses to stress, including stress appraisals and coping responses. Related to this view, Graber and colleagues (2016) described influences of peers on coping as incorporating both behavioral modeling and direct support. After describing forms of peer relationships, we draw upon theory and research on peer relationships, emotional reactions and responding, and emotional development in this section to propose multiple ways in which peer relationships can be important for the development of coping.

Peer relationships come in many shapes and sizes, but put simply, peer relationship researchers tend to concentrate on either peer groups or friendships and their respective structures or qualities. Features of peer groups during childhood and adolescence are numerous and researchers have examined structural linkages (who likes whom or who spends time with whom; size of the group; Kindermann, 2007), social standing (acceptance, rejection, or neglect), and reputational status (Cillessen & Bukowski, 2018). Friendships are dyadic relationships based on appreciation and liking. Qualities of friendships include support, liking, reliable alliance, companionship, conflict, and even hostility or victimization (Ferguson et al., 2019; Furman & Buhrmester, 2009). Building on this, the role of peers in stress and coping responses and development will likely involve three *general influence pathways*: presence of peers, selection of peers as companions and friends, and socialization or direct influence through modeling, instruction or sharing of information within groups of friendships. We address the first two topics in this section and consider socialization in the section that follows.

The Soothing and Distracting Presence of Peers

The first influence of peers on stress appraisals and coping may simply be a result of their presence. When peers are present, they can mitigate negative behavioral, physiological, and emotional reactions to stress and reduce time needed for emotional recovery (Hostinar et al., 2014). Developmentally, stronger effects are found in adolescence than in childhood, possibly because puberty is a normative turning point when peers ascend as a source of soothing, as well as a source of distress (see Chapter 11, this volume).

The presence of peers, particularly friends, may also modify stress appraisals because they have soothing and distracting qualities. Just being nearby a known peer can increase positive emotions, self-worth, and feelings of coping efficacy, all of which are resources that enable modulation of stress reactivity and constructive coping responses (Chein et al., 2011; Skinner & Zimmer-Gembeck, 2016). One study illustrates the potential for peers to be a supportive presence linked to recovery from the distress following stressful events. Uink et al. (2017) used an experience sampling design to examine whether the social context (peers present compared to being alone and peers present compared to family present) was an important organizer of adolescents' emotion responses to stressors reported five times a day for 7 days. Although coping was not directly measured, emotions of happiness, sadness, anger, loneliness, worry, and jealousy before and following short-term stressful events ("something bad" happening) were used to index coping responses. When something bad had happened, peer presence was associated with girls' lower sadness and boys' higher happiness when compared to being alone or being with family, and girls' greater happiness and less worry and jealousy when compared to being alone. Moreover, having a peer present has been found to alter responses of the hypothalamic-pituitary-adrenocortical axis. In a study using saliva samples from young adolescents taken multiple times a day, the presence of a best friend during a negative experience lowered adolescents' cortisol levels (a hormone from the adrenal gland that can indicate stress; Adams et al., 2011). Thus, it seems that the benefits of having a peer present during stress can be partly due to their ability to soothe the physiological stress response.

Having friends close by has been described as soothing, but their presence can also be associated with rules for stress responding.

For example, peers and friends can socialize coping processes through emotional display rules that are endemic in peer culture. Decades ago, Saarni (1988) found that 7-year-olds preferred expressing their emotions to parents rather than peers. Similarly, primary school age children are more willing to report sadness, pain, or anger to parents than to peers (Zeman & Garber, 1996). An interesting finding here is that such patterns reversed in older children (Saarni, 1988). Nevertheless, this may still be even more complicated, given that in other research with adolescents, boys report they hide emotions because they know that they will experience ridicule by their peers (Zeman & Shipman, 1997). However, whether boys hide their emotions from their peers more than girls or older age groups is not entirely clear: Way (2013) showed that boys do, in fact, reveal their deeper emotions, but typically not to the public and only to their closest friends. Yet, as multiple studies have reported, children and adolescents tend to tease, ostracize, or reject agemates who show certain emotions or display too much or too little relative to the situation (Gottman & Mettetal, 1986; Tassi & Schneider, 1997). One implication for coping with stressful events is that, through these experiences, children are learning as they get older about how emotion display rules with parents differ from those with peers, and through such experiences, most will eventually become experts at understanding contexts and how relationship status and quality can shape emotions – what, when, and how they are displayed. For example, by at least middle adolescence, most youth know very well the need to solidify close friendships through support, validation, and some level of self-disclosure (Booker & Dunsmore, 2017; Rose et al., 2012; von Salisch, 2018), but they also know the risks of disclosing personal information to their peers when information can easily be used for relational aggression, involving ostracism and gossip (Banny et al., 2011; Klimes-Dougan et al., 2014; Pronk & Zimmer-Gembeck, 2010).

Although some of the advances in emotion management and display rule understanding may be detrimental – they can lead to excessive emotion suppression and to missed opportunities for reaching out for helpful social support from others – we expect that learning skills in display management must provide benefits, too. These are opportunities to identify and practice new internal processes that allow for better coping with stressors. In other words, the evidence for growing awareness of social determinants of managing emotional display suggests that children are learning new and more sophisticated emotion management skills as they get older (Uink et al., 2017; von Salisch & Pfeiffer, 1998) and this will likely modify their stress responding and coping. Other evidence comes from direct study of how children regulate, whereby it appears that they become better able to do this voluntarily by distancing themselves from the experience (von Salisch, 2001), modifying their attention away from the stressor or emotion-provoking event, or practicing cognitive avoidance (Skinner & Zimmer-Gembeck, 2016; Zimmer-Gembeck & Skinner, 2011). In these ways, opportunities exist for youth to develop more complex ways of managing emotions and, relatedly, coping with stress. This development may provide a short-term buffer, while simultaneously not compromising relationship status or interactions. In turn, this may offer greater benefits when compared to the negative effects often associated with use of excessive emotion suppression and social avoidance. Indeed, peer relationships may be a critical bridge here. The wider peer group could model numerous strategies for coping with emotional distress via distancing and attention-shifting. Friendships can directly provide coaching, resources, and practical interactions that allow

for or constrain distancing and attention allocation efforts.

Selecting Which Peers to Spend Time With

The soothing and distraction functions (as well as the display rules) associated with the presence of peers will likely be dependent on the specific kinds of peer affiliates. Typically, considerable levels of similarity in many characteristics are found between individuals and the peers they spend time with, resulting from (homophilous) peer selection (Garrote, 2020; Veenstra et al., 2018). With increasing age, youth have more and more power to determine their peer groups and friendships themselves. When they select peers to spend time with, children and adolescents can create the contexts that become influential for their own coping and development. Competence at recruiting and maintaining peer companionship and close friends are important skills for coping with stress and for well-being (Borowski et al., 2018; Graber et al., 2016; Klimes-Dougan et al., 2014; Waller et al., 2014). Children and adolescents benefit most from friends close by that can soothe, calm, and comfort them, distract from negative thoughts by replacing them with positivity or neutrality, provide support beyond companionship and distraction, help solve problems together, and normalize and validate emotions to reduce distress.

Yet, selection is multiply determined and children's competence and ability to select peer relationships is grounded in many factors, including personal traits, family relationships, mental health problems, and reciprocation, as well as peer availability (e.g., based on location, but also reputation). In addition, selection processes will also be influenced by the specific purposes that the peer context will serve for an individual. Most relevant for coping with stressful events, children or adolescents who have difficulty regulating their own stress reactions or emotions tend to have fewer friends and less supportive interactions with friends, possibly because they themselves could agitate or distress others (Calhoun et al., 2014; Nakamichi, 2017; Zimmer-Gembeck et al., 2010) or because they may rely more often on social withdrawal or oppositional behavior when distressed. Both have negative impact on friendship stability and quality (von Salisch, 2018; Zimmer-Gembeck, 2015, 2016). For example, in one study, adolescents who reported more social anxiety symptoms attributed greater blame to themselves and others for stressful peer events and anticipated coping with rejection using more social avoidance, rumination, and opposition (Zimmer-Gembeck & Skinner, 2015). Those with more depressive symptoms perceived less control and attributed more self-blame, while also anticipating coping with peer rejection using less support-seeking, distraction, and negotiation. In other words, children and adolescents with specific coping patterns may have a reduced (or enlarged) range of opportunity to select the peers they want to spend time with, and they may themselves be more (or less) desirable or selectable as peer group members.

Personal traits and competencies provide a common foundation for friendship formation and for constructive stress responding and coping. For example, adolescents who have more friends, as well as those who cope more constructively with stress, have a greater capacity for humor and are described as more fun to be around (Rose et al., 2016; Sugimura et al., 2014). Similarly, adolescents who have more friends, or who cope more constructively with stress, typically display more positive affect and moderate (and appropriately timed) displays of negative affect (Ciarrochi et al., 2003; Eisenberg et al., 2000). Adolescents who are high in social anxiety report less supportive

friendships (Borowski et al., 2018) and expect to cope less well with stressful events (Masters et al., 2023; Zimmer-Gembeck & Skinner, 2015). Such findings even extend to stress physiology. For example, in one study, children with lower levels of cortisol report the highest density of friendships (Ponzi et al., 2016).

Summary

The presence of peers can be soothing and rewarding in the face of stressors. Furthermore, characteristics associated with competent coping appear to be consonant with the characteristics needed to select and develop close friendships; there does seem to be a common set of individual traits and resources associated with both adaptive (or more maladaptive) stress-coping responses and with selecting more (or less) positive and supportive peer groups and friendships. Yet, what is not known is whether by selecting specific peer associates, over and above others as members of their peer groups, children may (at least indirectly) select or deselect peers as group members or friends who have the specific coping-related characteristics that they need to enhance their own coping responses to stressors. In coping research, peer selection processes determine the interpersonal experiences that children and adolescents will need to cope with, but the selected peers can also provide opportunities for the development of coping. In addition, we can imagine that children and adolescents may be drawn to others with specific coping competencies when affiliations have specific purposes. One may think about *coping crews* (with members selected for specific tasks, e.g., in team sports groups), or *coping expeditions* (for example when adolescents find themselves in uncharted territory during school transitions).

Socialization of Coping and Influence within Peer Groups and Friendships

Once peer relationships are formed, members of peer groups and friends become unremitting models, socializers, and influencers of each other both offline and online (Neal & Veenstra, 2021; Prinstein & Giletta, 2020; Vollet et al., 2019; von Salisch & Zeman, 2018). These social interactions identify a third general pathway through which peer relationships can influence the development of coping. Children and adolescents are inspired in their future behaviors and attitudes from repeated interactions with peers over time (Dishion & Tipsord, 2011; Schaefer et al., 2013; Webb & Zimmer-Gembeck, 2014). This inspiration comes from almost daily peer interactions, and many of these provide opportunities for direct socialization and modeling of coping, shaping friends and other peer responses to negative, stressful events. Such shared stress-coping opportunities include working together on problems or challenging tasks, receiving advice, watching a peer respond to a stressful event, direct conversations with friends about problems, or real conflicts with friends. The opportunities for coping development cut across a broad range of coping strategies, including support-seeking, information-seeking, problem-solving, avoidance, accommodation through focusing on the positive or self-encouragement, helplessness or delegation, rumination, negotiation, and opposition or antagonism. We anticipate that each of these ways of coping can be modeled, practiced, and refined through peer relationships.

Research findings support this view (Bradbury et al., 2018; Glick & Rose, 2011; Reindl et al., 2016; von Salisch, 2018) suggesting that direct coaching or coping suggestions between peer companions or friends do socialize coping responses to stressors. For example, Bradbury et al. (2018) examined peer

socialization of coping, finding that peers' coaching (targeting distraction, problem-solving, retaliation/opposition, and distancing) were related to adolescents' own reports of use of the strategies in cases of cybervictimization. Sometimes coaching by peers was more strongly related to coping responses than was parent coaching. In a similar pattern, Vollet and colleagues (2019) found that exposure to peers' socially aggressive texting predicted changes in adolescents' own text-based as well as in-person social aggression. In their longitudinal study of adolescents, Reindl et al. (2016) found that, within dyads, adaptive coping strategies of one friend (problem-solving, distraction, and cognitive reappraisal) were associated with increases in these strategies in the other friend at the next time of measurement though this was not the case for maladaptive strategies (withdrawal, aggressive behavior, giving up). However, research on the potential of peer relationships to socialize coping has only scratched the surface, focusing most often only on emotion socialization (for reviews see Miller-Slough & Dunsmore, 2016; Zeman et al., 2013), social support, and help-seeking, closely connected behaviors of communication, disclosure, and co-rumination, and on problem-solving with peers.

Social Support, Communication, and Disclosure

Peer social support- (or help-) seeking and giving are direct routes to the development of coping. Seeking support usually involves personal and intense conversations with others about concerns, worries, values, and problems/stressors and their solutions. Given that older children and young adolescents report spending a great deal of time in conversations with their peers and this increases with age (Collins & Laursen, 2004; Larson & Richards, 1994; Valkenburg et al., 2011), peer relationships, especially friendships, can be crucial for the development of emotional competencies and skills at emotional regulation, understanding stressors, and coping (Booker & Dunsmore, 2017; Glick & Rose, 2011; Miller-Slough & Dunsmore, 2019; Rose et al., 2016; Vijayakumar et al., 2020; von Salisch & Zeman, 2018). The central idea in this research on peer conversations is that communicating about problems with peers via intimate disclosures, at least the types of problem and emotion talk that can be observed among adolescents, can reduce negative emotional reactions to stressful events, improve plans to counteract or alleviate stressful events, and improve emotional adjustment (Miller-Slough & Dunsmore, 2019; Rose et al., 2014; Stone et al., 2019; Valkenburg et al., 2011). Communication and disclosure with peers are thus seen as aids for stress and coping responses and recovery, as well as coping development.

Responses from peers to disclosure can come in many forms. Keeping in mind that peer interactions can differ substantially in their longevity, intimacy, and other qualities (Miller-Slough & Dunsmore, 2019), Klimes-Dougan et al. (2014) proposed that adolescents have three socialization practices with their peers that are positive and supportive and three that are unsupportive. Supportive practices include reward (validation), override (using distraction), and matching or mirroring the other's emotions. All three seem conducive to promoting coping with stressful experiences. The three unsupportive socialization practices can also be important to stress and coping (either by leading to poor coping opportunities and increased emotional reactivity, or by undermining relationship quality); they all fall within the domain of peer stressors and include neglect (ignore, avoid), overt victimization, and relational victimization (see also von Salisch & Zeman, 2017). Klimes-Dougan

et al. (2014) found that friends most frequently responded to each other's emotions with reward and override, and these responses, as well as negative responses of neglect and victimization, shaped friends' future emotions. In other words, friends' responses impacted on how their friends responded to stressors in the future, suggesting coping socialization within peer relationships.

Peer interactions and conversations with friends also provide opportunities for validation or comparison of stress appraisals and emotional reactions, which we believe provide opportunities for many useful coping responses, such as positive thinking or cognitive reappraisal. Between friends, appraisals of stressful events and the emotions they bring about can be compared, contrasted, and validated or invalidated (Gottman & Mettetal, 1986; Youniss & Smollar, 1985). At the same time, just the process of repeated disclosure with friends and the feedback this brings should yield improvements in organization and flexibility of coping. For example, it should be close friends with whom adolescents would discuss many problematic issues; repeated efforts during difficult communication and the feedback from friends can build skills at balancing support-seeking with self-reliance (e.g., individual problem-solving or self-encouragement). Even communication problems or failures among friends could foster the development of new strategies to regulate emotion and behavior in ways that optimize emotional *and* social outcomes (e.g., temper negative emotion *and* maintain close relationships).

Opportunities for Social Problem-Solving

Problem-solving that occurs with involvement of one's peers is another route to the development of coping via peer socialization. Problem-solving is a critical skill for coping with stress because it is adaptive, productive, and a positive coping response when stressful events are objectively controllable (Compas et al., 2017; Gardner et al., 2021). The first question is whether problem-solving to cope with stress occurs differently when peers are present and whether peers engage in co-problem-solving, impacting coping skill development. As touched on in a past review (Skinner & Zimmer-Gembeck, 2016), intentional problem-solving as a sociocognitive process can be observed even during the early childhood years (Keen, 2011) and, even then, transactions during play are opportunities for developing problem-solving skills when they involve negotiation or working together, even with uncooperative peers. Peers can help each other identify and generate ideas for new strategies, imagine consequences, select from alternative actions, try them out, and evaluate effectiveness (Berg & Strough, 2010).

Illustrating how problem-solving can be a social endeavor, Waller and colleagues (2014) defined co-problem-solving as interpersonal help working out ways to cope with negative experiences. With peers, children are known to engage in more complex problem-solving than when alone (Rohrbeck et al., 2003), and more complex problem-solving occurs between friends than between nonfriends (Zajac & Hartup, 1997). In fact, this may be a marker of success in relationship and emotional development during adolescence. Co-problem-solving may be important in any form, but when done with friends, it may be particularly indicative of positive socialization because of what its presence may offset. In other words, engaging in co-problem-solving with a friend suggests success in understanding what is needed to resolve stressful events while maintaining closeness within dyads or social groups, rather than engaging in interactions that focus on ruminating, isolating, withdrawing, avoiding, or catastrophizing negative

events. In an ecological momentary study, co-problem-solving with peers over the following weeks after a negative event was negatively associated with engaging in co-rumination, suggesting that co-problem-solving may reduce co-rumination or vice versa (Waller et al., 2014): "adolescents who co-ruminate may discourage friends' co-problem-solving attempts over time" (Waller et al., 2014, p. 876).

Summary

Peers are key players in the socialization of each other's stress appraisals, stress reappraisals, and coping responses through multiple channels. First, through communication, there are opportunities to directly observe how similar others talk about problems, appraise the cause of problems, and emotionally, behaviorally, and cognitively respond to stressors. Thus, peers can be role models or sounding boards for new ideas for coping with stress. Second, peers, and especially close friends, are important influencers in the development of coping because they often involve intimate disclosure and attempts at co-problem-solving; it is these activities where peer socialization of coping will most clearly emerge and where evidence suggests peers have the most influence on stress and coping processes. Notably, these experiences, and (ideally) the teamwork that can eventually be found among peers as they cope with stress are settings where children and adolescents can practice and improve skills learned at home and in earlier peer relationships as they move into new and increasingly diverse social contexts.

Peer Relationship Quality

Ideas related to peer relationship quality were woven through many of the reviewed studies and sections of this chapter. These qualities included, for example, the traits of peers selected as group members or friends; the intimacy of friendships; the level of peer interaction; and the conflict, antagonism, and victimization that can happen between peers. In this section, we briefly describe how the quality of peer relationships and coping may have bidirectional influences on each other.

Evidence clearly shows that peer relationships differ in quality. Peer groups can be accepting or neglecting, friendship can be high, moderate, or low in positive qualities (emotional support, commitment, companionship, and intimate self-disclosure), and some friendships can be high in conflict or have more of a power imbalance than others. Moreover, high-quality friendships are described as those that can provide emotional support during times of stress and allow practice of conflict resolution skills (Hartup, 1996). Measures are available that can tap all these aspects of peer relationships and friendship quality (see Ferguson et al., 2019 for a review). In fact, at least one measure of friendship quality includes the specific subscales of giving and receiving support (Furman & Buhrmester, 2009) – implying that these interactions are important indicators of friendship quality. Overall, seeking and receiving high-quality support, which is a foundational element of coping with stress, seems almost synonymous with good peer relationships.

This idea of an intermingling between stress, support, and peer relationships implies that better friendships should be a resource for coping and its development, and better friendships should buffer against negative effects of stress. Yet, it is also clear from the research that associations are bidirectional, and this is worth highlighting: Not only do higher-quality friendships provide opportunities for coping and development, but children and youth who are more competent socially and emotionally (as marked by, for example, better coping)

are also advantaged in selection, longevity, and positive quality of their friendships (Hubbard & Dearing, 2004; Klimes-Dougan et al., 2014). For example, research has found that seeking support from friends is a good strategy for building closer friendships (Remillard & Lamb, 2005).

In addition to bidirectionality of influence between peer relationships and stress-coping processes, we need to consider the bimodality of coping: it may be the negativity of peer relationships even during interactions with friends, rather than their positivity, that is important in promoting coping. Peer relationships, either groups or friendship dyads, can involve both support and problems, such as conflict or relational aggression, as these can co-occur (Ferguson et al., 2019; Zimmer-Gembeck et al., 2013). For example, in a public speaking task conducted with audiences of familiar peers, pretask-reported negative features of the peer group audience (i.e., reports of peers' negative evaluation and victimization) were associated with a steeper increase in speakers' negative affect during the task (Katz et al., 2019). Pretask reports of group members' negative features were not associated with speakers' patterns of cortisol or salivary alpha-amylase (SAA) during the task and group members' positive features (connectedness and comfort) were not associated with speakers' patterns of affect, cortisol, or SAA.

Gender as a Qualifier

Finally, across many of the studies described, gender was an important qualifier of associations between peer relationships, relationship quality, emotions, stress, and coping. For example, multiple studies report gender differences in coping responses (e.g., Glick & Rose, 2011; Zimmer-Gembeck & Skinner, 2009), in the content of friendship interactions (e.g., Miller-Slough & Dunsmore, 2019; Rose et al., 2016; von Salisch et al., 2014), and in peer correlates of coping challenges or failures (e.g., Graber et al., 2016; Perry-Parish & Zeman, 2011; Stone et al., 2019). Many other studies we cite here also noted gender differences or gender moderation of significant effects, which opens the possibility of different processes of stress and coping for boys compared to girls. Our coverage on this topic has been limited in this chapter, but we do encourage attention to gender in future research, especially as a moderator. Although not covered here, we also encourage similar studies of children and adolescents embedded within different communities or from different cultural backgrounds (see Chapters 23 and 24 in this volume).

Summary and Conclusion

Research studies directly addressing peer relationships and the development of coping are scarce. However, considering research on 1) peer stress, 2) the impact of the presence of peers on emotional reactivity, regulation, and coping, and 3) what is known about support, communication, and disclosure between friends and other peers suggests that peers, including peer groups and friends, are active participants in the development of children's and adolescents' coping responses to stress. Children and adolescents can repeatedly experience or witness encounters of peers as stressors, confronting rejection, victimization, harassment, and teasing, that require significant coping resources and sometimes defending and support for others. During these interactions, and in more positive interactions, peers provide norms of emotion expression and regulation when stressful events occur; peers, especially friends, can be a soothing presence; peers can distract each other from problems; and peers can model responses that others can copy. Through communication and

disclosure, peers also are direct coaches of stress-coping responses and their development. We tend to see peers as resources for making sense of stressful events. All these experiences and the repeated interactions with peers, especially "emotion talk" or "problem talk" with friends (Legerski et al., 2015; Rose et al., 2016), allow adolescents to rapidly accumulate knowledge about coping and relationships. Taken together, we expect that peer relationship experiences accumulate, allowing the development of an increasingly multidimensional and organized toolbox of possible coping responses to stress.

There appear to be three streams of evidence emerging, each of which each deserves further research attention. These streams identify: 1) specific ways that friends and other peers coach each other's coping responses, 2) how children and adolescents (and even older age groups) use a range of supportive and unsupportive responses to shape stress and coping responses within their peer group and friends, and 3) how children and adolescents provide help to alleviate distress through communication and distraction and help each other to confront stressors through problem-solving practice. It is especially remarkable that much of the current body of research identifies the potential dark side of peer relationships, such as interactions that can enhance coping failures, add fuel to existing problems, or increase negative affect. To balance this focus, we think that it is equally important that research addresses developmental patterns as gains as well as losses when identifying the social influences of peers on coping responses.

Children and adolescents are still new to many stressors, they are amid the development of their capacities to cope constructively, and they typically place a great deal of focus on their developing relationships with same-age partners. Thus, it is important to acknowledge that peers can bring extra burdens and produce ideas that serve to elevate distress to new levels or that can interfere with optimal coping responses. Research has only begun to examine how the positive and negative effects of peer relationships on stress-coping responses, and particularly the development of coping, unfold during childhood, adolescence and beyond. Many questions remain and we encourage research that continues along these themes into the future.

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23 Income, Income Inequality, Community, and the Development of Coping

The Reformulated Adaptation to Poverty-Related Stress Model

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Introduction

In the United States an exceptionally high degree of economic inequality is accompanied by the impoverishment of at least 1 in 10 residents, if one counts only those who live below the federal poverty line (Semega et al., 2020). Women, children, families supported by single mothers, and people of color are overrepresented in this conservative estimate of the poor population, of which almost half are living in deep poverty trying to get by on incomes of less than half the poverty line (Bullock, 2019). Unmet economic need takes a toll on health, and standing on the bottom rungs of the economic ladder in a country with large gaps between the rich and the poor makes things even worse (Wagstaff & van Doorslaer, 2000). High income inequality in an affluent country like the USA brings the wide gap between those who are prospering and those who are struggling economically into sharp relief. Added to the material hardship of living in poverty, poor people carry the psychological burden of feeling inadequate and powerless as they are frequently "disparaged, discounted, belittled, and ignored" (Davis & Williams, 2020, p. 659). These negative social comparisons of one's status and self-worth in relation to others are also associated with poor physical and mental health outcomes.

Humans are no different from other species in that one of the most potent stressors affecting us is competition for resources. In terms of resource scarcity relevant for humans in particular, both income and income inequality matter for health. At each step down the socioeconomic ladder from the very highest income bracket to the very lowest, there is a significant decrement in both mental and physical health (e.g., Braveman et al., 2010). This gradient exists in most countries across the globe and is steepest in countries with the highest levels of economic inequality such as the USA (Pickett & Wilkinson, 2015). In this chapter we focus on the low end of the income spectrum and on the bottom rungs of the socioeconomic ladder because these social locations create a unique developmental context; one that is short on resources, supports, and basic necessities and is often marked instead by instability, danger, unpredictability, and high levels of chronic, uncontrollable stress. Various physical and behavioral adaptations arise from poor people's efforts to survive in inhospitable environments where resources are made artificially scarce. Unfortunately, some adaptations necessitated by economic hardship are associated with physical and mental health morbidity and elevated mortality over time (McEwen & Seeman, 1999; Sapolsky, 1982).

The Adaptation to Poverty-Related Stress Model (APRS model) provides a framework for understanding how the economic circumstances

of an individual's developmental context exert powerful effects on their customary ways of coping with and adapting to stressful conditions. The model has guided empirical investigations of the different ways that children, adolescents, adults, and families cope with the stressors and conditions that are created, exacerbated, and maintained by poverty and low socioeconomic status (SES) (i.e., poverty-related stress; PRS; e.g., Wadsworth & Berger, 2006). These studies have identified patterns of responding to PRS that appear to protect against the development of psychopathology and other patterns that may promote psychopathology. This corpus of work suggests that the unique challenges and constraints that accompany life in poverty require different coping and self-regulation strategies than those that are well suited to adequately resourced environments – and as a result children developing in the context of poverty often acquire self-regulation and coping abilities better suited to low-resource environments. These developments led to refinements of the APRS model, including incorporating a functional adaptation lens focusing on the utility of coping in different contexts, rejecting a bilateral view of universally adaptive and maladaptive coping, and recognizing that whereas coping certainly involves individual processes, coping is also embedded within social groups such as family, friends, and communities and can therefore also include collaborative group-level responses (e.g., Wadsworth et al., 2020). The reformulated APRS model allows for a more complete understanding of individual variation in stress adaptation by accounting for the ways that coping repertoires dynamically develop and are enacted in a socially embedded context.

In this chapter, we (1) describe the theoretical and empirical origins of the APRS model, (2) explicate its core and newly expanded biopsychosocial elements, and (3) discuss how we have further expanded the APRS model to include culture, context, and community in understanding the development of coping in this critically important context. After each section we provide a table summarizing the key ideas that guided us in developing the APRS model. In conclusion we (4) offer implications for APRS model-informed interventions and recommendations for next steps in research on stress-adapted coping development.

Empirical and Theoretical Origins of the Adaptation to Poverty-Related Stress Model

The APRS model has its origins in both the family stress model (Masarik & Conger, 2017) and McLoyd's context of stress framework (McLoyd, 1990), each of which explicated how family economic problems translate into negative effects on children via poverty-related stress effects on parents. According to the family stress model, economic hardship creates economic strain – struggles to make ends meet and sacrifices made to do so – which takes a toll on parents' mental health and relationship with each other. Compromised parental functioning then spills over into the parent–child relationship and interferes with a parent's ability to enact effective parenting behaviors. Similarly, the context of stress framework addresses the backdrop of economic hardship surrounding various stressors and life events, with a primary focus on the effects of hardships on parents. This framework emphasizes that the context of economic hardship can amplify the effects of day-to-day stressors that might otherwise not have as large of an impact.

While both models emphasize how economic hardship compromises parental functioning (which in turn affects children), children's adaptation responses to the stressors created by economic hardship are not included in

these models. Wadsworth and Compas (2002) emphasized that in addition to the indirect effects of hardship on children via parental effects, children are also aware of family financial troubles, find them to be distressing, and enact a variety of strategies to cope with these stressors. Furthermore, youth-reported poverty-related stressors (such as not being able to buy something important and hearing parent(s) discuss serious financial problems) are associated with emotional and behavioral problems over and above the contributions made by family SES indicators, supporting the proposition that children's own experiences and interpretations of poverty-related stressors are also important to consider (Wadsworth & Compas, 2002). Evans' research on cumulative risk showed that multiple aspects of life in poverty, such as crowding, substandard housing, and family turmoil together raise the risk for child developmental problems, and further suggested that no one type of poverty-related risk factor is more consequential than the others. Rather, it is the sheer accumulation of multiple risk factors present in the environment of childhood poverty that compromises development (Evans et al., 2013).

As summarized in Table 23.1, the APRS model (Wadsworth et al., 2011) expanded upon these parent-focused models by explicitly focusing on children's own experiences of economic hardship as well as how they cope with poverty-related stressors. This program of research has further expanded conceptualization of poverty-related stress to encompass both financial difficulties as well as other stressful events that co-occur with poverty, such as household chaos, interparental conflict, exposure to violence, and food insecurity. Hence, the term poverty-related stress captures the total stress or impact placed on an individual (or group) resulting from an accumulation of negative life events, day-to-day hassles, and chronic conditions that occur in the context of poverty (Wadsworth & Berger, 2006).

Table 23.1 *Guiding ideas for developing the APRS model*

- The APRS model includes children's adaptation responses to stressors created by economic hardship.
- PRS captures the total stress or impact placed on an individual (or group) resulting from an accumulation of negative life events, day-to-day hassles, and chronic conditions that occur in the context of poverty.
- Effortful coping and involuntary stress responses moderate the effects of PRS on children's functioning.
  - Primary and secondary engagement coping have health-promotive and -protective effects on children's functioning.
  - Dysregulated stress responses exacerbate negative effects of PRS on children's functioning.

The APRS model posits that low SES and low-income create stress for all members of a family, not just the adults. The model proposes that PRS has direct and indirect effects on both children and parents in a family, disrupting family relationships and processes, constraining the ability to enact active, engagement coping in the face of PRS and instead encouraging disengagement coping and increasing involuntary stress responses. Prospective tests of the PRS model have revealed strong support for moderated effects of PRS on youth functioning via the interaction of PRS with both effortful and involuntary stress responses. For example, in their study of low-income families, Wadsworth et al. (2011) found that PRS was more strongly associated with psychological problems among children and adolescents with lower levels of engagement coping and/or heightened stress reactivity and involuntary stress responses.

Two types of coping in particular appear to have efficacy for coping with PRS. Both primary (e.g., emotion regulation, problem-solving) and secondary (e.g., acceptance, cognitive restructuring) control engagement coping, for example, consistently predict fewer internalizing symptoms in children and adults, even when accounting for previous symptoms and the pernicious effects of PRS. Primary control coping appears to serve a health promotive effect, as it tends to have direct negative associations with internalizing symptoms, whereas secondary control coping has often shown protective effects via interactions with PRS. These results suggest that, although taking steps to directly solve the financial problem or manage one's emotions is related to better functioning when utilized, the lack of opportunities for such direct action probably limits the effectiveness of primary control coping generally. Secondary control coping, on the other hand, is something that individuals can implement anywhere, anytime, perhaps boosting its effectiveness in buffering this type of stress.

Findings of empirical investigations of the APRS model (e.g., Wadsworth et al., 2013) further highlight that heightened involuntary responses to stress, likely stemming from physiologic stress system calibrations (Evans et al., 2007), can exacerbate the already-damaging effects of PRS on the mental health of children and families. When combined with continuing exposure to high levels of the stresses associated with poverty, these dysregulated stress responses increase the likelihood of psychological problems. Although these relations paint a bleak picture of the cyclical nature of the associations among poverty, stress reactivity, and psychopathology, understanding the important role of involuntary stress responses may direct the development of prevention programs that focus not only on enhancing coping but also on reducing involuntary stress responses.

Core Biopsychosocial Elements of the Adaptation to Poverty-Related Stress Model

As delineated by both the adaptive calibration model (Del Giudice et al., 2011) and our own functional adaptation framework (Wadsworth, 2015), individuals develop skills and capacities that equip them to survive in the future ecological niche that best matches their past ecological niche. The developmentally and ecologically informed APRS model proposes that the developmental context of poverty shapes children's skills, abilities, and stress physiology to manage and adapt to stress in ways that serve them well in the short term but can also place them at long-term risk for mental and physical health problems (Santiago & Wadsworth, 2011). Literally and figuratively PRS wears people down and leads to consequential physiological and psychological adaptations. The following sections review PRS' physiological adaptations in stress response systems that have cascading effects on other organ systems and health, and simultaneous adaptations to coping repertoires that tailor skills and capacities to survival in a resource-scarce environment.

Physiologic Adaptations

According to allostatic load theory, chronic overuse of the body's stress response systems, including the sympathetic-adrenomedullary (SAM) system, hypothalamic-pituitary-adrenal (HPA) axis, and associated organ systems, weathers the body, leading to premature diseases of aging – diseases such as cancer, heart disease, and type II diabetes that usually affect older adults – occurring in mid-adulthood or earlier for individuals who grew up in poverty (McEwen & Stellar, 1993). Recent decades have seen marked increases in type II diabetes and risk for cardiovascular disease

(e.g., inflammation) in children and adolescents growing up in poverty (e.g., Chen et al., 2002; Gaskin et al., 2014; Nemeroff, 2021). Further, recent research has shown markers of accelerated aging at the cellular and molecular level, where premature degradation of the protective telomere "caps" on the tips of chromosomes (long considered an index of cellular aging) is evident in poverty-exposed individuals as early as adolescence (Meier et al., 2019).

Modern developmental theory and research emphasize and explicate how the developing human organism is dynamically shaped in concert with its environment. The physiologic stress response system – perhaps more accurately described as a "sensitivity to environmental input" system – is exquisitely attuned to physical and social inputs from (before) birth. The response of the stress system to day-to-day events co-shapes our development starting even prenatally. Along our developmental pathway, there are many forks in the road, and which fork we take is guided by our prior development and our current circumstances. According to experiential canalization theory (Blair & Raver, 2012), for example, throughout development, a child encounters various environmental inputs – obstacles, opportunities, interactions, problems – to which they must respond. These responses both constitute and cause development, setting a child along a pathway that they follow until the next hurdle to which they respond, grow, change, and thereby embark along the next branch of the path. It is a constant branching of experience-dependent learning. As further explained in developmental cascade theory (Masten & Cicchetti, 2010), the repeated developmental experiences encountered along these paths accumulate and to some extent pave the way for future barriers, opportunities, and events that will be encountered and thereby contribute to the types and directions of available paths.

In brief, the SAM system detects incoming threats, events, and situations to which the organism needs to respond for survival or to maintain homeostasis. Together with the parasympathetic nervous system and HPA, the SAM coordinates a response from which learning about the environment will occur and homeostasis will ensue. These stress responses learned and practiced over time become our characteristic ways of being, of responding to stress and challenges, of keeping ourselves regulated, motivated, engaged – our characteristic cognitive, emotional, and behavioral repertoires (e.g., Chapters 8 and 9 in this volume).

What is clear is that there is no one "correct" developmental pathway. There are many possible pathways that will successfully lead to adulthood. As the individual travels along these pathways, they acquire knowledge about the world and skills for interacting with the world – equipping the individual to function well in a future world. Which future world? The beauty (and curse) of humans' experience-dependent development is that the future world is foretold by past experiences. Humans are incredibly adaptable, able to grow, develop, and flourish in countless possible ecological niches. This makes excellent evolutionary sense. Therefore, children growing up in dangerous, unpredictable, chaotic environments will develop neural networks and structures, behavioral repertoires, and ways of responding to their environments that are well suited to operating in dangerous, unpredictable, chaotic environments. They will not necessarily develop systems to support behaviors well suited to an enriched environment (such as delay of gratification or trust in adults). Del Giudice and colleagues (2011) refer to this process of environmental shaping of biological systems as "adaptive calibration," emphasizing that these "adaptations" serve children well in terms of

maximizing their evolutionary fitness (ability to survive and grow). The adaptations have trade-offs in other domains as they are not necessarily well suited to other contexts (West-Eberhard, 2003).

The stress response system is well equipped to handle infrequent, very intense life or death situations but is poorly equipped for chronic stress. At the biological level, this process of maintaining homeostasis in the context of chronic stressors like PRS over time recalibrates physiological stress response systems such as SAM and HPA to be, for example, extra sensitive to possible threat and less sensitive to safety cues – so the SAM–HPA response becomes easily triggered and difficult to shut down. This type of recalibration helps the individual respond to threats and danger in the here and now, but leads to damage over time. Frequent or continual activation of the SAM and HPA can also overtax other major organ systems in the body (e.g., cardiovascular, immunologic, metabolic), which are mobilized by the SAM to enhance our ability to fight off or outrun a predator. These organ systems are not equipped to be stuck in overdrive so to speak, and over time they too can suffer damage from overuse. This is how PRS quite literally wears people down (Miller et al., 2011).

Coping Adaptations

As explicated in the APRS model, coping can protect against PRS or promote positive outcomes despite PRS – Zimmermann and colleagues define protective factors as those aspects of an individual or their ecosystem that modify the effects of risk factor via a stress-protective factor interaction (e.g., in a regression model) and distinguish them from promotive factors, which are compensatory variables that counteract exposure to risk through "an opposite, direct, and independent effect on outcome (Zimmermann et al., 2013, p. 215). Wadsworth and colleagues (e.g., Wadsworth & Compas, 2002) have repeatedly found that typically "adaptive" types of coping such as problem-solving, emotion regulation, and positive thinking do in fact act as protective and/or promotive factors for youth facing poverty-related stress – the problem is that poverty limits opportunities to enact these types of active coping methods and as such children in poverty report less use of these "adaptive" strategies. They also report using more typically "maladaptive" disengagement coping such as avoidance and wishful thinking than other youth, yet findings are equivocal as to whether or not disengagement coping is maladaptive in the context of poverty (Edlynn et al., 2008).

Wadsworth (2015) proposed that this process of calibration of coping repertoires paralleled the adaptation processes described in the adaptive calibration model (ACM; Del Giudice et al., 2011). The implications of this alignment are outlined in Table 23.2. Labelling them as functional adaptations, Wadsworth noted that typically "maladaptive" avoidant coping seems to be overdeveloped and typically "adaptive" engagement coping is underutilized by individuals exposed to chronic environmental adversity. Furthermore, a number of studies support that typically maladaptive forms of coping such as avoidance can be beneficial in certain developmental contexts marked by danger and unpredictability. Hence, coping adaptations, like biological adaptations, may be functional when considered in context.

It appears therefore that children exposed to chronic and uncontrollable stress develop narrow repertoires of coping that equip them to cope with danger, unpredictability, and resource scarcity. Chronic and uncontrollable stressors are particularly challenging and damaging because they simultaneously drain

Table 23.2 *Guiding ideas for the core biopsychosocial elements of the APRS model*

- Developing the skills, abilities, and stress physiology to effectively manage and adapt to PRS in the short term can increase children's risk for long-term health problems.
- The calibration of coping repertoires parallels the adaptation processes described in the ACM.
  - Overdevelopment of "maladaptive" avoidant coping and underdevelopment of "adaptive" engagement coping may be functional in PRS contexts.
  - Functional adaptation in PRS environments promotes the development of skills and capacities that equip youth for future ecological niches that match their past ecological niche.
  - The chronic and uncontrollable nature of PRS is particularly challenging and damaging for children because it simultaneously drains resources and support for coping and limits opportunities for them to enact active coping methods.

resources and support for coping and offer few avenues by which a child can cope actively. Our studies have consistently found higher levels of cognitive and behavioral avoidance in samples of children experiencing elevated levels of poverty, family conflict, and community violence and victimization. Moreover, avoidant coping in the context of conflict and violence is not associated with problems in the short term and only becomes a liability with long-term use (Santiago & Wadsworth, 2009). Children facing PRS also report using less primary control coping (active attempts to problem-solve and manage emotions), a type of coping typically associated with positive outcomes. Our work has suggested that the chronic and uncontrollable nature of PRS makes it difficult-to-impossible for children to identify active coping solutions – a phenomenon common to uncontrollable stress (Wadsworth et al., 2011). Secondary control coping (efforts to accommodate oneself to stress through acceptance, cognitive reframing, distraction) tends to be more effective in coping with uncontrollable stress, but children facing toxic stressors like PRS report using less of this type of coping as well (e.g., Wadsworth & Compas, 2002).

Primary reliance on avoidant coping, while adaptive for toxic stress, does not equip children to cope with the wide array of circumstances they will encounter in life and places them at risk for development of mental health problems (Wadsworth et al., 2005). Coping strategies that are adaptive in their immediate environments may not continue to be as effective in the long term or in different contexts. The ACM highlights how coping adaptations such as hyper-vigilance serve to protect the child from threatening stimuli such as parental conflict and household chaos but do not necessarily translate well to future situations. Acknowledgment of calibrated responses and their respective developmental trade-offs are important insights gleaned from the ACM and a functional adaptation perspective that have informed the APRS model.

Reformulating the APRS Model: A Balanced Approach to Coping

Since its introduction a decade ago we have revised the APRS model in recognition of the functional benefits and trade-offs of stress-adapted coping discussed earlier. The guiding ideas for reformulating the model are summarized in Table 23.3. As Frankenhuis and Nettle (2020) observe, when it comes to understanding people living in poverty researchers may "misconstrue a behavior as a deficit when it is a reasonable response or skill in the context of poverty" (p. 17). Viewing behaviors as "reasonable responses" or functional adaptions to

Table 23.3 *Guiding ideas for reformulating the APRS model*

- Chronic and uncontrollable PRS is socially embedded in underresourced environments and necessitates individual and group-level coping responses and adaptations.
- Collaborative coping describes a group response to shared stressors like PRS that enables collective problem-focused coping responses to them.
  - Collective action to mitigate shared PRS provides opportunities for active coping to solve problems that an individual's coping abilities cannot.
  - Collaborative coping can simultaneously strengthen and diversify individual group members' coping repertoires and regulate or modify their shared environment through collective action.
- The reformulated APRS model incorporates the influence of sociocultural context and group identification on the development of coping.
  - Family coping encompasses how families cope together in a collective effort to strengthen the family as a whole and maintain the emotional stability and well-being of family members.
  - Culture serves as a collective coping resource when individuals draw on shared traditions, identities, beliefs, and values to help themselves and each other cope with shared stressors.
  - Identification with social groups shapes coping responses at both the individual and collective levels through the mechanisms of collective efficacy and social support.
  - Empowered individuals recognize and critique structural inequities, perceive those stressful conditions can be changed, and act collectively to do so to mitigate PRS at the community level.

PRS is vital in reframing them as contextually appropriate, even when they have harmful consequences downstream for people living in poverty or are less reasonable or functional in different socioeconomic contexts (Pepper & Nettle, 2017). In addition, we have come to recognize the limits of individual coping for dealing with the overwhelming volume and magnitude of stressors created by economic deprivation and inequality. Accordingly, we have incorporated group-level responses to PRS into our model because of the potential of collective action to mitigate shared stress stemming from socioeconomic disadvantage in a way that an individual's coping abilities cannot. In the reformulated APRS model we conceive of this as a process of "collaborative coping."

Collaborative Coping

Compas et al. (2001) defined coping as "conscious volitional efforts to regulate emotion, cognition, behavior, physiology, and the environment in response to stressful events or circumstances" (p. 89). More recently, Wadsworth et al. (2018) described collaborative coping as "engaging with like-minded others in collective action to address a need in one's community *as a means for coping with PRS*" (p. 1033). Collaborative coping denotes purposeful group efforts to help individuals "regulate" their personal emotions, cognitions, behaviors, physiology, and environment to enable collective problem-focused (primary control) coping to address collective stressors like PRS. We therefore suggest that collaborative coping can simultaneously strengthen and diversify individual group members' coping repertoires (functionally adapted to coping with PRS and promotive of positive outcomes in other contexts) and "regulate" or modify their shared environment through collective action to mitigate it.

Our concept of "collaborative coping" with PRS is an effort to retain a balance between

how individuals cope with stress and how they cope alongside others in a shared stressful context. However, it is also a way of moving toward the investigation of how people cope with PRS together – in ways not reducible to how individuals cope with this stressor on their own. So, individual coping and collaborative coping with PRS are not mutually exclusive – individual coping and the individual developmental consequences of it do not cease when collaborative coping strategies are engaged. Attention to types of collaborative coping that individuals cannot accomplish alone sheds light on how coping not only develops at an individual level or in a collective context, but how coping repertoires and the accumulation of biopsychosocial impacts on people living with PRS play a role in how they adapt and with what consequences over the life course. In other words, the reformulated APRS model allows for a more complete understanding of individual variation in stress adaptation by accounting for the ways that coping repertoires develop contextually through practice alone or in collaboration with others over time.

Our modified APRS model highlights how sociocultural contexts and group identification encourage or constrain various individual coping responses and opportunities for collaborative coping because both influence the development of coping. In the case of PRS, opportunities for collaborative coping may be especially important, not only because they can yield collective action to reduce PRS, but also because engaging in collaborative coping (even when instrumentally unsuccessful) introduces ways of coping beyond those that are relied on because they are functionally adaptive for individuals living in poverty (particularly primary control coping, which is less functionally adaptive for individuals living with PRS). Next, we outline the key concepts that have informed this reformulation.

Family Coping

Santiago and Wadsworth (2011) suggest that "family coping is composed of a family's strategies and behaviors aimed at strengthening the family as a whole, maintaining emotional stability and well-being of family members, using family and community resources to manage a situation or event, and making efforts to problem solve family hardships created by stress" (p. 322). To date, research on families coping with PRS has focused primarily on how individual family members cope with poverty-related stressors, rather than on how families cope together. Research into how children's coping develops in the context of their family relationships via parental coping socialization processes generally reveals similarities between how parents and children cope with PRS (Kliewer et al., 2006). Children learn and acquire coping strategies based on their parents' coaching, modeling, and reinforcement of preferred or customary ways of coping (Abaied & Stanger, 2017). For example, Santiago et al. (2012) found that low-income children rely on primary control engagement or disengagement coping strategies if their parents modeled those strategies.

In general, family coping includes strategies aimed at maintaining a positive outlook (family reframing), encouraging family participation in traditional spiritual or religious activities (family spiritual support), encouraging positive family relationships and getting help from relatives (family social support), and managing community resources to assist the family (family mobilizing support) (McCubbin et al., 1998). Family coping has been shown to have positive effects in adjusting to other types of stress, such as a child's developmental disability and parental chronic illness (e.g., Korneluk & Lee, 1998; Lustig, 2002). Research on family coping with PRS is limited, but Santiago and Wadsworth's

(2011) work with economically strained Latinx families revealed that familism and family reframing were inversely associated with pre-adolescent psychological problems, whereas family passive appraisal (e.g., waiting for things to get better on their own) and seeking support from family members were linked to more problems. The negative effects of support-seeking may reflect a higher need for support in more distressed families. A recent study of adults in the UK by Stevenson et al. (2020) showed that strong identification with one's family was associated with more family support, better well-being, and higher collective family financial coping efficacy. Collective efficacy (perceptions that the group can help members cope with stress) was, in turn, associated with reduced financial distress, suggesting that beliefs about the family's ability to come together and cope with financial stress may serve a protective or promotive function in the face of hardship.

Collectivist Coping

The cultural coping literature focuses on the way that cultural values, beliefs, practices, and social norms shared by interdependent members of collectivistic in-groups inform how the individual members cope with stressors. Collectivistic cultures are distinguished from individualistic Western cultures by their emphasis on members' interdependence and the prioritizing of the in-group's norms and well-being. The study of collectivist coping strategies has been vital in demonstrating cultural variability in coping behaviors and outcomes and questioning the universality of individualistic ways to cope with stress and their implications for mental health and well-being (Heppner, 2008). Described as a "constellation of multifaceted stress responses shaped and enhanced by collectivistic norms, values, and tendencies" (Kuo, 2013, p. 377), collectivist coping strategies range from the personal (e.g., acceptance, reframing, striving) to the relational (e.g., family support) and may coexist in collectivistic social contexts (Bernardo et al., 2017; Heppner et al., 2006). Scholarship on culture-specific coping underscores that coping styles and their effectiveness must be considered and evaluated in the cultural contexts in which responses to stress occur and that culture serves as a collective coping resource when individuals draw on shared traditions, identities, beliefs, and values to help themselves and each other cope with shared stressors. As suggested by Santiago and Wadsworth (2011), the familism commonly valued in collectivist cultures encourages ways of coping with PRS oriented to safeguarding the family. Similarly, the use of group-centered activities by African American youth and adults to cope with economic disadvantage and racial discrimination stems from an African-based collectivist culture that stresses the well-being of the in-group (Gaylord-Harden & Cunningham, 2008; Utsey et al., 2007).

Social Identity

Social identity theory further spotlights how individuals' identification with social groups shapes coping responses at both the individual and collective levels (Becker et al., 2015). This is reflected in Gaylord-Harden et al.'s (2012) cultural-assets framework for adapting to stress that incorporates both culturally relevant coping and social identity into a strength-based explanation for how African American youth deal with race-related stressors. As demonstrated by Constantine et al. (2002), identifying positively with their racial group encouraged African American youth to use Afrocultural, group-centered activities ("collective coping") to cope with stress. As a "complex model of collective resilience"

(Stevenson et al., 2020, p. 3), the social identity approach posits collective efficacy and social support (reliance on group members) as mechanisms that shape the association between group identification and responses to stress (Jetten et al., 2017). Specifically, Haslam and Reicher's (2006) social identity model of the intergroup dynamics of stress (SIS) focuses on the degree to which members identify positively with an in-group facing group-based disadvantage, such as racial discrimination and economic deprivation. For example, positive identification with family (Stevenson et al., 2020) and community (McNamara et al., 2013) have been shown to predict individual well-being when the group is facing economic stress.

Haslam and Reicher (2006) conceptualize "collective coping strategies" as resulting from social processes wherein stressful events or conditions are evaluated by the group as a problem or challenge and a group-based strategy for addressing the problem is sought. Strong identification with a low-status group whose members feel stymied in their efforts to respond effectively to a stressor can lead to "collective coping" in response to a community-level or structural problem, such as neighborhood violence or economic injustice. In their study of African Americans' appraisals of coping options, Outten et al. (2009) view racial group identification as a coping resource that can engage members in collective action to improve the group's position (social competition/resistance) and promote a positive reframing of African American identity (social creativity) as group protection strategies. Discussing "the relative futility of addressing group-based disadvantage as an individual," Outten et al. (2009) explain that "group-based disadvantage is a pervasive stressor that implicates oneself along with one's group members so that it would be difficult for individuals to envision themselves effectively mitigating group-based disadvantage on their own, regardless of how highly identified they are with their social group" (p. 163).

However, McNamara et al. (2013) found in their study of residents in disadvantaged areas in Limerick City, Ireland that group identification predicted well-being via the mechanism of collective efficacy, but was not associated with collective action. They suggest that this is because community members felt stigmatized from the outside and stressed by the criminality in their own neighborhoods, which led to community disengagement as residents avoided activities that would highlight their spoiled identity and made them fearful. Thus, as the SIS model explains, group identification is necessary but not sufficient to promote "collective coping" with PRS; barriers to and opportunities for members to view their group as unfairly disadvantaged and engaging in collective action due to their social context, must also be considered.

Empowerment

Over two decades ago Gutierrez (1994) argued that because it targeted individual adaptation to stressful environments, the prevailing coping perspective would benefit from an empowerment framework in which stressful contexts might be changed through collective action. Seen through a critical consciousness lens, empowerment involves a recognition and critique of structural inequities; the perception that one can change such stressful conditions; and acting upon that perception to effect social change (Watts et al., 2011). Such critical reflection, political efficacy, and critical action are evident in how underresourced youth of color respond to marginalization and disadvantage (Roy et al., 2019). Zimmerman's empowerment theory (1995) provides a framework for youth-led collective action for

positive community change (Zimmerman et al., 2018) and community engaged crime prevention through environmental design (Rupp et al., 2020). For individuals, empowerment entails intrapersonal positive self-perceptions and interpersonal understanding of one's social context and how to change it. At the community level intracommunity perceptions of social cohesion, collective efficacy, and sense of community along with interactional social normative supports parallel individual outcomes. Importantly, a third behavioral component of individual and community empowerment is taking action to change the environment for the better (Aiyer et al., 2015; Zimmerman, 2000).

Summary and Implications

Since the first publication describing and testing the APRS model in 2011, our thinking about adaptation to PRS has grown and matured. This has stemmed from empirical tests of the model, advances in complementary areas such as the neurobiology of childhood adversity, and our efforts to develop a potent coping-based intervention for youths exposed to PRS. It is now time that we updated the APRS model to reflect our current thinking.

The first shift in thinking was a move away from adherence to strict ideas about which coping strategies are maladaptive and which are adaptive. Poverty is an individual and collective stressor that sets development along any number of possible pathways – trending toward pathways that prioritize survival amid scarcity and unpredictability rather than pathways made possible by environmental safety and predictability. Stress system responsivity, coping, and self-regulation are built along these pathways, and generally prepare an individual for future environments similar in nature to those previously encountered. Our research has revealed that there are few universals when it comes to coping, because the context in which coping occurs matters (Bendezú et al., 2016). Stress-adapted skills exist because they are currently helpful in navigating a highly stressful environment, or they were adaptive in the past and may continue to be useful to the extent that one continues to live life in a stressful context. Therefore, there are not "correct" and "incorrect" pathways – but rather pathways that simultaneously promote wellness in one domain (e.g., survival) and illness in another (e.g., anxiety and depression).

The second shift in thinking is therefore that stress-adapted coping is valuable and comes at a cost. The trade-offs that come with what Frankenhuis et al. (2020) refer to as stress-adapted coping and regulation are not optimal and hence attention on how to lessen trade-offs is warranted. Given the variety and volume of conditions and events that comprise PRS, it is clear that coping with poverty requires many different types of strategies, including both strategies typically considered beneficial such as emotion regulation and problem-solving as well as strategies typically considered detrimental such as avoidance and wishful thinking. In PRS-affected youth, pervasive, repeated, and primary use of avoidance over time, for example, portends mental health problems, whereas strategic, periodic use of avoidance along with active coping strategies does not. This suggests that stress-adapted coping repertoires do not need to be replaced, but rather expanded to meet the heightened demands of PRS, and further that coping flexibility or knowing what to use when may also be critical.

Third, the wide array and sheer volume of stressors make it exceedingly difficult for an individual to cope effectively with PRS on their own. Hence, we have expanded our conceptualization of coping to include strategies and efforts that groups of individuals such as

families or neighborhoods work on together. For youth especially, constant striving on one's own against insurmountable obstacles can lead to skin-deep resilience wherein a young person manages to succeed academically despite the odds, for example, but at the expense of their physical health (Brody et al., 2013). Coping together as a group is also consistent with collectivist values, beliefs, and practices that are not only culturally relevant but provide collective activities that are efficacious in coping with PRS. The APRS model now includes collaborative coping to reflect this emphasis on the importance of coping together as well as on one's own. Updating the APRS model with these emphases has several obvious implications for both intervention and research.

Implications for Interventions

First, interventions need to move beyond "fixing" deficits. Rather than situating the source of youth problem behavior as something they themselves or their parents are doing wrong that needs to be fixed, the APRS model situates poverty as the source of the problem and the thing that needs to be "fixed" or dealt with. This shift relinquishes the deficit mentality that pervades so much of the scholarship on poverty. As a result, APRS model–informed interventions should strive to "meet youth where they are," recognize their strengths as well as the utility of their stress-adapted coping and regulation skillsets, and help them grow fuller, more broadly adaptive skillsets. Replacing stress-adapted skills with safe-adapted skills is likely to be extremely difficult and perhaps not very wise, as stress-adapted skills may still be needed in certain developmental contexts.

Furthermore, the vast array and sheer volume of stressors to which youth in poverty are exposed necessitate expanding rather than exchanging coping repertoires – adding tools to youths' coping toolboxes rather than discarding "incorrect" tools. We would encourage intervention developers to consider ways in which programs might be able to draw on stress-adapted skills to scaffold or facilitate learning of new approaches or combinations of approaches, and ways that hidden talents might be discovered and nurtured. Appreciation of the functional relevance of stress-adapted coping is critical and will hopefully inspire approaches that teach youth how to match their choice of coping strategy to the context. Similarly, helping youth develop coping flexibility – the ability to know what type of coping to use in a particular situation, and the flexibility to switch to a new strategy if the chosen one doesn't get the job done – is likely to be very beneficial (Cheng et al., 2014).

Second, to deal effectively with extra-individual stressors like poverty and discrimination, people need like-minded others – we can't always cope alone. Affiliation and belonging are important human needs that serve as critical coping resources, especially for those living in underresourced communities (García-Coll et al., 1996). Positive group identification, such as with one's neighborhood or ethnic/racial group, is central to the empowerment process for youth growing up in economically deprived communities (Lardier, 2018). Interventions should strive to build a uniting social identity among people facing shared PRS to pave the way for the psychological and collective empowerment needed to cope with it individually and collaboratively. Coping via social action for community change is one example of collaborative coping that is consistent with various positive youth development principles such as empowerment theory and youth participatory action research. Importantly, collaborative coping such as social action builds agency and a sense

of purpose, which constitute fundamental human needs that are often depleted by chronic PRS.

Third, interventions could pull both ideas together for maximal impact. Multicomponent intervention programs that address both individual youth-strengthening as well as community-based risk exposure reduction could amplify the effects of either approach on its own. Helping youth build fundamental self-regulation and coping skills needed to engage productively in group-based work and then connecting youth with adults in the community with whom to work on social change projects would be a logical extension of the APRS model. Building a Strong Identity and Coping Skills (BaSICS) is the first intervention to explicitly apply the APRS model and is designed to improve and expand preadolescents' coping and self-regulation skills and to prevent the development of post-traumatic stress symptoms, anxiety, and depression (Wadsworth et al., 2018, 2020). We theorized that these individual-level goals would be best achieved through a social justice intervention in which coping and self-regulation skills are conceptualized as resources to facilitate positive identity development and proactive engagement with others to bring about social change (Quinn et al., 2017).

Hence, in line with critical consciousness and empowerment approaches, BaSICS content is derived from youths' own lived experiences and issues that matter to them, such as problems in the community. This approach helps raise awareness of social injustice and lays the groundwork for how they as "collaborative copers" can together address issues important to them (Roy et al., 2019). The BaSICS curriculum provides a structure to help youth learn and apply coping skills and develop a socially embedded sense of self, culminating with a youth-designed community action project that builds community assets and/or reduces community stressors. Via the social action work, which is made possible by the program's coping and identity skill-building, youth voices are heard, acknowledged, valued, and used for action. They become engaged in agentic activities to solve real problems in their community (Burns et al., 2019). Agency, belonging, and sense of purpose are hypothesized to empower youth in prosocial ways. In this way, BaSICS is designed to transform youth into agents of change and authors of their own stories rather than victims of their circumstances.

Implications for Research

First, the emerging literature on hidden talents (e.g., Ellis et al., 2020; Frankenhuis et al., 2020) suggests that some stress adaptations may be advantageous in many contexts and could be leveraged to promote positive development outside adverse environments. At present, the list of identified "talents" is short. In order to fully realize the potential of nurturing these preexisting strengths that develop under conditions of adversity, we first need to discover more of them. This will require a different approach to our research – a shift away from the deficit perspective and an openness to considering the full range of skills and abilities that children in poverty possess. The potential benefits of capitalizing on things poor kids already do well to build new capabilities are great.

Second, as noted earlier, because life in poverty creates so many stressors in so many domains of life, a child is likely to need a larger-than-average coping toolbox and knowledge about how and when to use which strategies. The current dearth of research on the efficacy of different types of coping in various contexts has made it difficult to guide this selection and tailoring process. Additional research is needed to better understand when

youth may benefit from certain strategies over others, and when a combination of approaches may be needed. Knowledge of hidden talents with which to scaffold the learning of new coping tools would be especially useful.

Third, active/action-oriented coping remains a cornerstone of efficacious coping – even though it can be exceedingly difficult at times to identify viable active solutions to PRS. The chronic and uncontrollable nature of PRS often makes it difficult-to-impossible for children to identify active coping solutions – a phenomenon common to uncontrollable stress (Wadsworth et al., 2011). While primary control coping may be effective when youth face controllable stressors, it is not a good fit in cases where stressors are uncontrollable (Clarke, 2006; Jaser et al., 2005). Evans' work has repeatedly shown that chronic experiences of the low levels of controllability of PRS and the dearth of available active solutions for PRS can lead to learned helplessness, giving up, and ultimately depression and other mental health problems. This is why the expansion from individual to collaborative coping is so important. Collaborative social action creates the opportunity for direct action and is also theorized to promote fundamental human needs of agency, belonging, and sense of purpose. Research is needed on both the challenges of and possibilities for collaborative coping with PRS. Such studies could examine context-specific processes that foster or limit empowerment and social identity in groups affected by PRS and how social networks influence collaborative coping in underresourced environments (Gazso et al., 2016).

Finally, as reviewed earlier, PRS leads to adaptations in neurobiological systems, such as the HPA axis. While these adaptations may have served important functions in the past, they do leave individuals vulnerable to physical and mental health trade-offs that can lessen well-being and contribute to early morbidity and mortality. Interventions timed to neuroplastic developmental periods such as early postnatal life and the pubertal transition may have the potential to reverse "damage" or recalibrate physiologic systems. For example, the foster care infants enrolled in Dozier's Attachment and Biobehavioral Catchup treatment program showed a normalizing of their diurnal cortisol pattern over the course of treatment, as compared to controls (Bernard, Dozier, Bick, & Gordon, 2015). Similarly, a handful of studies have now shown that a normalizing recalibration of the HPA axis can occur during puberty for those youngsters who experienced early-life adversity such as parental separation or living in an orphanage who then experience an improvement in the home environment such as the return of the parent or adoption (e.g., DePasquale et al., 2019; Zhang et al., 2021). These studies showed that such children had blunted cortisol responses early in puberty in comparison to controls, that then shifted to typical cortisol patterns by the end of puberty. Even cellular aging is highly malleable and regrowth/reversal is possible. Studies show strong support for telomere lengthening with the implementation of behavioral interventions (Epel, 2012). Hence, properly timed and appropriately targeted interventions hold great promise for improving the life chances of youth who experienced early-life adversity by providing "safe spaces" for them to practice individual and collaborative coping skills (primary control coping) that are by necessity underutilized in PRS contexts.

Conclusion

In sum, coping develops in a biopsychosocial context. As with most skills and abilities that humans acquire, characteristics of the individual such as temperament and physiologic stress reactivity interact with opportunity

structures, school and neighborhood characteristics, and family processes to direct the development of coping. Appreciating that there are substantial individual differences in children's coping skillsets, there do exist overarching patterns of coping and other stress responses that reflect the economic circumstances of a child's early life. Coping patterns developed in the context of economic deprivation and scarcity prioritize survival over health and wellness and do not necessarily translate well to different contexts. Still, until society can help transform youths' home environments into safer ones, stress-adapted coping may continue to be necessary. In addition, in thinking about interventions for stress-adapted youth, we need to shift away from believing such youth need different coping strategies. Rather, we assert that they need more strategies to be able to regulate in the many and varied contexts they will encounter.

Further, we assert that efficacious coping with the overwhelming context of stress created by income inequality and poverty likely requires input and assistance from others. Collaborative coping reflects the types of actions that groups such as families, neighborhoods, and communities affected by economic hardship sometimes take to cope together to resolve a common problem. Exemplified by collective social action, collaborative coping both releases a child from feeling as if they need to cope with structural problems on their own, and provides the support, agency, sense of purpose, and belongingness needed to proactively face what we refer to as "societal stress." The updated APRS model embraces these complex ideas about coping in the context of low income and income inequality and therein offers new ideas for coping-based research and intervention with PRS-affected children. The hope is that the updated APRS model will inspire research that better reflects and appreciates the value in the many and varied ways that individuals and their families, neighborhoods, and communities cope with poverty-related stress. Dumping the deficit model in basic research and intervention development with people in poverty is long overdue. Let's remedy that, shall we?

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24 Culture, Diversity, Context, and the Development of Coping

A Phenomenological Perspective

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Introduction

Representing the normative human condition, all individuals face challenges and experience psychological stress. Coping is a psychological process that allows individuals to manage the challenges and stressors that occur throughout the life course (Folkman & Moskowitz, 2004). Through the use of specific targeted actions and cognitive techniques, coping reduces acute stress and increases overall well-being (Ben-Zur, 2009).

Although there are myriad coping strategies, not all tools are useful to everyone. One's identity determines the coping tools and strategies that are available to them. In other words, it is through identity that coping is operationalized. Gender, racial background, developmental stage, and socioeconomic status have all been shown to influence coping strategies (Matud, 2004; Moreland & Dumas, 2008; Santiago et al., 2012). Though important in determining identity, one's geographic location and demographic designations are but two facets of identity formation. Among people who share the same social identity, there exist individual identities, because there is also a phenomenological component to identity as individuals interpret the world around them, including the feedback they receive from others, infer from interactions with others, and figure out their place within it. Accordingly, there is intragroup variation.

Purpose and Key Concepts

Coping is multifaceted and dynamic in that it is an individualized process but takes place within shared developmental contexts. In other words, common contextual challenges might provoke the need for a coping response among all who exist within the shared context, but individuals can respond differently to such challenges. Given the intragroup variability we have already referenced, coping within shared contexts is distinctly individual given that people may not experience the environment in the same way due to phenomenological interpretation. For example, individual members within a family might cope differently in response to a shared family stressor depending on diverse role expectations (e.g., mother vs. child status, individualized temperaments, and developmental stage). Additionally, though individuals within a shared context might have common stressors, they will have varying amounts of *net* stress. As we will explore more fully, knowing the amount of stress or risk attached to an environment is not enough information to know what coping strategies are accessible and on which one may rely (Spencer et al., 1997).

The purpose of this chapter is to make explicit the ways that coping processes experienced in context are linked to identity. This is particularly important when considering that societal inequalities are often based upon identity.

Thus, social inequality itself, then, provides a shared context for determining coping responses, and this very process becomes part of identity formation. When certain social identities are more likely to be pathologized, victimized, and excluded, then shared coping strategies are especially important for determining best practices as supports. We examine this issue through explicating experiences of diverse youth and families. First, we provide an overview of Spencer's phenomenological variant of ecological systems theory (PVEST) framework, which operationalizes the relationship between coping and identity, then we discuss the particular contours of identity development for Black male youths in particular, and the interplay between parental identity and adolescent identity development in a low-resourced, urban setting. Further exploring the concept of context, the chapter then argues for the importance of considering the radiating impact of exogenous shocks on the developmental trajectories of diverse youth in the United States. We close with a call for novel research paradigms and strategies to account for those facets of coping that are anchored in an identity-focused development perspective that acknowledges individuals embedded in distinctive cultural and ecological contexts.

Coping, Identity, and Diverse Youth

It is critical to acknowledge that one's emergent identity is linked with implemented coping strategies and outcomes; thus, everyday coping practices also shape identity. Spencer's PVEST (1995, 2006, 2008) builds a bridge between vulnerability status, coping, identity, and context. By applying a phenomenological perspective to Bronfenbrenner's ecological systems theory (EST; 1986), Spencer's PVEST allows an analysis of self-appraisal and meaning-making processes occurring within interactions with others as a dynamic system taking place within the various contexts of development (e.g., school, family, neighborhood). Coping occurs while individuals manage the satisfaction of normative developmental tasks taking place under varying conditions. These processes, evolving over time, at maturational points, and diverse spaces, underlie *identity formation, coping processes, and life-stage outcomes* (Spencer, 1995, 1999). Spencer's PVEST provides a framework to examine shared normative human development – through the interaction of coping, identity, and context character, which provide much variation in experiences and outcomes. The governing framework for this chapter, PVEST, accounts for individual and group-level differences in the experiences of coping, perceptions, and the negotiation of stress and dissonance (or lack thereof). As such, PVEST utilizes an identity-focused cultural-ecological (ICE) perspective, integrating issues of social, historical, and cultural context with normative maturational and developmental processes that individuals undergo and to which youth are particularly sensitive (Spencer, 1995).

Phenomenological variant of ecological systems theory is conceptualized as five basic components linked by bidirectional, recursive processes, forming a dynamic, cyclic model (see Figure 24.1). The first component, *net vulnerability level*, essentially consists of the contexts and characteristics that can potentially pose challenges and, thus, require coping during an individual's development at any life stage. Risk contributors are factors that may predispose individuals for adverse outcomes during particular developmental stages. The risk contributors function as liabilities that, of course, may be offset by corresponding stage-specific protective factors (e.g., cultural capital). For marginalized youth (youth of color and low-resource individuals in the USA), risks include socioeconomic conditions such as poverty, imposed expectations such as race

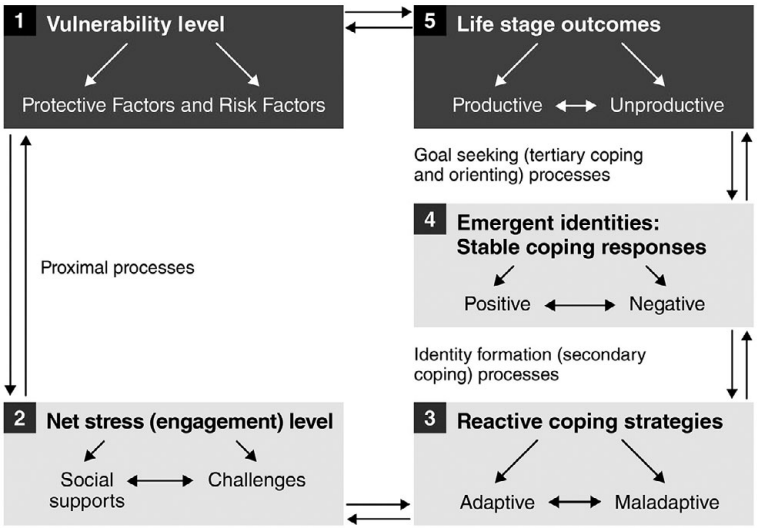

Figure 24.1 Outcome options for positive youth development: PVEST. (based on Spencer, 2008, p. 708)

and gender stereotypes, and larger historical processes including racial subordination and discrimination. At the same time, for highly privileged youth, a risk factor may be the lack of positive coping opportunities or unrealistic self-appraisals (e.g., an embraced identity but one difficult to live up to). Self-appraisal is a key factor in identity formation; perceptions of the risks one faces and the protective resources available are central to identity processes and development.

Net stress engagement level, the second component of PVEST, refers to the actual experience of situations requiring coping and which challenge an individual's well-being; these are risks that are actually encountered and that are juxtaposed against available supports. Available social supports can help youth negotiate experiences of stress; thus, supports are *actualized protective* factors. Virtually unconscious equilibrating efforts, which also impact future vulnerability, occur as the individual engages these stresses as challenges given accessible supports. Involvements with racism and unbridled supports – both subtle and overt – and related experiences of dissonance are salient stressors for youth that necessitate coping. Differential individual and group experiences with COVID-19 are recent exemplars of dissonance-generating conditions. Such nonnormative, asymmetrical events as COVID-19 compound the normative developmental issues that all adolescents must confront (e.g., puberty, identity exploration, peer relationships, experiences with independence expectations). One's history of cultural socialization can serve as a protective factor for some; its character matters for the coping developmental process, and available adult role models can serve as supports to help youth reactively cope with these experiences.

In response to stressors and in conjunction with supports, *reactive coping methods operationalized* "in the moment," in a particular context, are employed to resolve uncomfortable or dissonance-producing situations. Normative cognitive maturation makes youths' awareness of dissonance both acute and unavoidable. Reactive coping responses include problem-solving strategies that youth

employ to deal with stress and dissonance, which can lead to either adaptive or maladaptive solutions.

As youth employ various coping strategies, self-appraisal continues, and those strategies that produce desirable results for the ego, whether adaptive or maladaptive – given redundant usage – are replicated. Accordingly, these become stable coping responses, and, coupled together, yield emergent patterned responses, or identities. *Emergent identities* define how individuals view themselves within and between their various contexts of development (e.g., family, school, neighborhood) and may show stability over time as well as navigated spaces. The combination of cultural/ethnic identity, gender role understanding, accessible supports, and self and peer appraisal all help to define one's identity.

Consistent with Eriksonian theorizing (1959), identity lays the foundation for future perceptions, self-appraisal, and behavior, yielding adverse or productive *life-stage, specific coping outcomes*. Productive outcomes include – although are not limited to – well-being, positive relationships, and high self-esteem; at the same time, adverse outcomes may include poor health, the narcissism of underinterrogated privilege, incarceration, and self-destructive acts. Stated differently and given the shared and expected normative developmental task requirements confronted across the life course as described by Havighurst (1953), *achieved successes (or failures to address expectations) at any one stage have implications for subsequent periods of development and consequent levels of vulnerability.* The bidirectional and systems orientation of Spencer's theoretical framework demonstrates the links between stages and intragroup variability as contributed, as well, by context features. That is, individuals' outcomes at one developmental period have implications for the level of human vulnerability experienced at subsequent stages as lives unfold across the life course; prior outcomes matter as individuals confront normative developmental tasks at subsequent periods. As suggested by Figure 24.1, the PVEST normative process demonstrates why it is referred to as an ICE perspective (see Spencer, 1995, 2006, 2008). Figure 24.2 indicates the ever-forward-moving

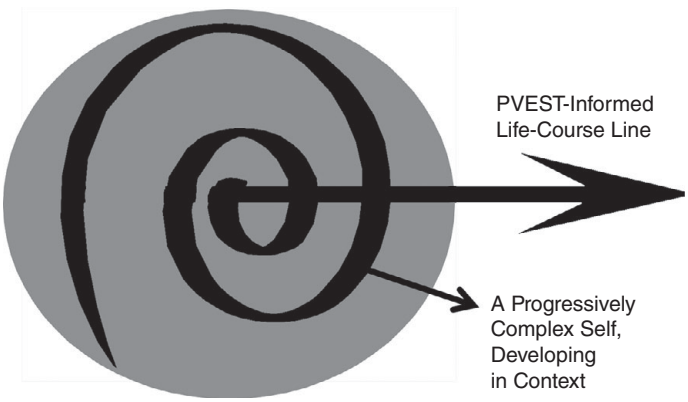

Figure 24.2 As dynamic, systems-linked processes, PVEST represents identity-linked spiraling components, which unfold throughout life as humans engage normative stage-specific development tasks, which are confronted under varying ecological conditions (see Spencer, 2006; Spencer et al., 2006).

life-course line and development stage–specific tasks that the systemic processes of PVEST both confront and address.

The PVEST framework represents dynamic processes that continue throughout the lifespan as individuals encounter and balance new risks against protective factors, engage new stressors (potentially offset by supports), establish more expansive coping strategies, and redefine how they view themselves, which impacts how others view them, as well. The ICE perspective specifies the nature and character of intervening processes. Spencer's PVEST aims not only to capture this entire developmental process, but also to place it within its broader social contexts as ever-emergent identity processes unfold across the life course as linked to stage-specific developmental tasks (see Havighurst, 1953). Net stress engagement is concerned with the lived experiences of individuals within their environmental context that can pose obstacles to well-being. While the previous component, net vulnerability level, is about potential risk that an environment can impose on an individual, net stress engagement is about those actual risks experienced given one's confronting of stage-specific developmental tasks. The net stress engagement is comprised of experienced stressors and accessible supports that help mitigate the effects of the stressors. Examples of stressors might include experiences of racism or colorism, violence or danger confrontations by an individual, and just general daily hassles. An example of a social support might be positive relationships with adult role models.

Reactive coping is comprised of those personalized behaviors and cognitive techniques one employs to help manage the reality of their circumstances. Coping mechanisms are products of the environments in which they exist and can be maladaptive or adaptive in nature. Coping strategies react to the immediate stressors and provide opportunities for problem-solving. For example, one immediate stressor for an adolescent within a violent neighborhood might be the feeling of being unsafe on the way to and from school. Although clearly responsive to the immediate context, nevertheless, a maladaptive (albeit high-risk) response might be to adopt hypermasculine behaviors to signal that one is "tough" and not an easy victim (e.g., see Spencer et al., 1995). An adaptive response to the same stressor might be to identify and form relationships with "safe" people and develop "safe" routines that minimize risk when negotiating the environment.

Eventually coping mechanisms form the basis of identity development. As one employs the same set of techniques on a consistent basis and interprets the responses received from the external environment, one is able to decide what is useful and helpful until available strategies that get enough responses are found. These are the strategies that get repeated often and internalized. It is through this process that emergent identities develop. These tentative identities provide a framework for how individuals view themselves in multiple contexts while continuing to receive feedback from others that could be negative or positive. Emergent identities also provide an organized and stable sense of self for the individual navigating diverse spaces and places linked with the combinations of behaviors they deem appropriate for themselves.

Lastly, life-stage-specific outcomes are the result of forged identities. These specific outcomes could prove to be unproductive or productive. For example, an adolescent, seeking to cope with feeling unsafe in a violent neighborhood by participating in violent behaviors, might eventually begin to self-identify as someone who victimizes others. In this case individual coping became an identity that might result in a series of unproductive outcomes including negative relationships, incarceration, and financial insecurity. New situations and

challenges arise as people move through the life course. Individuals develop new cognitive techniques in the manner previously described to navigate new scenarios and attendant challenges. It is important, then, to acknowledge that coping behaviors and strategies that work for people in one situation may not be equally effective in other contexts. As such, the identification of effective supports is important given implications for stress, challenge, and coping repertoires in response to novel context-linked phenomena.

For example, African-American male youth in low socioeconomic neighborhoods might be compelled to cloak themselves in hypermasculine coping behaviors such as carrying weapons and being outwardly aggressive in order to shield themselves from fear and stress induced by threats from multiple environmental sources and underserved and protected neighborhoods (Stevenson, 1997). Lack of economic opportunity, failure of policing professionals to support and protect, neighborhood disorder, and threats to gender identity provoke youths to adopt hypermasculinity as a relevant and meaningful coping strategy. Unfortunately, hypermasculinity often proves to be a maladaptive short-term solution because those youth who engage in such behaviors increase their chances of encountering the very circumstances that they seek to avoid (Seaton, 2007). In a hypermasculine volatile environment in which youth are adopting risky behaviors in order to retain identity and self-esteem, it becomes imperative for one to learn how to navigate it at a young age.

Spencer et al. (1997) note that it is inadequate to only consider the "risks" or disadvantages when theorizing about individuals in context. Spencer's PVEST model notes that everyone across the socioeconomic spectrum has a net amount of both risk factors and supportive factors. While youth in poor communities may collectively have a disproportionate amount of risk factors, there will also be varying amounts of supportive factors among youth who live within the same context. Such consideration of risk and supportive factors aids an appreciation for and understanding of resilience and why people within the same context can yield vastly different results as a function of something as basic as youths' inferences of close parental monitoring (see Spencer et al., 1996).

African-American adolescent males in poor neighborhoods interpret an enormous number of messages from peers, their communities, intended supports who may function as sources of threat (e.g., policing professionals), and mainstream society, more generally. Stevenson (1997) argues that the impossibility of navigating and constructing a stable identity leaves such youth "missed, dissed and pissed," or misinterpreted by others, seething with expressed and unexpressed long-term anger, and disrespected by authorities. Emerging movements led by diverse young adults (e.g., Deferred Action for Childhood Arrivals (DACA), Black Lives Matter, Stop Asian Hate rallies) offer new avenues for understanding collective engagement of net stress, with the ramifications for positive identity development yet to be revealed.

While PVEST research addresses some of the critical concerns of the context of youth participation in criminalized behaviors, the role of inferred parental monitoring as a protective factor, and parenting in poor black neighborhoods, have been underinterrogated. Specifically, scholars have not yet adequately addressed the phenomenological processes through which parents explain and make meaning of such behaviors within their communities. Next, this chapter addresses this conceptual gap through an examination of Black mothers' parental identities and the adolescent identity development processes for their children.

Parent Identities

All parents experience anxieties concerning their children's outcomes. Parents are members of a societal category and are subject to a set of societal expectations, some of which seem obvious and universal. Even though not all parents are burdened by the same social and historical forces, all are expected to yield the same desirable child outcomes and employ the same set of culturally approved strategies and behaviors. Not to do so is to fail in one's parental role and be a failure in one's parenting identity.

Parental identity, like all identities, is dependent to some extent on comparison with others who are both similar and different. But in order to protect their individual parental identity, such parents make the cognitive leap between not being able to control their children's outcomes while simultaneously being blamed for them, by imagining children as capable agents with their own desires, motives, and actions that are contrary to what their parents want for them.

African-American Urban Mothers

In the sections above, we have indicated that coping tools, strategies, and behaviors are determined by identity and one's location within the life course. We've used the example of potential coping strategies and identity formation processes in African-American urban youth to note that some youths must negotiate growing and developing within the context of racial segregation, poverty, and larger sociocultural phenomena that has real implications for their life trajectories and outcomes. Underresourced African-American urban communities are more likely to be policed than other types of neighborhoods. Further, a considerable portion of police action is dependent upon individual officer discretion. In accordance with "stop and frisk" policies that allow officers to stop and search anyone they consider to be "suspicious," Black and Latino males are more likely to be targeted than all other groups (Goldstein, 2013).

Sociologist Bruce Western (2007) asserts that incarceration has become more common among poor urban African-American males than bachelor degrees, marriage, or military participation. For this group of men, incarceration begins early in the life course and tends to become a cyclical pattern, as men who are released from prison must continue to engage in illegal activities because a prison record impedes their ability to enter the formal wage economy.

However, such youth and young men do not exist within a vacuum. Poor parents raising Black boys in racially segregated neighborhoods are located at the center of the hyperincarceration phenomenon. If one key role of parenting is understood to be that of training children to fully participate in society and keep them from harm, how do parents in such environments manage the difference between larger cultural expectations of child outcomes and their actual lived experiences within their families? This is further complicated by the fact that Black parents are often implicated in undesirable youth outcomes.

Historically, Black mothers have been inaccurately conceptualized in the broader imagination as negligent, morally deficient, and incapable of completing the central parenting task, which is to raise responsible and productive citizens (Roberts, 1997). In fact, Black mothers have been seen largely as corrupting figures that tarnish Black youth, who often need state-sanctioned protection from their selfish Black mothers who put their own needs ahead of their children (Roberts, 2012). Since at least the end of the Civil War, the social ills of the Black community were thought to be rooted in the deficient instruction of Black children by Black mothers. The exact nature of the conceptualizations evolved

as society changed, but all involved comparing Black mothers to their White counterparts, without accounting for differences in the latter group's aggregate access to more resources and privileges.

In a study of 40 parents within one Southside Chicago neighborhood, Hall (2020) concluded that poor Black parents of youth who participate in criminalized behaviors are able to maintain a positive parental identity in spite of societal messages that tell them they are bad parents and in spite of undesirable child outcomes. One way they are able to maintain a positive parental identity is by imagining children as capable agents with their own desires, motives, and actions that are contrary to what their parents want for them. Hall finds that parents come to understand that parental behaviors are not directly tied to child outcomes and that there are no tried-and-true set of behaviors that assure child success. Poor Black youth then, are thought to have much more agency than their parents and are therefore choosing their outcomes. However, imagining youth as fully agentive can be read as a means of coping with unrealistic expectations by underresourced parents who know they are being blamed for their undesirable youth outcomes, yet cannot guarantee success for their children within the confines of their developmental context.

In the case of parental efforts in highly vulnerable communities, risks are significant and require substantial supports for offsetting the effects of challenging and inequitable national and local policies, practices, and conditions that compromise parental efforts no matter how well-intended for obtaining positive youth outcomes. This insight motivates a deeper exploration of the multidimensionality of context, and the criticality of its role when examining the connection between coping and identity development.

Coping, Context, and Identity Development

As noted earlier, Bronfenbrenner's EST provides a framework to engage the contextual factors that inform human development over the life course. Ecological systems theory (Figure 24.3) articulates a series of nested systems in which individuals are embedded, that are constituted by the proximal and distal components that interact with individuals' developmental milestones and trajectories.

Most immediately located around the individual is the microsystem that is primarily occupied by familial and home context. Adjacent to the microsystem is the mesosystem, which establishes the connection to the broader exosystem where more remote, disparate networks, such as neighbors and social services, reside. The outer bands are where Bronfenbrenner situates culture and values (macrosystem) and the broader events occurring over time envelop all of these nested systems (chronosystem). Certainly, the study of an exogenous shock that occurs within the chronosystem, such as the Great Recession of 2008, facilitates an examination of the implications of an event on the developmental processes and strategies undertaken by diverse young adults to cope with the disruptive effects of this event on their education planning and postsecondary pursuits. The investigation of the Great Recession can shed light on how to provide developmental supports to young adults as they navigate one of the most pivotal societal shocks in the last century, the COVID-19 global pandemic, that pierces through the proximal and distal systems that surround human developmental processes.

Spencer's PVEST considers risk an experience associated with harm or danger, which facilitate the cultivation of coping mechanisms to achieve a stable identity status. However, when risk is exacerbated by a global pandemic or economic shock, the level of risk may exceed

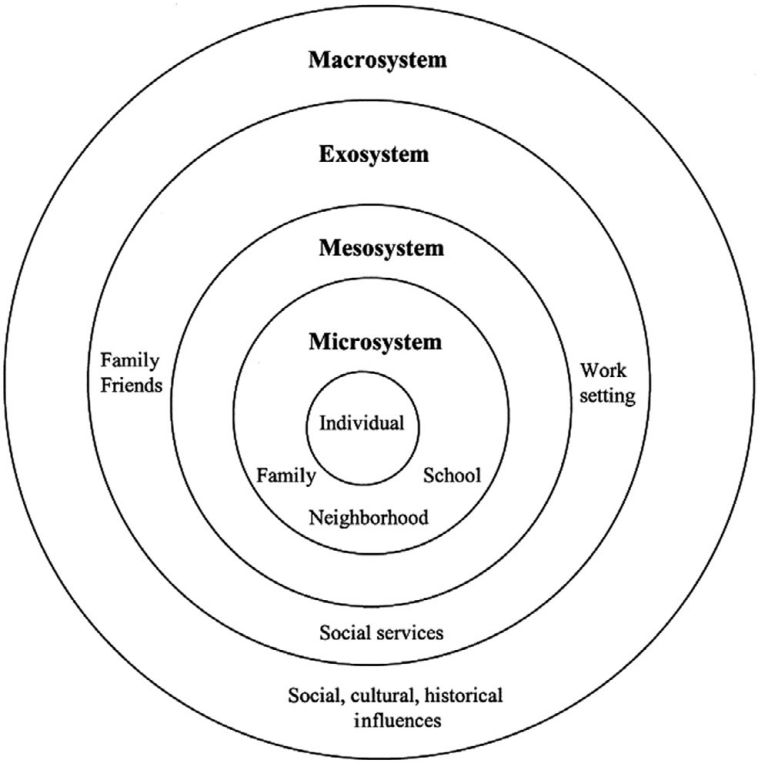

Figure 24.3 Ecological systems theory.
Source: Spencer et al., 2002

the access to and availability of requisite supports to diverse youths as they carry out critical developmental tasks (Havighurst, 1953; Spencer, 1985). As highlighted in other works examining developmental processes of diverse youths (see Nichols Lodato, Hall, & Spencer, 2021; Nichols Lodato, Harris, & Spencer, 2021) it is important to examine the destabilizing implications of exogenous shocks, such as the Great Recession and the COVID-19 pandemic, on developmental contexts due to the sheer scale of the event impacting governing paradigms regarding the assumed developmental trajectories, particularly educational pathways after high school graduation for diverse young adults. Certainly, previous research that identifies the transition to adulthood or emerging adulthood as a distinctive developmental period evaluates the role of the developmental period over the life course (Arnett, 2000) or implications for intergenerational mobility (DeLuca et al., 2016). Additionally, when examining the milestone of postsecondary education attainment, it is critical to note that the pathways young adults pursue after high school are not normative nor standardized: US Census data show that only 45% of persons between the ages of 25 and 44 pursue postsecondary education (US Census Bureau, 2015). As such, research on postsecondary outcomes must accommodate a constellation of the pathways that young adults pursue, or are forced to pursue, with education comprising one of those paths, and how those paths reflect coping strategies adopted to address risk. This latter question is the subject of an investigation into the particular effects of the Great Recession on postsecondary

pathways. Utilizing the Panel Survey of Income Dynamics (PSID) Transition to Adulthood module (PSID, 2017), Nichols Lodato's research on diverse young adults enrolled in college indicates disparate effects over time on the postsecondary educational pursuits of young adults as a result of the Great Recession: By 2011, many young adults enrolled in college reported changing their academic major, or primary field of study, in reaction to the Great Recession. These students' academic adjustment indicates a reactive coping strategy in response to a disruptive event. Interestingly, dropping out was only highlighted as a statistically significant pathway in 2013, after the Great Recession was declared over. The implications for positive identity development are noteworthy. Research highlights the salutary effects of pursuing a postsecondary education on life outcomes, with particular literature in the field of economics and human capital underscoring the role of education in skill acquisition and advancing labor market outcomes (Becker, 1964; Schultz, 1961). However, the pernicious and enduring effects of economic inequality in US society thwart progression toward intergenerational upward mobility (Chetty et al., 2014) and economic stability. Indeed, when an exogenous shock, such as the Great Recession or the COVID-19 pandemic, collides with preexisting levels of high economic inequality and discriminatory practices the result is higher levels of risk encountered by diverse young adults in their developmental contexts. For diverse youths in the USA, this higher level of risk, appropriately deemed "lethal risk" by Nichols Lodato, Hall, and Spencer (2021), can challenge the most robust developmental supports that promote adaptive coping and positive identity development. Lethal risk can overwhelm already overstretched networks of support that reside in the layered developmental systems, particularly in underresourced areas, thereby undermining the functionality of these supports and/or revealing the pervasive shortcomings to address and mitigate lethal risk. It is critical, then, to document the impact of exogenous shocks, such as the Great Recession or the mass casualty event that the COVID-19 pandemic wrought, and how, in the USA, shocks collide with endemic inequality and discriminatory practices exacerbating adverse outcomes for individuals whose intrinsic humanity is denied by systems responsible for the provision of supports, resources, and opportunities. Indeed, shocks in the chronosystem brings into stark relief the foundational tenet of PVEST: that all humans are vulnerable. With this as a foundational principle for engaging coping, the cultivation of coping strategies that promote positive identity development is, then, a key human undertaking over the life course that is enhanced by understanding how diverse persons make meaning of the risks they encounter, where and how their *perceived and accessed* networks of supports reside and are understood, and what new research strategies are warranted to ascertain levels of net stress and emergent coping skills that are cultivated in response to shocks. When considering exogenous shocks, the degree to which coping strategies are robust enough to facilitate stable, positive identity development are inextricably linked to the accessibility and deployment of supports and resources that are premised on shared human vulnerability. The sheer scale of risks emanating from adverse events that precipitate human and systemic existential threats force a paradigm shift in how human coping is understood and studied.

Shifting the Paradigm: COVID-19 and New Realities of Risk, Resilience and Coping

The human toll of the global pandemic exists on a scale not seen for well over a century, with

lethal health, social, and economic effects playing out across the USA particularly for communities of color. Black, Latino, American Indian, and Alaskan Native communities have been disproportionately adversely affected by the pandemic, with the rates of infection and death far outpacing White counterparts and resulting in a reduction in overall life expectancy (Arias et al., 2022; Andrasfay & Goldman 2021; Yancy, 2020). When examining the effects on diverse youth, the developmental ramifications are profound and far-reaching. Indeed, research from Kidman et al. (2021) identifies the stark effects of the pandemic on a generation of children owed to the searing loss of a parent. As of 2021, Kidman et al. estimated that between 37,000 and 43,000 children aged 0–17 years old lost a parent during the COVID-19 pandemic, a 20% increase over the year prior to its onset, and Black children, who comprise 14% of children in the USA, are disproportionately affected by parental loss, enduring 20% of parental losses (Kidman et al., 2021). Loss is not just at the level of the parent–child relationship: Numerous families have experienced simultaneous or successive losses of more than one family member (family can be defined by biologically or socially based ties). Verdery et al. (2020) sought to develop a measure of the effects of the COVID-19 "mortality shock" by modeling the pandemic effects on kinship networks, estimating at the time of the article's publication that each death from COVID-19 in the USA resulted in nine persons losing a close relative. Certainly, this particular phenomenon of familial loss and the ensuing multileveled, cross-generational shock to youth may render preexisting resources and supports overwhelmed by the need or incapable of marshaling sufficient resources to compensate for lost relatives or other persons who are part of the fabric of youths' critical support networks. Research that highlights the adverse impact of parental loss on youths' short- and long-term outcomes notes higher rates of depression, lower academic attainment, and other risks to psychological health and well-being (Berg et al., 2016; Nabunya & Ssewamala, 2014). Nationally, the scale of loss from the pandemic in the USA alone exceeds that of US war casualties accrued over a period of years, such as World War I (1917–1918: 116,516 mortalities), World War II (1941–1945: 405,399 mortalities), the Vietnam War (1964–1975: 90,220 mortalities), with no community spared from the searing psychological, economic, and social effects. Notably, the presumed stabilizing effects of school are not immune from these disruptive events as schools were closed and hybrid learning arrangements were implemented throughout the country. In many cases, this revealed the broader structural racial and socioeconomic inequality in K-12 education in the USA as many schools struggled to comply with public safety standards for safely reopening schools (Lordan et al., 2020). This resulted in students experiencing a period of disrupted education over the course of more than an entire year, with the full extent of the lost learning on long-term outcomes not yet fully determined.

Conclusion

It is fair to surmise that the challenge in the USA is to develop a new system of supports that are predicated on novel research paradigms and strategies that effectively address the unique challenges diverse children and young adults encounter as they mature and develop in the years to come. When situating the loss in the broader context of societal reckoning with the enduring ramifications of economic inequality and racial discrimination, human development theoretical models, as exemplified in PVEST, offer a framework that

encourages research models and applied strategies to support the cultivation of coping strategies for diverse youth. Most importantly, culturally relevant perspectives that acknowledge and interrogate the ecologies of development for the prior 400 years as experienced by the nation's diverse citizenry remain underinterrogated.

Accompanying the robust application of human development theory to guide research and policy is the acknowledgment that human development occurs in context, and must incorporate the role of exogenous shocks on developmental trajectories for diverse youth.

As noted elsewhere (see Spencer, 2022), this chapter posits that both vulnerability (i.e., a status of having both risks and protective factor presence) and resiliency considerations (i.e., good outcomes possible irrespective of high-risk status) indicate the need to consider several factors required for better scholarship, in general, and particularly efforts guiding research, assessment, and evaluation. In a parallel manner, ignoring cultural traditions for assisting adaptive coping innovations is a dire shortcoming. Rendering such practices invisible – vis-à-vis normative coping and identity scaffolding needs – contributes to missed opportunities. The shortsightedness compromises the discernment of best practices for aiding, scaffolding, and designing supports that result in the design and specification of adaptive coping supports that lead to healthy identity processes.

As a helpful framing device to understand these developmentally linked coping processes, PVEST – our ICE conceptual strategy – provides a useful heuristic device. It assists in identifying, unpacking, and linking supportive healthy coping for positive identity; as well, it demonstrates that understanding the links between coping and identity are critical for determining the strategies needed for healthy broad ego processes and stage-specific productive outcomes. Coping outcomes that are visible and guarantee sufficient efficacy for healthy identity processes are important attributes both for the sources of socialization (e.g., parenting, context, and developmental status–specific, culturally relevant supports) as well as the focus of parental labors, that is, resilient youth themselves.

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Part VI

Application and the Development of Coping

25 Social Media Use and Misuse, Stress, and the Development of Coping

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Introduction

Recent years have witnessed a dramatic growth in the usage of social media, with as many as 3.6 billion people worldwide having used at least one social networking platform in 2020 (Statista, 2022). Social networking sites (SNS) have now become so embedded in many aspects of individuals' daily lives that they have undeniably altered the ways in which we connect with one another, structure our day, and perceive the world around us.

The omnipresence of social media is true especially among young people, who now spend a majority of their free time online. This time is predominantly spent on viewing television/videos, e-reading, browsing websites, and using social media (Rideout & Robb, 2019). Reports have shown that children aged 8–12 typically use just under 5 hours' worth of entertainment screen media a day, of which they spend almost 1.5 hours on average on social media (Rideout & Robb, 2019). The quantity of media use increases in adolescence, with teens using entertainment screen media for an average of 7.5 hours a day (including both weekdays and weekends), of which almost 2 hours is spent on their social media use (Rideout & Robb, 2019). Compared to children and adolescents, young adults' (aged 18–29) daily media consumption is centered around social media, with social network sites taking up to 3 hours of their day (Attest, 2021).

Aided by the rapid adoption of mobile devices, this heavy use of online communication has enabled young people to be connected to their family, friends, work, or school environment potentially "anyplace and anytime," consequently blurring the temporal and spatial boundaries of media use. This increased social connectivity, however, can be regarded as a double-edged sword that provides users with a number of benefits (e.g., increased social support; Park et al., 2009), but has significant cost for well-being, also. Research has shown that social media can negatively impact child and adolescent well-being through social comparison, risk of cyberbullying, fear of missing out, or negative peer feedback (McDool et al., 2016; Twigg et al., 2020). Studies have also reported that many users show concern over the expectations of constant availability placed on them by either themselves, their work, or their social network (Fox & Moreland, 2015; Gao et al., 2018). These demands could result in feelings of stress when the user is not reachable, accompanied by interferences in sleep, work, or other activities (Freytag et al., 2020; van der Schuur et al., 2019). Not being able to return calls or messages may lead to guilt and feelings of overload, while individuals also describe compulsive feelings to check their social media accounts or their mobile phone (Thomée et al., 2010). However, not all social media use is detrimental to child and adolescent well-being. Adolescents report that social media offer them a way to connect socially with friends and family and perceive social support, to develop and experiment with their

identities, and to find information or news (Pew Research Center, 2018).

In what follows, the chapter sets out to review existing literature on the relationship between social media use and coping from childhood all the way through emerging adulthood. We focus here on the differential roles social media can play in relation to stress and coping. Through describing the different roles social media can play in the developmental stages, we aim to create a holistic image of the development of coping from a social media perspective.

Social Media Use in Childhood, Adolescence, and Early Adulthood

Social Media Platforms and Daily Use

Due to the age limitations on nearly all SNS (Instagram, for instance, requires a minimum age of 13), data on children's social media use is relatively scarce. However, despite these age restrictions, a national survey among US 8- to 18- year-olds on their use and relationship with media stated that about 13% of 8- to 12-year-olds reported using social media regularly in 2019 (Rideout & Robb, 2019). When children enter adolescence, their social media use sees a steep incline, with about 95% of adolescents having access to social media, and 45% who claim to be online "almost constantly" (Anderson & Jiang, 2018). It is this developmental phase that has accordingly received most scholarly attention over the past decade.

While usage numbers have been steadily increasing, social media platform popularity, on the other hand, has known great shifts over the last few years. Facebook was the dominant social media platform in 2014 when 71% of adolescents regularly used the platform. More recent data from 2020, however, show that only half of the adolescents in the survey (51%) regularly use Facebook and report using Instagram and Snapchat more often (Rideout & Robb, 2019). One platform that has recently gained rapid popularity among adolescents is the video-sharing app TikTok. The average user spends 27 minutes per day on the app, watching videos of no more than 60 seconds long (Stokel-Walker, 2020).

Social Media Use and Misuse and Associations with Well-Being

Over the years, a substantial amount of research has been conducted on social media use and misuse, and their relations with user well-being. Well-being is a concept that is defined in numerous ways. Subjective well-being can be measured through life satisfaction, eudemonia, and affect (Gerson et al., 2016; Organisation for Economic Co-operation and Development, 2013). Life satisfaction or life evaluation is the degree to which one is satisfied with one's life; eudemonia concerns the extent to which one is living to one's full potential and to which extent one feels like one is fulfilling one's purpose in life; and lastly, affect concerns the extent to which one experiences positive affective states (Gerson et al., 2016). However, individuals' well-being can be threatened when demands are exceeding the individual's resources and the situation is perceived as stressful.

While social media use can exert positive influences on well-being by offering users convenient means to connect with one another, consequently providing a potential source of online social support (Bonetti et al., 2010; Park et al., 2009), social media can also be a threat to one's well-being when the use is perceived as stressful. Such threats or "social media misuse" can be defined in a myriad of ways: from online antisocial behavior toward others, to affecting politics, to invading users' privacy, to behavior that is harmful to oneself. This antisocial and harmful behavior toward others

(i.e., cyberbullying) and oneself (i.e., social comparison) may be the most important factors in the relationship between social media use and well-being.

A Stress and Coping Perspective on Social Media Use

Individuals can cope with the harmful behavior and stressful situations associated with social media use by employing coping strategies. The transactional model of stress and coping by Lazarus and Folkman (1987) is an influential model that explains the ways in which individuals cope with such stressful situations. Coping is defined as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 141). When a person perceives something as stressful, their coping responses are activated to manage this threat and minimize its adverse effect on their well-being. The handling of the threat begins with the appraisal, or the person's perception of how stressful the event is and whether or not it forms a threat to their well-being (Raskauskas & Huynh, 2015; Völlink, Bolman, Eppingbroek, & Dehue, 2013). The first step in appraisal is evaluating whether or not the situation is a threat. The second step is assessing if the situation can be changed. A central idea in the transactional model of stress and coping is that coping is characterized by dynamics and change, with continuous appraisals and reappraisals of the threat that, in turn, influence subsequent coping efforts (Lazarus & Folkman, 1984).

According to Lazarus and Folkman (1984), one can engage in two distinct forms of coping (see Figure 25.1): solving or managing the problem responsible for the distress, or regulating the emotional response to, or the distress caused by, the problem (Völlink, Bolman, Dehue, & Jacobs, 2013). The first way of coping is referred to as problem-focused coping. Engaging in problem-focused coping involves analytic processes that focus on the environment, but also on internal processes, by (1) defining the problem, (2) finding solutions for the problem, (3) weighing the costs and benefits of each solution, (4) choosing the best solution, and (5) acting upon the solution (Lazarus & Folkman, 1984, p. 152). Problem-focused coping can be directed at the environment (i.e., focusing on changing it), or at the self (i.e., changing motivations or cognitions,

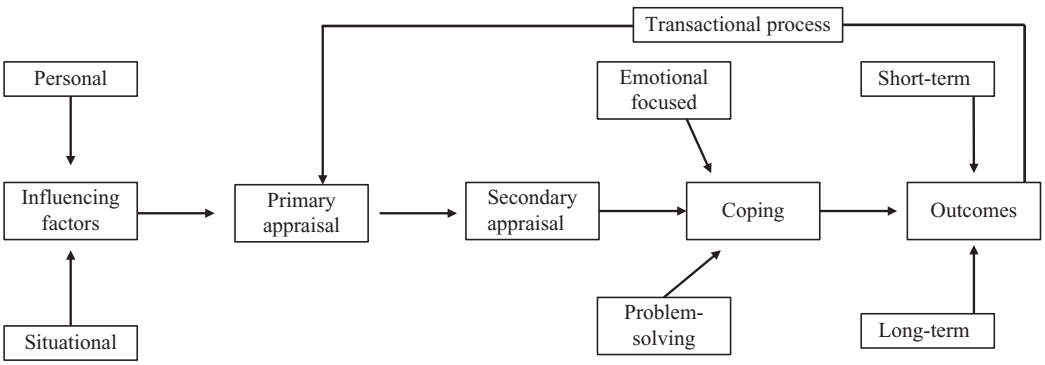

Figure 25.1 The transactional model of stress and coping.
Note: Figure 25.1 represents the transactional model of stress and coping by Schuster and colleagues (2003) based on the theory by Lazarus and Folkman (1984). From Schuster et al. (2003, p. 279).

such as learning new skills) (Lazarus & Folkman, 1984). Cognitive or emotion-focused coping involves engaging in strategies to minimize the emotional distress by, for instance, distancing oneself from the problem or avoiding the problem, engaging in positive comparisons, or paying selective attention (Lazarus & Folkman, 1984). As such, the coping method does not change the environment of the problem itself, but rather the way in which the problem is perceived.

Problem- and emotion-focused coping can occur simultaneously, and can both disrupt or facilitate each other. One can, for instance, engage in emotion-focused coping to minimize the emotional distress created by the problem, while simultaneously focusing on solving the problem by acquiring new skills to treat it.

A Developmental Perspective on Coping

Coping strategies are not stagnant from early childhood to emerging adulthood, but tend to become more differentiated with age (Zimmer-Gembeck & Skinner, 2011). In *early childhood*, young children who experience stressful events tend to turn to support-seeking when other coping efforts fail. This support-seeking is a safety valve to prevent turning to maladaptive coping strategies such as escape or avoidance coping. Escape as a coping strategy generally decreases as children age and shows a low and steady usage in later childhood and adolescence. As young children age, they thus employ less maladaptive coping strategies, whereas the use of cognitive coping strategies increases and support-seeking undergoes change. Children in *middle childhood* employ social support-seeking less than young children and, furthermore, tend to be more selective in whom to go to for social support and turn less to caregivers. During *adolescence*, coping strategies tend to become more diverse and flexible as adolescents engage in both problem-focused coping and undertake instrumental action, as well as engage in emotion-focused coping and reflect on their inner emotional states. However, with increased reflecting on emotional states comes the risk of engaging in maladaptive coping strategies such as rumination. With regard to support-seeking, adolescents are more likely to turn to peers than parents for emotional support and engage in informational support-seeking that is more specifically aimed at the problem (Leipold et al., 2018). Looking further, *emerging adults* show less flexibility and diversity in their use of coping strategies and tend to rely on the strategies that have worked for them in particular situations. Additionally, as emerging adults take on more responsibility and grow into adulthood, they learn personal and social coping strategies through experience. As such, their support-seeking is informational in order to deal with the problem at hand.

When looking at social media use and coping, we find that social media can play different roles in relation to the development of coping with stressful events, and can therefore appear in a variety of forms in the transactional model by Lazarus and Folkman (1984). In what follows, we will untangle the ways in which social media can appear as a coping strategy or a coping resource, but equally, as a source of stressors, or a coping liability. Since research on children and social media use is sparse as they are not yet, or in a very limited capacity, using social media, and studies have predominantly been conducted in adolescent and young adult populations, the current chapter will focus on these adolescent and emerging adult populations.

Social Media Use as an Adaptive Way of Coping

Social media can be used to cope with stressful events in a number of ways, ranging from information-seeking to deal with a problem

at hand, to connecting with others to ease and minimize the distress created by the problem.

Information-Seeking

Adolescents turn to social media to seek information, yet not as intensely as emerging adults (Stockdale & Coyne, 2020). This could be due to the fact that emerging adults are in the process of separating from their parents and require information about topics they were unfamiliar with as adolescents. Emerging adults' media use is no longer under parental control or supervision, while their lives are more flexible if they are studying at college or university. It is especially this group of emerging adults that turns to social media to seek information to cope with daily stressors and to manage problems in their daily life (Barahmand et al., 2019). Although literature on information seeking on social media as coping strategies is sparse, an explorative study by Barahmand and colleagues (2019) found that information on social media may help in making changes in the environment to remove or mitigate the stressors, as well as aid in coping with emotional distress. Emerging adults can turn to information-seeking as problem-solving coping when a problem is perceived as long term and severe. Furthermore, online information-seeking may result in recognizing the problem and stressor. However, when one recognizes the problem, a lack of problem-solving skills or inability to define the exact source of the stress may result in not seeking the information that is necessary to solve the problem, meaning the stressor continues to exist. With regard to emotion-focused coping, emerging adults employed information-seeking on social media as way to distract themselves, by, for instance, watching entertaining content, which would minimize the emotional burden by offering distraction or by changing their moods. A recent study on social media use in adolescence and emerging adulthood to cope with stressors as a result of COVID-19 additionally found that emerging adults turned to social media to lift their bad or anxious moods or to distract themselves from the stressful situation (Rideout et al., 2021).

Online Social Support

A second way in which social media can help in coping with stressful events is by providing ways to establish social resources (Schümer & Buchwald, 2012). Social support appears in multiple forms with regard to coping with stressors, namely as a resource for coping, or as a coping strategy. A first form we will be discussing is using social support on social media as a coping strategy. Online social support plays an important role in the secondary appraisal of a stressful event (i.e., the evaluation of the ability to alter a situation) and serves as a buffer for stressful experiences (Chung et al., 2014). When a user of social media perceives they are supported by their social network, they know whom to turn to during a stressful event and consequently feel more confident and competent in confronting the stressor (Chung et al., 2014). Users who turn to social media for social support receive predominantly informational and appraisal support rather than emotional support. Informational support refers to the information friends provide on the social media platform in order to cope with the stressor, whereas appraisal support refers to, for instance, receiving "likes" as a form of encouragement from the online social network (Chung et al., 2014). The lack of emotional support when seeking online social support can be explained by the asynchronous nature of social interactions, which makes it more difficult to support each other vocally or physically.

Social Media as a Maladaptive Way of Coping

As introduced earlier, social media use can be beneficial to young users' well-being by providing ways to cope with stressful situations. Yet, social media use can equally pose a threat to the user's well-being when the use is perceived as a stressor, which requires the user to engage in coping strategies to mitigate the negative effects on their well-being. Cyberbullying and negative social comparison are examples of such stressors that require the user to engage in coping strategies.

Helplessness as a Result of Cyberbullying

Cyberbullying is a widespread phenomenon that occurs in all adolescent age groups with long-term harmful effects on the well-being of its victims (Hamm et al., 2015). Cyberbullying, much like traditional bullying, is the repetitive and continuous aggressive behavior of a group or an individual toward a victim with the intention to cause harm. It is furthermore characterized by a power imbalance in which the recipient is unable to defend themself (Pyżalski, 2012). Although the bullying has shifted to social media, the perpetrators are typically part of a traditional group such as a class at school or university (Pyżalski, 2012; Whittaker & Kowalski, 2015). Perpetrators can contact their victims through social media messaging (synchronous communication) or via emails and comments on the victims' social media activity (asynchronous communication). Another way in which perpetrators can bully their victims is through posting the victims' personal content on social media platforms in order to embarrass them in front of wider audiences (Pyżalski, 2012).

Individuals' online aggressive behavior can be explained through online disinhibition effects. Disinhibition is believed to be accompanied by a decrease in moral restraint in some individuals, allowing them to act out more frequently and more intensely than they would in person (Suler, 2004). According to the theory of online disinhibition, a number of features inherent to online environments cause people to feel less inhibited online than they would in person. This includes, for instance, users' potential invisibility, a certain minimization of authority, and the asynchronicity of online interaction. Another feature of the online environment is anonymity, which supports deindividuated behavior and therefore makes it feel easier for the perpetrator to transgress social norms (Postmes & Spears, 1998) or engage in online aggressive behavior (or cyberbullying) (Twenge, 2013).

Cyberbullying can have a devastating impact on victims, and is associated with an increased likelihood of mental health issues (Hamm et al., 2015). Cyberbullying evokes emotional reactions in victims, ranging from feelings of anger to feelings of helplessness and powerlessness (Machmutow et al., 2012). Victims of cyberbullying are also more likely to report symptoms of depression and/or social anxiety, and overall lower well-being compared to peers who have not experienced cyberbullying (Fahy et al., 2016). Furthermore, victims report more suicide ideation and behavior compared to adolescents who have not been victimized (Brailovskaia et al., 2018; Iranzo et al., 2019). However, adolescents who report greater positive mental health are more resilient to suicidal thoughts when they are victims of cyberbullying (Brailovskaia et al., 2018). Positive mental health can thus alter the impact of cyberbullying and can act as a buffer against suicidal ideation (Siegmann et al., 2018).

The negative impact of cyberbullying on well-being can be mitigated through the use of coping strategies (Raskauskas & Huynh, 2015). Employing coping strategies can reduce

Table 25.1 *Potential ways of coping with social media stress and abuse (based on Machmutow et al., 2012)*

Problem-focused coping	
Social support-seeking	*Telling a teacher or principal to receive informational social support*
	Telling a friend to receive emotional social support
Counteraggression and revenge	*Confronting the cyberbully*
Technological solutions	*Deleting a post/conversation*
	Unfriending the bully
	Blocking the bully
Social self-efficacy	*Ability to develop supportive social relationships*
Avoidant coping strategies	
Helplessness	*Not coping*
	Ignoring the cyberbully(ing)
	Self-blaming for being bullied

the immediate stress evoked by the bullying and prevent long-term harm (see Table 25.1). Victims of cyberbullying can use both online and offline coping strategies. An example of an online coping strategy is to solve the issue with technology by unfriending or blocking the bully on social media (Raskauskas & Huynh, 2015). This way, the victim can avoid the problem (i.e., the bully). Examples of offline strategies are ignoring the bully, or confronting the bully if they are known by the victim. The victim can also turn to social support-seeking in online or offline spheres as a positive coping strategy. However, social support-seeking is more often employed by younger youth and less by older youth (Raskauskas & Huynh, 2015).

Important to mention is the use of social self-efficacy as an effective coping strategy that can be employed by victims of cyberbullying (Raskauskas & Huynh, 2015). Social self-efficacy is the individual's belief in their ability to develop social relationships that provide emotional support (Raskauskas & Huynh, 2015, p. 123). To date, however, this social self-efficacy has been an often-overlooked coping strategy in coping literature. When victims of cyberbullying perceive themselves capable of developing supportive social relationships, their social self-efficacy serves as a buffer against negative outcomes (e.g., depressive symptoms) triggered by stressful threats (e.g., cyberbullying).

Online Social Comparison

Social comparison is defined as the process by which individuals compare themselves with others in order to create an external guideline to evaluate their skills, personality traits, emotions, and abilities when no "objective" standard is available (Festinger, 1954; Gerson et al., 2016). Social comparison can be either downward or upward, whereby downward social comparison takes place when an individual compares themselves with people they think are worse off than them. Such downward social comparison can make oneself feel better about one's own abilities. Upward social comparison, on the contrary, occurs when one compares oneself with people one perceives to be better than oneself with the intention to better oneself.

Social comparison plays an important role in coping with stressful events and is integrated in social support processes (Taylor et al.,

1990). When an individual finds themself in a condition of stress, engaging in downward social comparison can aid in making them feel better and in improving themself. Such downward social comparison in light of self-enhancement serves the individual in maintaining positive self-perceptions (Taylor et al., 1990). During this process of downward social comparison, the comparison group is typically worse off and has been actively selected based on three criteria. A first way in which individuals can engage in downward social comparison is by comparing themselves with a societal group that is generally worse off or already less fortunate. A second way to engage in social comparison is by comparing oneself based on a dimension or skill of which the individual engaging in the comparison already has more of (e.g., social support). A third and last way of downward social comparison is by creating new dimensions of comparison in which the individual is better off than the comparison group (Taylor et al., 1990). While positive social comparison can be employed as an emotion-focused coping strategy, not all social comparison has positive well-being outcomes. Contrary to downward social comparison, upward social comparison is associated with lower well-being (Chou & Edge, 2012; Frison & Eggermont, 2016; Nesi & Prinstein, 2015).

Social comparison is facilitated to a great extent by social media because of the tendency for ideal self-presentation on social media (Gerson et al., 2016). During a period of experimenting with their identity and developing their own sense of individuality, adolescents tend to turn to others to construct the normative standard in their environment. One way of observing this normative standard is through engaging in social comparison (Gerson et al., 2016). Social comparison can, however, be a stressor when the adolescent finds themself to be worse off than the comparison group (Gerson et al., 2016).

Users can choose how to present themselves on social media platforms, often resulting in a favorable presentation of the self (Chou & Edge, 2012). However, users engaging in upward social comparison will compare themselves to these favorable self-presentations. Research has shown that individuals observing the ideal lives of others online react in a negative manner to these presentations, believing they are worse off than their comparison targets (Chou & Edge, 2012). Users engaging in upward social comparison therefore tend to report a lower well-being over time (Frison & Eggermont, 2016; Nesi & Prinstein, 2015). Furthermore, studies have shown that upward social comparison, and not downward social comparison, is an explanatory mechanism in the relationship between social media use and lower well-being (Vogel et al., 2014). As such, when an individual with the intention of self-enhancement through social comparison is represented with ideal self-presentations of others on social media, their social comparison may not result in the desired outcome. However, more research is necessary to create a more thorough understanding of this process.

Social Media as a Coping Liability

While social media can help individuals in their ability to cope with stress and stressful events in daily life, individuals who often experience daily stress tend to engage in excessive use of social media platforms (Brailovskaia et al., 2019). Furthermore, relying on social media to cope may prevent users from engaging in other ways to cope or may even result in perceiving social media as a stressor itself as a consequence of the need to be constantly connected to others.

Psychological Dependence and Addictive Tendencies

Social media platforms provide easy access to social support as well as opportunities for

mood modification; however, using social media to cope may be linked to addictive social media use tendencies and the need to be online constantly (Brailovskaia et al., 2019). Addictive behavior on social media is characterized by a psychological unease in offline situations, a constant thinking about social media, and excessive use (Andreassen et al., 2012). Such addictive behavior is most often present in groups of users who do not receive adequate offline social support and therefore turn to social media for online social support. Furthermore, when the probability of receiving such online social support is high, users tend to use social media with a greater intensity and risk developing a psychological dependence on it (Brailovskaia et al., 2019). As such, while social media can aid in coping with stressful events, users who often experience daily stress are at greater risk of developing addictive social media use tendencies.

Preventing from Learning Other Ways to Cope

When individuals find themselves in stressful situations, they may turn to the Internet/social media as a way of coping with emotional or social difficulties (Brand et al., 2014). When adolescents turn to these media to cope and expect a distraction from the negative feelings or the problem, other ways of coping, such as social support-seeking or engaging in health-promoting behavior, are diminished (Brand et al., 2014). Furthermore, internet-/social media-related coping is a maladaptive coping style that is used to avoid the issues rather than dealing with them and creates a higher risk for developing internet addiction. Interestingly, addiction to media is associated with a higher likeliness of engaging in emotion-focused coping than problem-focused coping. Rather than dealing with their problems, individuals turn to the Internet or to social media to help them forget about the problem. Individuals with addictive media use tendencies are thus more likely to use social media as a distraction and engage in dysfunctional avoidance coping (Sriwilai & Charoensukmongkol, 2015).

Social Media as a Stressor

With 45% of adolescents feeling the need to be online constantly, recent research has focused on the reasons why they feel this need and what consequence this may have for their well-being. It goes without saying that such constant social media use is not free of harm. Studies have mentioned how "fear of missing out" or "FOMO" may encourage intense media use, resulting in adolescents reporting feelings of stress (Beyens et al., 2016; Li et al., 2018). Fear of missing out is the fear that others (e.g., peers) are having rewarding experiences without you. As a result, individuals feel the need to stay constantly connected in order to see what these others are doing (Przybylski et al., 2013, p. 1841). A conceptualization of FOMO was built upon self-determination theory (SDT) (Deci & Ryan, 1985; Przybylski et al., 2013), which explicates the psychological needs for effective self-regulation and psychological health. Based on this macro theory of human motivation, Deci and Ryan (1985) put forward three basic psychological needs for positive well-being: competence, relatedness, and autonomy (Deci & Ryan, 1985; Przybylski et al., 2013). Competence refers to one's need to operate effectively within important life contexts, relatedness is the need to feel socially connected and to be a significant member of social groups, and, lastly, autonomy refers to the need to self-endorse experiences and actions (Ryan & Deci, 2018).

Based on SDT, FOMO can be understood as "a self-regulatory limbo arising from situational or chronic deficits in psychological need satisfactions" (Przybylski et al., 2013, p. 1842). Social media use, then, is a way to seek fulfilment of these needs (Przybylski et al., 2013). Social media provide a way to control the outcome of actions (i.e., developing social competence), to connect with others (i.e., strengthening social ties and relatedness to others), and to be in charge of one's own life (i.e., autonomy, getting in touch with others).

Fear of missing out can thus explain why adolescents who score low on need satisfaction tend to engage more in social media use in order to satisfy their needs (Przybylski et al., 2013). Consequently, FOMO is related to lower adolescent well-being and higher social media use (Fabris et al., 2020). Furthermore, FOMO, or the need to be connected to others at all times, has been found to increase adolescent sensitivity to stress. Because individuals with higher FOMO have higher needs for popularity and group membership, no reactions or negative reactions or feedback from others on social media can arouse feelings of stress (Fabris et al., 2020). The user then feels that their social media use is not fulfilling their psychological needs (Fabris et al., 2020). As such, FOMO is an explanatory factor in the relationship between psychological needs that drive positive well-being and feelings of stress.

Social Media as a Coping Resource

A final way in which social media are associated with coping and stress is by providing resources to cope with stressors. Coping behavior is an integral aspect of dealing with social media–related stress. It mediates the relation between social media stress and emotional exhaustion: Individuals with higher levels of coping resource are better at managing their stress than individuals with fewer coping resources (Lim & Choi, 2017).

Coping with Social Media as a Stressor

As previously introduced, cyberbullying, FOMO, and online social comparison can be stressful experiences for young people. In order to mitigate these stressful experiences, users can turn to problem-focused coping strategies, or emotion-focused coping strategies (Li et al., 2018).

Adolescents and emerging adults are very familiar with social media platforms and therefore most often turn to problem-focused coping. When a social media activity receives little or negative feedback from friends on a social media platform (e.g., negative comments or few likes on a social media post), a way of problem-focused coping would be to remove the stressor from that platform (Li et al., 2018). However, problem-focused coping is insufficient to manage the stress evoked by this negative or little feedback. It is therefore necessary to cope with the negative feelings through emotion-focused coping even after the post has been removed by, for instance, distracting themselves from the (lack of/negative) feedback (Li et al., 2018). By using an emotion-focused coping strategy, the adolescent will attempt to minimize the impact of the negative emotions caused by the negative comments or lack of likes on a photo.

The previously mentioned problem-focused coping is an approach coping strategy to handle stress. In order to cope using approach strategies, one must have the control and resources to control the environmental and emotional stress (e.g., deleting a photo with negative feedback). When the user does not possess either one of these, they can turn to an avoidance strategy as a passive way of coping with social media stress (Lim & Choi, 2017). Choosing to distract oneself from social media

stress by engaging in other activities or avoiding social media altogether are examples of such avoidance strategies (Lim & Choi, 2017).

Social Support

As mentioned earlier, social support can provide resources for coping with stressful events (Schümer & Buchwald, 2012). During stressful times, social media can provide a pool of contacts to turn to in such situations. Interestingly, the study by Schümer and Buchwald (2012) reported a clear distinction between individuals who integrated social support on social media in their coping processes and those who rejected social media as a coping resource. For individuals who integrated online social support in their coping process, their social media use provided them with social structures that, unlike offline social connections, were not restricted by time and space (Schümer & Buchwald, 2012).

Summary and Discussion

This chapter set out to create a holistic view of the relationships between stress, social media use, and coping during the developmental stages of childhood, adolescence, and emerging adulthood. While social media do not yet play a central role in the daily life of children, adolescents and emerging adults spend a significant amount of time on social media platforms (Anderson & Jiang, 2018; Rideout & Robb, 2019). Social media can provide young people with ways to cope with stressful situations but can equally be a stressor itself.

Both adolescents and emerging adults turn to social media to seek information to cope with stressful situations (Stockdale & Coyne, 2020). Yet, it is mostly the emerging adult population that uses information on social media to change the environment or their perception of the stressor (Barahmand et al., 2019). Another coping strategy that is made more accessible through social media use is online support-seeking. In addition to information-seeking, individuals who turn to friends online can receive informational support that can be of help when coping with a stressor (Chung et al., 2014). Furthermore, online social support can provide users with appraisal and emotional support.

As mentioned earlier, social media can provide means to support coping in users. However, social media use comes with risks that can be perceived as stressors by the user. One such risk is cyberbullying, which is a reoccurring phenomenon in all adolescent age groups (Hamm et al., 2015). Online aggressive behavior toward others can have detrimental effects on the well-being of the victims. By employing coping strategies, victims can mitigate the negative, long-term impact of cyberbullying on their well-being (Raskauskas & Huynh, 2015). Adolescent victims of cyberbullying can use the technological features of the platform to cope (e.g., blocking the bully), or can undertake offline actions (e.g., confronting the bully). Another way of coping with cyberbullying is by seeking social support, either online or offline, yet seeking for social support declines as adolescents age (Raskauskas & Huynh, 2015). An additional risk of social media use is the tendency for social comparison. While positive social comparison can be employed as a positive emotion-focused coping strategy to maintain positive perceptions of the self, comparisons with ideal self-presentations on social media more often than not result in a lower well-being (Chou & Edge, 2012; Frison & Eggermont, 2016). When social media users compare themselves with the favorable self-presentations of others, they believe themselves to be worse off than others.

A third association we discussed between social media and coping was social media as a coping liability. While individuals can turn

to social media to cope with stressful situations, such as social support-seeking, relying on social media to cope with stressful situations can increase the risk of excessive use and developing a psychological dependency (Brailovskaia et al., 2019). Furthermore, turning to social media to cope with stress and expecting a relief from the stressful event can prevent young users from employing other adaptive coping strategies (Sriwilai & Charoensukmongkol, 2015). Another way in which social media use can be a stressor is through fear of missing out. Using social media for social connection and support can result in excessive use and feelings of stress when the user does not feel like their needs are being met (Fabris et al., 2020).

A final association we introduced was the relation between stressful situations and social media as a coping resource. Adolescents and emerging adults are very familiar with social media platforms and their features, which makes them capable of employing problem-focused coping strategies (e.g., removing a stressor from their social media feed) (Li et al., 2018). Emotion-focused coping strategies can then help further in minimizing the negative feelings evoked by the stressful experience. When users cannot rely on these approach-focused coping strategies (e.g., because they do not have the control or resources), avoidance coping strategies such as distraction through social media use (e.g., choosing entertainment content) can provide relief from the stressor (Lim & Choi, 2017). Finally, social support can provide coping resources by providing social connections that are available at all times (Schümer & Buchwald, 2012).

While the previously introduced research provides great insight in the role of social media in coping processes in young people, a great number of gaps still remain. Research on children and coping through social media use is very sparse, despite the increase in social media use among this age group and the earlier age of introduction to technologies that provide ways to engage with social media. Furthermore, longitudinal research mapping the differential role of social media in the developmental stages from childhood throughout young adulthood is lacking and creates opportunities for future research.

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26 Clinical Treatments for Child Emotional Disorders and the Development of Coping

The Case of Irritability

Maria Kangas and Ronald M. Rapee

Introduction

Maladaptive coping and regulatory skills are risk factors for the development of mental health disorders across the lifespan, including internalizing and externalizing problems. The most common psychological disorders in children and adolescents are internalizing conditions, particularly anxiety disorders with an estimated 6.5% of children worldwide experiencing at least one type of anxiety disorder (Polanczyk et al., 2015). As a consequence, the treatment for anxiety disorders for children and adolescents has the strongest evidence base, with cognitive behavioral therapy (CBT) with or without medication (particularly, selective serotonin reuptake inhibitors) having the highest quality of empirical support to date (Bennett et al., 2016). However, the treatment of anxiety disorders (including CBT-based interventions) for children and adolescents with comorbid conditions, including externalizing and mood disorders, is not as effective (Gibby et al., 2017; Walczak et al., 2018). This has raised questions as to the utility and efficacy of targeted, modular treatments relative to more transdiagnostic-focused therapies for children and adolescents experiencing comorbid mental health problems. Yet the evidence base for the transdiagnostic treatment of emotional problems in youth is in its infancy. To this end, persistent irritability is increasingly recognized as a core transdiagnostic feature for both internalizing and externalizing disorders in children and adolescents. Hence, strengthening the evidence base for irritability-related disturbances in youth may have utility in preventing chronic psychopathology. We propose that the coping and emotion regulatory literature is instrumental in advancing this field.

The focus of this chapter is on outlining and evaluating relevant conceptual models and emerging treatment interventions targeting recurring, elevated irritability in children and adolescents to enhance their adaptive coping and emotion regulatory abilities. We begin by outlining the role of coping and emotion regulatory strategies in managing emotions and highlight similarities and differences between these constructs. This is followed by a review of two recent related conceptual frameworks for irritability in children and adolescents incorporating ways in which coping and emotion regulatory processes align with these models. We then review published treatment studies that have tested the efficacy of psychotherapy interventions for children and/or adolescents presenting with persistent, elevated irritability disturbances as a primary problem. We conclude with a discussion of the implications of findings in terms of the psychotherapy approaches showing promising effects in managing irritability disturbances in youth, as well as highlighting gaps that need to be addressed in future research and that can be further informed by developmental coping and emotion regulatory frameworks.

Coping, Emotion Regulation, and Irritability Problems in Children and Adolescents

There is growing recognition that the developmental fields in coping and emotion regulation (ER) have remained relatively separate (Compas et al., 2017; Zimmer-Gembeck & Skinner, 2016). This is reflected in the lack of integration of the conceptualization and measurement of these two related processes (Compas et al., 2017). Yet, coping and ER are related yet distinct constructs. In particular, coping is subsumed under the broader construct of ER (Compas et al., 2014). Coping is commonly defined in the developmental field as a process of responding to stressful circumstances or events. The seminal work by Lazarus and Folkman (1984) comprises two broad types of coping: problem-focused and emotion-focused coping, which are shaped by an individual's goals of coping efforts. Specifically, whereas problem-focused coping involves effort to resolve the source of the stressors and includes problem-solving strategies, emotion-focused coping involves efforts to manage one's emotions if the stressor cannot be avoided or ameliorated. Compas et al. (2001) developed the control-based model of coping, which consists of three domains: 1) primary control coping, which is comparable to Lazarus and Folkman's (1984) problem-focused coping construct; 2) secondary control coping, which involves efforts to adapt to the source of stress (e.g., using acceptance or reappraisal strategies); and 3) disengagement coping, which involves efforts to move away from the source of the stressor or one's emotional responses, and includes such strategies as avoidance and distraction. These latter two coping domains are compatible with aspects from Lazarus and Folkman's (1984) emotion-focused coping construct.

In contrast, ER involves managing an array of emotions in an effort to upregulate and/or downregulate both positive and negative emotions in response to broader life circumstances, not necessarily restricted to stressful situations and events (Compas et al., 2014; Gross, 2015). It is noteworthy that the *regulatory process* is a central feature that unifies the coping and ER constructs (Compas et al., 2014, 2017; Zimmer-Gembeck & Skinner, 2016). Moreover, Compas et al. (2017) have noted that coping is both a narrower and broader construct than ER, as coping is a response that unfolds in the context of stressors, whilst ER extends to both stressor and nonstressor contexts; yet as a broader construct than ER, "coping encompasses the regulation of a wider range of processes that includes not only emotion, but also cognition, behavior, physiology, and sources of stress in the environment" (Compas et al., 2017, p. 942). Hence, adaptive coping is considered a balance between stress reactivity and regulating a broad array of factors including cognitive and behavioral responses (Eisenberg et al., 1997). However, in line with Gross' (2015) process model of ER, cognitive processes and modulation of behavioral responses are included as efforts in managing emotional responses to a broad array of experiences across various environmental contexts. This further highlights that coping and ER processes share more similarities than differences. Yet in the developmental field, the contribution of coping and ER processes in the advancement of relevant conceptualizations and treatments for child and adolescent mental health problems seems to have occurred in parallel. This is particularly relevant for the increasing recognition of chronic irritability problems in youth within the past decade (Vidal-Ribas et al., 2016).

In the following sections, we outline how chronic irritability in youth has been conceptualized as a deficit in ER processes, and how

it has informed the emerging psychotherapy evidence base for treating this transdiagnostic phenomenon in children and adolescents. In evaluating this literature we also discuss how the developmental coping literature can be integrated to further advance the conceptualization and strengthen the psychotherapy evidence base for children and adolescents experiencing chronic irritability problems.

A growing volume of studies have shown that ER is a transdiagnostic factor that has a central role in determining adaptive versus maladaptive functioning (Aldao et al., 2016; Fernandez et al., 2016), by shaping which emotions we experience, and how and when we experience and express them, and which can be modulated by cognitive and behavioral strategies (Gross, 2015). Studies have shown that difficulties in ER processes are related to both internalizing (e.g., anxiety and depression) and externalizing (e.g., conduct behavioral) problems in children (Sullivan et al., 2015). For example, anxious children have been shown to oscillate between emotional outbursts and avoidance to manage their emotions (Cisler & Olatunji, 2012). Similarly, children with externalizing behavior problems show dysregulated "bursts" of irritability, anger, and aggression (varying on a continuum) (Sullivan et al., 2015). Although temper tantrums are common in the toddler/preschool years, by early childhood, the frequency and severity of such outbursts typically tapers off (Sukhodolosky et al., 2016). The decline in frequency of temper outbursts as children develop is attributed to the development of more adaptive ER skills (Southam-Gerrow & Kendall, 2002). In particular, young children, facilitated by responsive caregiver interactions, shift rapidly from relying solely on reflective strategies to regulating their own emotions (Dennis & Kelemen, 2009; Eisenberg et al., 2010). This is achieved through learning to inhibit inappropriate external behaviors by applying self-soothing strategies (such as walking away or playing a calming activity). With the incremental codevelopment of executive abilities and language skills, children further learn to express their feelings as well as understand the social norms for appropriate emotion expression and reactivity (Eisenberg et al., 2010; Harrington et al., 2020; Paulus et al., 2021). This also extends to the acquisition of primary volition regulatory strategies by age 7 including problem-solving and help-seeking strategies, suppression of impulses, and redirecting attention (Paulus et al., 2021; Ross & Thompson, 2011). Hence, ER is a core process in the development of adaptive emotional competency and regulatory skills and psychological well-being in children's formative years. Moreover, the development of ER skills involves accessing coping resources by utilizing a broad range of regulatory strategies as children developmentally mature (Paulus et al., 2021; Ross & Thompson, 2011).

In contrast, emotion dysregulation in children is operationalized as demonstrating difficulties in regulating the intensity and quality of emotions (e.g., anger, fear, and sadness) "in order to generate an appropriate emotional response, to handle excitability, mood instability, and emotional overreactivity, and to come down to an emotional baseline" (Paulus et al., 2021, p. 1). Not surprisingly, emotion dysregulation has been associated with poor emotional understanding and expressivity, as well as elevated ruminative tendencies, factors shown to predict psychopathology by adolescence (McLaughlin et al., 2011). Hence, emotional dysregulation shares comparable features with poor coping responses (such as ruminative coping) following involuntary stress when experiencing intense-negative valanced responses.

Deficits in ER are fundamental to developmental psychopathology across childhood and adolescence including disorders that have

irritability as a core feature (Copeland et al., 2015), given elevated irritability arises from both overreactivity to environmental stimuli as well as regulatory problems in managing the generation of appropriate responses. Importantly, recurring elevated irritability is a core transdiagnostic feature for internalizing (e.g., major depressive disorder [MDD]), externalizing disorders (e.g., oppositional defiant disorder [ODD] and conduct disorder [CD]), and heterotypic comorbidity (Beauchaine & Tackett, 2020; Sukhodolosky et al., 2016). Moreover, elevated, prolonged irritability in young children tends to predate the emergence of psychopathology in subsequent years (Beauchaine & Tackett, 2020). Yet it is noteworthy that chronic elevated irritability in children predicts both anxiety and unipolar depression. However, elevated irritability is not a marker for all types of psychopathology as, to date, it has not been found to predict the onset of bipolar disorder, conduct disorder, and substance use disorders (Kircanski et al., 2019; Savage et al., 2015; Vidal-Ribas et al., 2016). From a dimensional (continuum) perspective, children with more enduring and persistent irritability typically display an angry and sullen mood manifested as annoyance and frustration, even in response to mild provocations and ambiguous contexts (Kircanski et al., 2019). On the severe end of this spectrum, persistent, chronic irritability has been characterized as a central feature of disruptive mood dysregulation disorder (DMDD), which is a new disorder introduced in the most recent *Diagnostic and Statistical Manual for Mental Disorders* (5th edition; DSM-5) (American Psychiatric Association, 2013). The core features of DMDD include (a) recurring temper outbursts (at least three times per week), manifested verbally or behaviorally that are (b) out of proportion to the situation or provocation, and (c) are also inconsistent with developmental level (Criteria A, B, C); whilst persistent irritability or angry mood occurs between temper outbursts for most of the day (Criterion D). The onset of symptoms must occur before age 10 and be present across at least two settings (e.g., school, home and/or social environments). However, children can only be diagnosed with this disorder at a minimum of 6 years of age, given evidence that the normative peak for irritability occurs between 4 and 5 years (e.g., Wakschlag et al., 2015). Moreover, for children, the DMDD criteria integrate elements from ODD and MDD, although DMDD supersedes ODD when both are applicable (American Psychiatric Association, 2013). Accordingly, DMDD is a diagnostic framework, which can identify children with more severe levels of irritability, and with volatile mood prone to regular temper outbursts (Brotman et al., 2017).

Chronic irritability in children is a specific risk factor for chronic depression and anxiety disorders well into adulthood (Copeland et al., 2015; Vidal-Ribas et al., 2016). The rates of subthreshold levels of irritability causing functional impairment are estimated to be high in children and adolescents. For example, 22–51% of children (aged 9–16 years) had heightened irritability in a longitudinal study from the USA and 22% were at risk of dysfunctional problems (Copeland et al., 2015). In a separate, 20-year follow-up study, Stringaris et al. (2009) found that "parent-reported irritability in youth at mean age of 13.8 years predicted major depression, dysthymia, and generalized anxiety disorder at 20-year follow-up, even after adjustment for baseline (internalizing) ... disorders" (p. 1051). Similarly, in a recent longitudinal study, Evans et al. (2020) found that irritability in school-aged children was a predictive risk factor for both externalizing problems (via both poor anger and sadness coping), and

internalizing problems (via poor anger coping and intolerance of uncertainty). In an Australian longitudinal study, irritability in preschoolers was identified as a key predictor of psychopathology in later childhood (Forbes et al., 2017). In a separate longitudinal study, Savage et al. (2015) found that irritability disturbances were stable between middle childhood and early adolescent years (i.e., between ages of 8–9 years and 13–14 years) and, comparable to other studies, irritability was a predictor of anxiety and depressive problems by adolescence.

Collectively, these findings accentuate the importance of providing early interventions for children experiencing persistent irritability problems to enhance developing and strengthening adaptive and flexible emotion regulatory and coping skills particularly in regulating fear, anger, and sadness responses. The transdiagnostic nature of more severe levels of irritability in children and adolescents also attests to the need for evidence-based interventions targeting chronic irritability in at-risk youth as well as in children and adolescents presenting with either or both internalizing and externalizing disorders. To this end, there is increasing recognition that persistent irritability-related regulatory impairments in children and adolescents are a common reason for referral to mental health services (Roy & Comer, 2020). Yet, there is consensus of a paucity of evidence-based interventions specifically tailored for childhood irritability problems (Evans et al., 2020; Hawks et al., 2020; Kircanski et al., 2018; Linke et al., 2020). Given this notable gap in evidence-based practice, several scholars have recently developed conceptual frameworks that have utility to inform the screening, assessment, and treatment of children and adolescents experiencing functional impairments due to persistent, unrelenting irritability disturbances.

Conceptual Frameworks for Irritability in Children and Adolescents

Two overlapping models have recently been developed to explain the process of elevated irritability in children and adolescents; specifically, 1) the translational neuroscientific model of pediatric irritability (Brotman et al., 2017) and 2) the exposure targeted model of pediatric irritability (Kircanski et al., 2019). A brief overview of these models is presented next, and we highlight how components of these models align with the developmental coping and ER literature.

The Translational Neuroscientific Model of Pediatric Irritability

Brotman et al. (2017) have integrated relevant clinical and neuroscientific research in developing their model of irritability, which serves as a useful heuristic framework to explain deficits in 1) reward processing and 2) threat processing in children experiencing severe and/or chronic presentations of irritability. They propose that children who experience deficits in reward processing, which is influenced by cognitive control, display aberrant responses to interactions interpreted as nonrewarding. This is referred to as "frustrative nonreward" to explain the frustration and elevated irritability children experience when they fail to receive an expected or anticipated (conditioned) reward (Kircanski et al., 2019). Thus, frustration and temper outbursts may occur when a reward is either prevented or withdrawn, resulting in blocked goal attainment. For example, when a child or adolescent refuses to complete their homework, the parents may remove their gaming privileges for that afternoon. Studies have shown that children with heightened irritability have difficulties in modifying their behaviors in line with

such stimulus–reward associations (e.g., Adleman et al., 2011), as well as learning from their errors and adapting their affective and behavioral responses to changing socioenvironmental contingencies (e.g., Gagne & Goldsmith, 2011; Lamm et al., 2011).

Brotman et al. (2017) further posit that chronic, elevated irritability in children is motivated by threat processing, which is associated with heightened sensitivity as well as attentional bias to environmental/social cues that are misinterpreted as threatening. In particular, these scholars propose that youth with significant irritability misinterpret social cues as threatening giving rise to frustration and outbursts. Two common cues include 1) misinterpreting ambiguous facial features as threatening (e.g., a peer looking at the child in a particular way) and 2) interpreting feedback as a risk for personal failure (e.g., child feels insecure about doing their homework if they are finding it challenging, and consequently may feel threatened when a parent expects homework to be completed before the child can watch TV). Hence, even nonthreatening stimuli are interpreted as threatening in terms of blocked goal attainments, as well as sense of competency, thus resulting in irritable outbursts. To this end, it has been demonstrated that these children have lower thresholds for perceiving a broad array of stimuli (including ambiguous or neutral cues) as threatening and aversive (Hommer et al., 2014; Salum et al., 2017). For example, the transitioning of playing a game after school to doing homework is a critical switch point if the child/adolescent perceives the work to be challenging, difficult, or even boring and is thereby threatened by it. Research has further shown that irritable youth show threat-relevant cognitive biases in misattributing neutral and ambiguous environmental stimuli (including interpersonal interactions) as threatening or aversive (e.g., Stoddard et al., 2016). In summary, Brotman et al.'s (2017) dual deficit model highlights that these children have added difficulties in regulating their emotions in response to cognitive bias errors, which can lead to a self-perpetuating cycle of low frustration tolerance, increased outbursts, and irritable and fluctuating mood.

Exposure Targeted Model of Pediatric Irritability

Expanding on Brotman et al.'s (2017) translational model of pediatric irritability, Kircanski et al. (2019) have recently developed an exposure-targeted model of irritability for youth comprising six core components. The first component, the triggering stimulus, includes the two core elements from Brotman et al.'s (2017) model, the frustrative nonreward and threatening contingencies (already outlined). The second component, prediction error (PE), is defined as the difference between an expected and/or anticipated versus actual (received) outcome, and this is based on Schultz's (2016) two-component theory of PE. Specifically, if a child receives an outcome (reward) that is better than expected, this is considered a positive PE. Conversely, if a child receives a worse than predicted outcome, this is operationalized as a negative PE. Kircanski et al. (2019) posit that youth with elevated irritability are vulnerable to encoding more negative PEs in response to frustrative nonreward and/or threatening stimuli, which is associated with cognitive biases. For example, if a parent delays playing with a child after school, this can trigger an outburst in a vulnerable child, as the child may disproportionately interpret this delay as highly aversive (e.g., concerned that the parent may not end up playing with them at all).

Negative PEs give rise to frustration, which is the third component of this exposure-targeted model. Hence, negative PEs heighten

irritability and lead to a temper outburst. However, Kircanski et al. (2019) propose that the child's level of cognitive control is likely to moderate the association between negative PEs and frustration severity levels. The fourth component, temper outburst, captures the lower threshold that children with heightened, persistent irritability problems have for experiencing outbursts. Kircanski et al. (2019) consider temper outbursts as both approach behaviors (i.e., when outbursts occur in response to nonreward and threat contingencies) and avoidant behaviors (i.e., when the initial nonreward or threat is removed; e.g., when parents give in to the child's trigger for their outbursts).

Cognitive control is the fifth component of Kircanski et al.'s (2019) model. A subcomponent of cognitive control comprises inhibitory control that includes the child's ability to suppress inappropriate/maladaptive behavioral and emotional responses in response to blocked goal attainments and/or perceived threats. Developmentally, with the maturation of the prefrontal cortex, as children transition from toddlerhood to the young to middle-aged school years, their propensity to apply inhibitory control improves, therefore lessening the frequency of temper outbursts. However, irritable youth are proposed to have difficulties in inhibitory control (e.g., Deveney et al., 2015), given they are more prone to experiencing frustration and temper outbursts that are out of proportion to their developmental chronological age.

The final, sixth component comprises the consequences of the child's temper outbursts and incorporates environmental (inclusive of parental) responses that influence and shape the probability and intensity of future negative PEs and subsequent outbursts. Kircanski et al. (2019) acknowledge that this final component is an extension of the fundamental principles that conceptually underpin CBT-based parent-management training (PMT) programs (e.g., Kazdin, 2010). Hence, how parents (and other key figures in the child's environment) react can differentially reinforce negative PEs and outbursts in the child. Indeed, this final component reflects the interpersonal influence of what can sustain and perpetuate a cyclical negative reinforced pattern of temper outbursts in children and adolescents experiencing enduring, elevated irritability.

Behavioral learning principles are core to these two interrelated irritability models. Accordingly, Kircanski et al. (2019) propose that exposure to threat cues should underpin the treatment of elevated and prolonged irritability problems in youth for three key reasons. First, as aforementioned, given irritability is a transdiagnostic symptom, it is highly comorbid with anxiety in children and adolescents. Second, threat-relevant cognitive biases underlie both irritability and anxiety; and third, heightened arousal and negative affective states are elicited in response to triggering threat stimuli in both irritability and anxiety conditions. Considering that irritability is also a symptom of several anxiety disorders (such as generalized anxiety disorder, or GAD), and that exposure-based interventions have been found to be an effective core ingredient in the treatment of anxiety disorders in children (Plaisted et al., 2021; Rapee et al., 2017), it is expected that using exposure to cues that also trigger frustration and irritability are expected to help alleviate these responses over time in children displaying heightened irritability independent and/or concurrent with anxiety. Therefore, utilizing an exposure-based therapeutic approach for irritability provides an opportunity for new corrective learning to occur in response to frustrative nonreward and threatening triggers. Exposure further provides an opportunity to curtail temper outbursts as an avoidance behavior. This can be achieved by targeting parental behaviors so that the

child has the opportunity to fully confront the consequences of their temper outbursts, and can learn to tolerate nonreward and threatening stimuli (Kircanski et al., 2019), thus hindering the reinforcement of negative PEs.

Importantly, the role of stress and interpersonal resources for enhancing adaptive coping and ER strategies is missing from both Brotman et al.'s (2017) and Kircanski et al.'s (2019) irritability models across each of the core components. Yet in developmental coping models, the social context is central across all stages of adapting to stressful triggers (e.g., Compas et al., 2017; Zimmer-Gembeck & Skinner, 2016). This is further noteworthy, given that the evidence base for managing both internalizing and externalizing problems in youth, and which include irritability as one of the core symptoms (e.g., GAD, MDD, ODD, and CD), are conceptually based on treatments that include social learning theory as a foundational premise for core therapeutic components (e.g., Derella et al., 2019; Hawks et al., 2020). Chief among these therapy components is PMT. Indeed, the focus of PMT is on improving child–parent relations by helping parents learn new strategies to manage their child's behavior, and includes learning how to model adaptive coping and ER strategies. This is particularly relevant in helping children cope with stressful situations and thus learning adaptive coping strategies to strengthen resiliency over time.

In line with the commonly accepted definitions of coping (reviewed earlier), coping is initiated when a child is confronted with a stressor that blocks their goals and/or is evaluated as a threat (inclusive of sense of competency and/or integrity and/or needs being met). We propose that for children with heightened irritability, nonreward and threatening trigger cues (in line with the first component of Kircanski et al.'s [2019] irritability model) are likely to be exacerbated by stress (see Figure 26.1). The child's appraisal of the stressor as threatening (inclusive of appraising the stressor as a risk to nonreward) is proposed to

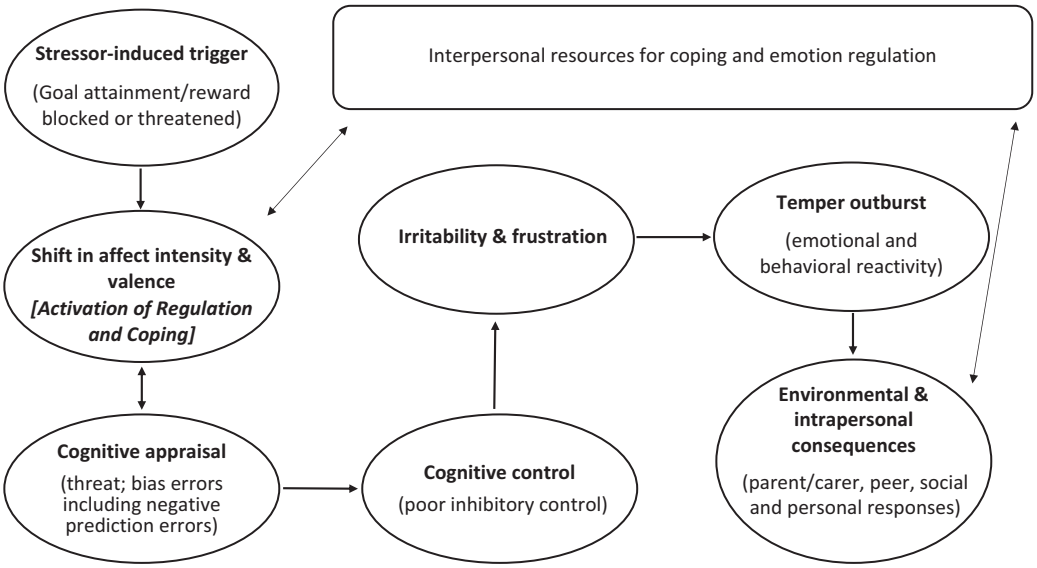

Figure 26.1 Irritability model for children and adolescents.
Note. Adapted from Kircanski et al. (2019) and extended to include stress as the trigger event and activation of coping process including resources.

be influenced by their negative prediction errors (a second component of the irritability model). This is further modulated by the child's inhibitory control (another component of the irritability model). If the child has not yet learned how to inhibit inappropriate behavioral and emotional reactions and implement adaptive coping and ER strategies in responses to stress cues (e.g., problem-solving, distraction strategies), this is likely to strengthen frustration leading to temper outbursts (two further components of the irritability model). Parental and other interpersonal responses to these outbursts (e.g., from teachers, peers, siblings) will influence how the child learns to cope with subsequent stressor triggers. Hence, how parents and caregivers model adaptive coping and ER skills and how they further interact with and manage the temper outbursts in children should be a core component of treatments targeting irritability in children, in addition to focusing on exposure training to stressor and threat cues activating elevated irritability. This is compatible with PMT programs that focus on not only training parents to more consistently cease rewarding maladaptive coping strategies in response to stress cues, but also focus on rewarding and modeling adaptive coping strategies to help children manage their emotions and cope with stress. Moreover, this attests to the importance of providing early interventions for children to prevent the onset of chronic maladaptive coping repertoires as children transition into adolescence.

The evidence base for the treatment of irritability in children and adolescents is very much in its infancy, However, a modified version of Kircanski et al.'s (2019) exposure-targeted model that also factors in the role of ER and coping skills including interpersonal coping resources in adapting to stressor cues, and thus strengthening resiliency, has utility considering that irritability is a transdiagnostic phenomenon in children and is a potential risk factor for chronic anxiety and depressive disorders in later adolescence if left untreated. Hence, a combined therapeutic approach that integrates exposure with PMT may have utility for children and adolescents experiencing severe levels of irritability including DMDD. In the following section, an evaluation of published treatment studies is presented, which includes emerging evidence for CBT-based programs including exposure and PMT in treating irritability in children and adolescents presenting with clinically elevated symptoms of irritability as well as meeting full diagnostic criteria for DMDD.

Treatment Interventions for Pediatric Irritability

As aforementioned, the evidence base for the treatment of pediatric irritability lags considerably behind the established evidence base on practices for treating internalizing and externalizing disorders in children and adolescents. However, an emerging body of research has tested the feasibility and initial efficacy of behavioral-based programs in treating children and adolescents diagnosed with DMDD. There are also several studies that have tested the efficacy of CBT-based programs for children and adolescents presenting with elevated irritability disturbances (without a diagnosis of DMDD). These studies are summarized in Table 26.1. In the first section of this table, seven published studies, which focused on children and adolescents diagnosed with DMDD, are summarized. Three further studies are also summarized in the latter part of Table 26.1, which focused on testing psychotherapy programs for children with primary irritability disturbances.

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Table 26.1 *Treatment interventions for children and adolescents with DMDD and severe irritability symptoms*

Study	Aim	Design	Sample and diagnosis	Treatment program(s)	Key findings & limitations
			DMDD studies		
Kircanski et al. (2018)	Test feasibility and efficacy of exposure-based CBT for severe irritability & DMDD	Open feasibility pilot trial	Total N = 10 children/ adolescents (M = 12.4 yrs; Range: 9.3 – 15.1 yrs). N = 8 met DMDD criteria & N = 2 DMDD history but current high irritability symptoms. N = 8 were also on psychotropic medications.	• Combine CBT-based exposure and PMT program • Manualized exposure-based CBT • 12–16 weekly outpatient therapy sessions of 60–90 mins each in duration. • Each session included separate child and parent components, with some combined child/parent sessions. • Child component – motivational interviewing (MI); developing exposure hierarchy; graduated in-session exposure with emotion tolerance; exposure homework. • Parent component –psychoeducation on instrumental learning applied to child–parent relations; positive reinforcement for adaptive behavior and active ignoring for maladaptive behavior; limit setting; positive combined activities; intermittent unexpected positive rewards; managing parental emotional tolerance to child outbursts. • Combined child–parent sessions included practice exposure and emotion tolerance.	• Full therapy attendance. • Significant decline in DMDD and irritability symptoms posttherapy. • No child reported worsening of symptoms from pre to posttherapy, indicating exposure tasks were tolerated. • Limitations: • Non-RCT and no comparison condition, hence findings are preliminary. • No medium- to longer-term follow-up to assess retention effects. • Majority (80%) on medication – so unknown effects of this type of psychotherapy program for nonmedicated children. • No assessment of ER or coping strategies.

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Table 26.1 (*cont.*)

Study	Aim	Design	Sample and diagnosis	Treatment program(s)	Key findings & limitations
			DMDD studies		
Linke et al. (2020)	Evaluating effects of a CBT-exposure and PMT program for DMDD case report	Case report (without multiple baseline assessments)	11-year-old male (initially diagnosed with ADHD at 7 yrs). Met criteria for DMDD comorbid with ADHD – combined type. On stimulant medication.	• Combine CBT-based exposure and PMT program. • 12-weekly outpatient therapy sessions of 60–90 mins each in duration. Each session comprised 30–45 min sessions with child and parent separately, although some sessions were also conjoint. • Therapy components were same as those reported in Kircanski et al. (2018).	• Child still met criteria for DMDD at end of therapy but at a milder level with some reductions in irritability symptoms. • Level of impairment was moderate at posttherapy. • Limitations: • No multiple baseline assessment so very provisional findings. • No medium- to longer-term follow-up. • No assessment of ER or coping strategies.
Miller et al. (2018)	Test feasibility and acceptability of interpersonal psychotherapy for mood and behavioral dysregulation (IPT-MBD) compared to TAU	Pilot RCT – block randomization	TotalN = 19, 12–17 yr old youth (M age = 13.7yrs); 58% males. All met DMDD criteria and/or severe mood dysregulation (SMD) (as recruitment commenced pre-DSM-5). N=10 in IPT-MBD (70% females; 70% on medication) N=9 in TAU (11% females; 89% on medication).	• IPT-MBD condition comprised 24 individual weekly, 45–60 min sessions with adolescent (with some intermittent parental sessions). • IPT-MBD adapted from the IPT for depression adolescence (IPT-A; Mufson et al., 2004) program with goal of improving interpersonal skills and reducing irritability and outbursts. • Modifications to program included: longer duration; psychoeducation on anger and temper outbursts; discussion on family accommodation to outbursts; outbursts safety plan to de-escalate outbursts; modified rhythmic metric; increase in parental involvement. • Three phases to IPT-MBD (initial, middle, and termination) focusing on four problem areas: 1) interpersonal	• Significantly more females in IPT vs. TAU, but did not covary for analyses due to small sample sizes. • N=15 (80%) completed study in IPT condition versus 78% in TAU condition. • IPT condition, M number of sessions attended = 20 with a high satisfaction score. • TAU condition, 6/9 received both psychotherapy and medication (range of sessions attended was 0–16 sessions). • Participants in IPT condition reported significant improvements in functioning at posttherapy vs. TAU condition (via clinical interview scores). IPT classified as "mildly ill" at posttherapy vs. TAU classified as "moderately ill."

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				role transitions; 2) role disputes; 3) deficits; and 4) grief, and which included emotional awareness, interpersonal emotional interactions, communication, problem-solving, and relapse prevention. • TAU condition – continued with current therapy provider if relevant, or referred to a nonstudy therapist.	• No significant differences on depressive, anxiety, and irritability symptoms assessed via self-report measures. • Only 1/8 participants continued to meet DMDD diagnosis at posttherapy vs. 4/7 TAU participants; and n=1 TAU participant had been hospitalized for psychological problems. • Limitations: • Underpowered study. • Gender differences not statistically accounted for. • Majority (79%) on medication – so unknown effects of this type of psychotherapy program for nonmedicated children. • No medium- to longer-term follow-up to assess retention effects. • No assessment of ER or coping strategies. • Lengthy treatment.
Perepletchikova et al. (2017)	Tested feasibility and efficacy of DBT for children with DMDD	RCT stratified via age (>/= 10 yrs).	Total N = 43 children (7–12 yrs) with DMDD N=21 DBT condition; M age = 9.19 yrs; 57% males. 33% (n = 7) comorbid ADHD; and 38% (n = 8) anxiety disorders at baseline. N=10 (48%) met criteria for two disorders; and 19% (n = 4) met criteria for three disorders. 19% (n = 5) also medicated.	• DBT – manualized program comprising four modes from standard DBT: 1) individual therapy; 2) skills training; 3) phone coaching; 4) therapist team consultation. Plus new component 5) parent training. • DBT = 32 weekly, 90 min individual sessions including child, parent, and conjoint sessions. • DBT was made freely available to families (no fee costs).	• DBT condition – 89% attended all sessions and 100% completed study assessments. • TAU condition – 49% attended sessions and 64% completed study assessments. • Significant improvements in functioning assessed via clinical interview scores (CGI) for 90.4% of participants in DBT condition vs. 45.5% of TAU participants.

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Table 26.1 (*cont.*)

Study	Aim	Design	Sample and diagnosis	Treatment program(s)	Key findings & limitations
			DMDD studies		
			N=22 TAU condition; M age = 9.27 yrs; 55% males. 46% (n = 10) comorbid ADHD; and 18% (n = 4) anxiety disorders at baseline. N=14 (64%) met criteria for two disorders; and 9% (n = 2) met criteria for three disorders. 36% (n = 8) also medicated.	• TAU – received up to 32 individual treatment but families had to pay fees for the treatment with relevant providers.	• Significantly greater proportion of participants in DBT condition were in remission posttherapy (52.4%) versus 27.3% of participants in TAU condition. • Posttherapy a greater proportion of TAU participants were still on medication (54.4%) vs. 19.1% in DBT condition. • For DBT condition – effects retained at 3-month follow-up, with clinical functioning (CGI scores) significantly improving between posttherapy and follow-up. • No severe side effects for DBT condition whereas one participant in TAU was hospitalized due to psychological problems. • Limitations: • Although retention rates were high for DBT condition, they received the therapy at no cost, whilst the TAU participants were required to pay for treatment. • No measures assessing comorbid, transdiagnostic symptoms for depression, anxiety, and emotion regulatory functioning. • Lengthy treatment at 32 weeks × 90 min sessions. • No assessment of ER or coping strategies.

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Stoddard et al. (2016)	Test utility of interpretation bias training for children and adolescents with DMDD	Open clinical experimental trial.	Total N = 14 children with DMDD (M age = 14.1 yrs; 57% females). 71% had comorbid ADHD and 71% had comorbid anxiety.	• Computer-based interpretation bias training (IBS) for four sessions conducted over 4 days. • IBS sessions comprised six training blocks consisting of a total of 180 trials. Training focused on benign interpretations of ambiguous facial expressions.	• Clinical range scores "slightly improved" posttraining and "improved" range at 1-week follow-up. • Significant reductions in parent reports of irritability symptoms post-training and at 1-week follow-up. However, no significant change for irritability scores assessed via child/adolescent self-reports. • fMRI results showed some change in the lateral orbital frontal cortex and amygdala for subtle expressions of happiness versus anger cues. • Limitations: • Researchers acknowledge results confounded by high psychological comorbidity, hence cannot rule out that irritability- related changes were due to alterations in fear-related interpretations. • Preliminary results as non-RCT and no comparison condition. • Retention effects not known beyond 1-week follow-up.
Tudor et al. (2016)	Reporting effects of CBT for a case study with DMDD	Case study (with no multiple baseline assessment)	9-year-old female with DMDD comorbid with ADHD – combined type, on medication, and with unspecified anxiety.	• 12-weekly, 60-min CBT sessions and 5 follow-up booster sessions within a 3-month period. • CBT based on manualized program for anger and aggression for youth (Sukhodolsky & Scahill, 2012) with three core modules: 1) emotion regulation; 2) social problem-solving; 3) social skills. • Additional DMDD components added to manual including: 1) extending psycho-education on irritability triggers; 2) behavioral activation for negative mood; 3)	• Significant reductions in irritability, anger, and aggression and within normative range at posttherapy • "Very much improved" clinical functioning. • Effects maintained following booster sessions. • Limitations: • Lacking multiple baseline assessment so results are provisional. • No longer-term follow-up assessment following end of booster sessions. • No assessment of ER or coping strategies.

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Table 26.1 (*cont.*)

Study	Aim	Design	Sample and diagnosis	Treatment program(s)	Key findings & limitations
			DMDD studies		
				extending emotion regulation training to focus on irritable mood; and 4) extra booster sessions from three to five. • Also included a parental component (three separate 60-min sessions).	
Waxmonsky et al. (2016)	Test feasibility and efficacy of a joint parent–child CBT group therapy program for children with SMD combined with medication	RCT	Total N = 68 children (7–12 yrs) with comorbid SMD and ADHD. CBT + ADHDmedication program comprised n = 35 children, M age 9.3 yrs; 29% with anxiety; 94% with ODD; 65% males. Community Care/TAU + ADHD medications comprised n = 33 children, M age 9.4 yrs; 44% with anxiety; 96% with ODD; 76% males.	• CBT group program comprised 11 × 105-min parent and child group therapy sessions run in parallel. • Child sessions included emotion recognition in self and others, connection between emotions and cognitions, problem-solving, and coping skills. • Parent sessions included psycho-education, behavior modification including identifying and interrupting negative family cycles reinforcing outbursts, emotion regulation coaching, and problem-solving. • TAU condition – majority received psychotherapy in community care (86%; n=25).	• Significant decline in mood and hyperarousal for CBT participants who attended the majority of the therapy sessions. • Significant decline in parent reported irritability symptoms at posttherapy (ES=0.63) for CBT group. • Frequency of temper outbursts and irritability increased over follow-up – suggesting need for booster sessions in future. • Nonsignificant changes for ADHD. • Nonsignificant group differences in favor for CBT for managing full spectrum of ODD symptoms. • Limitations: • No longer-term follow-up beyond 6 weeks. • All participants on medication – so unknown effects for this type of psychotherapy program for nonmedicated children. • No assessment of ER or coping strategies.

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			Children presenting with severe irritability symptoms		
Derella et al. (2019)	Secondary analyses testing efficacy of CBT-enhanced emotion regulation for managing childhood chronic irritability symptoms	Based on secondary analyses of an RCT-effectiveness trial	Total N = 252 males (aged 6–11 yrs) who took part in an emotion regulation trial testing the effects of the Stop Now and Plan (SNAP) program compared to a TAU condition. Children required to score at clinical levels (T score of 70) on Conduct Disorder subscales on the Child Behavior Checklist (CBCL) – or obtained a T score of 64 overall on Externalizing subscale for CBCL. N=130 SNAP condition; M age 8.58 yrs; 86.2% African American. N=122 TAU condition; M age 8.38 ys; 87.7% African American.	• SNAP is manualized and comprises small child group therapy sessions focusing on problem-solving, emotion regulation skills encouraging prosocial behaviors and reducing negative affectivity, role-play activities, videotaped review and peer critique of problem-solving strategies, and conducted over 3 months. Concurrent, separate parent group sessions focusing on parent practices, and problem-solving training. • Following this first phase of group therapy children were reassessed and additional individual therapy was made available (e.g., SNAP family counseling, or booster sessions). • TAU participants encouraged to engage in external provider services.	• No significant direct effects between the two conditions in terms of changes for irritability symptoms. • No significant direct effects found between SNAP skills training and reductions in irritability symptoms; although SNAP is associated with greater ER skills, the ES was small. • Higher ER skills mediated effect between SNAP and irritability scores (ES=0.48). • Limitations: • Secondary analyses – hence program never designed to specifically target chronic irritability using a transdiagnostic framework. • Cannot generalize findings to females. • No clinical assessment of symptoms beyond CBCL externalizing symptoms.
Evans et al. (2020)	Secondary analyses testing effects between modular psychotherapy program vs. standard manualized psychotherapies vs. TAU for youth with severe levels of irritability	Based on secondary analyses of a clustered RCT effectiveness trial whereby children randomized to the Modular Approach to Therapy for Children with Anxiety, Depression, Trauma, or Conduct	Secondary analyses based on children classified with severe irritability and mood dysregulation (SIMD) Total N=81, M age 10.2 years; 69% males. SMT condition N=26 with SIMD; MATCH = 31 with SIMD; and TAU = 24 with SIMD.	• MATCH – manualized modular program comprising weekly sessions (CBT-based program with behavioral parent training individualized to each child's case formulation). 83% related to manual content. • SMT – clinicians administered one of three manualized protocols: 1) coping cat for anxiety; 2) primary and secondary control enhancement training (PASCET) for depression;	• MATCH significantly or marginally better and faster improvements than TAU and SMT on outcomes including youth self-reports (internalizing, externalizing, and combined functioning scores). • MATCH has significantly fewer diagnoses posttherapy vs. TAU (averaging one fewer; ES=0.93). • Both MATCH and SMT equivalently better than usual care in

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Table 26.1 (*cont.*)

Study	Aim	Design	Sample and diagnosis	Treatment program(s)	Key findings & limitations
			DMDD studies		
		Problems (MATCH), one of three standardized manualized treatments (SMTs) or TAU		and 3) defiant children for disruptive behavior. 93% related to manual content. • TAU – only 8% related to a manual content. • Mean sessions = 16.2 over 32 weeks.	reducing irritability symptoms (ES=0.49). • Limitations: • Secondary analyses – hence programs never designed to specifically target chronic irritability (SIMD) using a transdiagnostic framework. • The SIMD subsample for this study was based on a three-item measure adapted from CBCL and subsamples were underpowered to detect small to medium ES. • Not clear which specific treatment components contributed to positive results for irritability. • No assessment of ER or coping strategies.
Hawks et al. (2020)	Tested adapted version of the unified protocol for transdiagnostic treatment of emotional disorders in children (UP-C) for treatment of pediatric irritability	Prepost design	Total of 19 children (aged 8–12 yrs); M=10 yrs; 79% males. Primary diagnoses included: 53.3% ADHD, 13.3% DMDD, 6.7% ODD, 6.7% intermittent explosive disorder, 6.7% MDD, 6.7% adjustment disorder, 6.7% other mood disorder. Comorbid diagnosis included 26.7% ADHD, 20% GAD, 13.3% unspecified anxiety,	• Modified UP-C comprised 10 × 90-min group weekly sessions; child and parent groups, with at least 20 mins conjoint parent–child experiential activities. • Child component: Focused on anger and irritability emotions. Emotional and somatic awareness and identification; psychoeducation on cognitions including "thinking traps," cognitive restructuring via	• N = 15 completed study (n = 3 dropouts and n = 1 did not complete baseline assessment). Of the 15 participants, 50% attended 50% or more of sessions (M attendance number is 7); with 22% dropout. • No significant changes in child-reported irritability symptom and own hostile intent biases at posttherapy. • Parent reports of their child's irritability and oppositional

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		13% MDD or adjustment disorder.	detective thinking; problem-solving; exposure and skills review. • Parent component: parent behavioral management strategies including engaging in positive interactions with child, consistent parenting, using effective command–punishment procedures, modeling adaptive emotional coping. Encouraged to support child in implementing child skills.	behaviors significantly declined posttreatment. • Parent reports of their child's emotion regulation did not significantly change pre to posttreatment. • Parent reports of their child's broad emotional and behavioral problems were significantly lower by posttherapy. • Parent reports of their child's prosocial behaviors marginally improved by posttreatment. • Parents rated program as highly satisfactory. • Limitations: • No control condition. • Majority had a primary or secondary diagnosis of ADHD (70%). • No follow-up assessments, so retention effects unknown.

Review of the Seven DMDD Treatment Studies

Of the seven DMDD studies, three were randomized controlled trials (RCT) (Miller et al., 2018; Perepletchikova et al., 2017; Waxmonsky et al., 2016), one was a nonrandomized, prepost design (Kircanski et al., 2018), two papers were case reports (Linke et al., 2020; Tudor et al., 2016), and one study used an experimental prepost design to test a computerized interpretation bias training paradigm (Stoddard et al., 2016). The three RCTs tested different types of psychotherapeutic approaches; however, they all included individual and/or interpersonal emotion regulatory and coping skills training components (Miller et al., 2018; Perepletchikova et al., 2017; Waxmonsky et al., 2016). The largest trial by Waxmonsky et al. (2016) evaluated the efficacy of combined medication for attention deficit hyperactivity disorder (ADHD) and group-based CBT (including child and parent components) for the treatment of comorbid DMDD with ADHD relative to a community care (treatment as usual, TAU) comparison group of children aged 7–12 years. Moreover, both the child and parent components included ER and coping skills training. The child component included training to increase emotional awareness in self and others as well as how to use adaptive coping skills including self-soothing and problem-solving skills to manage stressful experiences. To reinforce these skills, the parental components included psychoeducation training in ER coaching and problem-solving in addition to PMT strategies. The combined group CBT program was found to reduce child irritability and hyperarousal symptoms and improve child mood symptoms posttherapy, but these improvements were not retained at follow-up. Notably, the rate of temper outbursts and irritability symptoms increased by 6 weeks follow-up relative to posttreatment. There were also no significant group differences in terms of ADHD and ODD symptom changes between the CBT and TAU conditions. Waxmonsky et al. (2016) acknowledge that the lack of short-term retention effects may indicate that this comorbid group of children require booster therapy sessions, beyond the 11-session CBT program for further skill consolidation.

More positive findings were documented by the other two RCT studies, which were based on psychotherapy programs of much longer treatment duration. In particular, Perepletchikova et al. (2017) investigated the efficacy of a child version of an adapted 32-week dialectical behavior therapy (DBT) program in a small sample of preadolescents (7–12 years) (n=21) and compared this to a TAU (n=22) condition. The DBT program included both child and parent training sessions, including mindfulness, ER, and distress tolerance skills involving in-session experiential practice as well as PMT and family therapy sessions. Results were positive with 90% of children in the DBT group improving in their overall functioning, compared to only 45.5% of children in the TAU condition. Moreover, 52% of children in the DBT condition were in remission for DMDD at the end of therapy compared to only 27% of children in the TAU group. Similarly, Miller et al. (2018) also found positive treatment effects for a 24-session, individualized interpersonal psychotherapy treatment (IPT) program for a very small sample of adolescents aged 12–17 years. It is noteworthy that the IPT program also included emotional awareness and interpersonal ER training (see Table 26.1). The majority (87.5%) of the sample who received the IPT program were in remission for DMDD relative to only 43% of adolescents in the TAU condition at the end of the 24-week therapy program. The outcomes from these latter two

RCTs are promising and attest to the potential effectiveness of interpersonal-based training programs that include both child emotion regulatory, coping, and social skills training as well as interpersonal ER coaching coupled with PMT in facilitating the management of DMDD.

Although all three RCTs for DMDD included parent training components, it is noteworthy that none of the psychotherapy programs evaluated (i.e., group CBT, DBT, and IPT) included a specific exposure component targeting the management of irritability symptoms and temper outbursts in line with Kircanski et al.'s (2019) exposure-targeted irritability model. In response to this gap, the two studies conducted by Kircanski et al. (2018) and Linke et al. (2020) tested the efficacy of a combined 12-week, individually based, CBT exposure and PMT program for treating pediatric DMDD. In both studies, the CBT-based program primarily focused on graduated in-session and between-session exposure to nonreward and frustration threat cues coupled with PMT inclusive of managing parental emotional tolerance in response to children's temper outbursts. As outlined in Table 26.1, Linke et al. (2020) reported the findings from a case study based on an 11-year-old male diagnosed with DMDD comorbid with ADHD, and who was on stimulant medication. Although at the end of the therapy program this child continued to meet criteria for DMDD, the symptoms had been reduced to a milder level.

Kircanski et al. (2018) also tested the efficacy of this combined, 12-weekly individual CBT exposure and PMT program using a pre-post design, based on a small sample (N=10) of children aged 9–15 years diagnosed with current or a history of DMDD, with current elevated irritability symptoms. A significant decline in DMDD symptoms was found post-therapy. However, the authors did not report the diagnostic status of participants post-therapy. Hence, the proportion of participants who were in remission by the end of this cohort study remains unknown. Clearly, further large-scale controlled RCTs are warranted to further test the efficacy of this combined exposure and PMT program for managing DMDD as well as chronic clinically elevated irritability symptoms in children and adolescents who may not necessarily meet full diagnostic criteria for DMDD. Indeed, Kircanski et al. (2018) acknowledge that on the basis of their initial trial results, it is premature for exposure-based CBT programs to be considered an empirically supported treatment for severe irritability disturbances in youth. It is noteworthy that the CBT-based exposure and PMT program tested by these researchers did not include any active ER training components. This is a key difference between this program and the multicomponent CBT-based programs tested by Miller et al. (2018), Perepletchikova et al. (2017), and Waxmonsky et al. (2016) that did include specific child and parent ER and coping skills training components.

As further summarized in Table 26.1, Tudor et al. (2016) used a case study design to examine the effects of a 12-week CBT-based program for a 9-year-old female diagnosed with comorbid DMDD and ADHD, and who was also medicated. The CBT program focused on ER and social skills including problem-solving training, as well as behavioral activation that involved compiling a list of enjoyable activities to help with periods of low mood. In addition, three separate parent training sessions were incorporated into the intervention. However, in contrast to Kircanski et al.'s (2019) irritability model, no specific exposure targeted component was included that involved gradual increase in activities that triggered an irritable mood state. In contrast to the Linke et al. (2020) case study, Tudor et al. (2016)

documented significant reductions in the child's irritability, anger, and aggressive symptoms and the child's functioning was evaluated to be in the normative range posttherapy. These results were maintained following the 3-month period during which the child also received up to five intermittent booster therapy sessions. Comparable to the psychotherapy programs tested by Miller et al. (2018) and Perepletchikova et al. (2017), the CBT program reported in the Tudor et al. case report also focused on child ER and social skills including problem-solving training components. This pattern of findings lends support to the utility of including specific ER and coping skills training components in future studies in strengthening program benefits when treating youth with severe irritability.

In the final DMDD study we summarize in Table 26.1, Stoddard et al. (2016) published the first experimental open pilot trial to test the utility of a computerized interpretation bias training program for children and adolescents with DMDD. Based on a four-session training program conducted across 4 consecutive days, the paradigm had promising efficacy for improving DMDD in children. Specifically, based on parent reports (but not child self-reports), significant reductions in child irritability symptoms were found posttraining and at 1-week follow-up. These positive outcomes were further supported by fMRI-measured alterations in the lateral orbital frontal cortex and amygdala for the subtle expression in responses to happiness relative to anger facial cues. Stoddard et al.'s (2016) positive findings align with components from both Brotman et al.'s (2017) and Kircanski et al.'s (2019) pediatric irritability models that highlight the cognitive bias errors that children and adolescents with severe irritability disturbances are susceptible to experiencing. Accordingly, Stoddard et al.'s findings lend support to the further testing of this paradigm in larger-scale RCT designs.

Summary of the Seven DMDD Treatment Studies

Collectively, the findings from these seven studies suggest that in the treatment of severe pediatric irritability as characterized by the DMDD diagnosis, clinicians need to accommodate comorbid psychological disorders. In fact, the majority of studies included children and adolescents with concurrent diagnoses of ADHD; however, two of the RCT studies also included children with comorbid anxiety disorders (Miller et al., 2018; Perepletchikova et al., 2017). Although some promising findings were documented across the seven studies outlined in Table 26.1, given the mixed array of samples, treatment components tested, and variable designs, it is premature to conclude that any one particular psychotherapeutic approach is more suitable for managing pediatric irritability problems. Interestingly, all studies included some degree of PMT, although no trial has yet tested the effects of PMT separately from other child-CBT and/or IPT-based components. Moreover, it is noteworthy that the studies that included emotion-regulatory, interpersonal, social skills, and problem–solving training (e.g., Miller et al., 2018; Perepletchikova et al., 2017; Tudor et al., 2016) showed the most encouraging results in terms of DMDD remission rates posttreatment. This pattern of findings further attests to the important role that ER and coping skills training may have in helping children learn how to manage their emotions in response to various contextual changes in their environments. However, whether comparable results can be achieved by exposure-based and PMT-focused interventions remains to be empirically determined (e.g., Kircanski et al., 2018).

Treatment of Severe Irritability (Non-DMDD) in Children: Review of Additional Studies

Based on a noncategorical (dimensional/continuum) perspective, there is an emerging body of literature testing the effects of psychotherapy interventions for children who do not meet full diagnostic criteria for DMDD, but are suffering from enduring, elevated irritability symptomatology. As summarized in Table 26.1, three published studies have been identified reporting on the effects of psychotherapy programs for managing heightened irritability disturbances in children and adolescence. Two of these studies are based on secondary analyses from larger randomized controlled effectiveness trials (Derella et al., 2019; Evans et al., 2020) that were not specifically designed for the treatment of pediatric irritability. One of these studies tested the effects of an ER and prosocial behavior training program that also included problem-solving (see Table 26.1 for further details) in a large male sample of children aged 6–11 years with clinically elevated externalizing symptoms (Derella et al., 2019). However, these researchers failed to find a significant direct treatment effect for the reduction of irritability symptoms. Rather, the reduction in irritability problems was found to be mediated by improvements in the use of adaptive ER skills. These significant mediational effects suggest that at-risk children experiencing elevated irritability disturbances, but not necessarily meeting full diagnostic criteria for psychopathology such as DMDD, may benefit from accessing early interventions focusing on ER interpersonal skills training to prevent the onset of psychopathology.

In a separate study summarized in Table 26.1, Evans et al. (2020) investigated whether a modular CBT-based psychotherapy program (MATCH), which included CBT-based components including PMT, and three evidence-based manualized therapies for children with anxiety, depression, and externalizing problems were also effective in treating children presenting with severe irritability and mood dysregulation (SIMD) symptoms, based on secondary analyses from a larger-scale clustered randomized effectiveness trial (Chorpita et al., 2013). In the original trial, participants were randomized to either the MATCH, standardized manual treatment (SMT), or TAU conditions. Findings showed that both the MATCH and SMT programs were comparably effective in reducing irritability symptoms in children displaying SIMD, with moderate effect sizes (ES=0.49). However, the MATCH program led to more rapid improvements than children who received the SMT programs. A greater proportion of children who received the MATCH program were also in remission posttherapy relative to children allocated to the TAU condition.

In a further recent study, Hawks et al. (2020) tested the effects of a modified version of the unified protocol for the treatment of emotion disorders in children (UP-C; Ehrenreich-May et al., 2018) by reducing the number of therapy sessions from 15 to 10 to target primary persistent, irritability problems in children aged 8–12 years. This modified version of the UP-C intervention comprised 10 × 90-minute group therapy sessions, whereby separate parent and child group sessions were held concurrently, although 20 minutes of each session included conjoint parent–child experimental activities to target both child-focused and contextual-focused ER skills (see Table 26.1). Based on a small pilot, open trial intervention (n=19 children), Hawks et al. found that parents reported significant reductions in their children's' irritability and emotional problems, whilst they only reported marginal improvements in their children's prosocial behaviors. However, child reports of

their own irritability and attributional biases did not significantly change. Similarly, parental reports of their children's emotional lability/negativity and adaptive use of ER skills also did not significantly change following therapy. Hawks et al. acknowledge that these mixed findings indicate further modifications are needed to the UP-C protocol to effectively target underlying ER deficits that are a core mechanism underpinning transdiagnostic irritability disturbances in children. Indeed, the mediation results from Derella et al.'s (2019) study lend support to this proposition.

Summary of Additional Child Irritability Studies

These three additional studies provide further provisional, yet promising support for providing psychotherapy interventions for children experiencing heightened, yet dysfunctional irritability and who may not necessarily meet criteria for DMDD. As DMDD reflects the severe end of irritability and mood problems in children, there is a notable gap in the provision of early interventions for at-risk children suffering from heightened irritability that impairs functioning. Therefore, identifying at-risk children provides a valuable opportunity for early interventions to prevent onset of chronic and more severe psychopathology. To that end, the outcomes from both Hawks et al.'s (2020) and Derella et al.'s (2019) studies provide provisional support for the utility of further strengthening the evidence base for early interventions for at-risk children (6–12 years), targeting ER and coping skills training, particularly as the incidence of heightened, enduring irritability disturbances in children is high (22%) by middle childhood (e.g., Copeland et al., 2015).

Furthermore, a shortcoming of Hawk et al.'s (2020) therapy protocol was the explicit focus on downregulating negative emotions whilst overlooking targeting the upregulation of positive emotions through the use of adaptive positive ER strategies. In fact, in a recent meta-analysis, Moltrecht et al. (2020) found that most ER-based interventions for youth primarily focus on emotion dysregulation, whilst neglecting the development and strengthening of positive ER skills (such as empathy and gratitude) that are pivotal for adaptive interpersonal connections. Moreover, considering that, 1) persistent irritability is a transdiagnostic phenomenon; 2) ER is a transdiagnostic process underpinning the mechanisms of a wide range of psychopathology including irritability-related disorders (e.g., DMDD, MDD, ODD, and generalized anxiety); and 3) studies have shown there is a significant decline in ER skills in at-risk children aged between 10 and 12 years (Moltrecht et al., 2020), there is an ongoing need to develop further efficacious, feasible treatments specifically designed to enhance ER skills in managing persistent irritability in at-risk school-aged children presenting with irritability-related disturbances as the core primary presenting problem. This is further supported by the findings from Evans et al. (2020), which suggest that combining CBT with PMT in a flexible, yet individualized manner has utility in managing severe levels of irritability and mood disturbances in children presenting with transdiagnostic problems. Yet comparable to the preliminary results from Kircanski et al.'s (2018) results, Evans et al. (2020) also acknowledge that future research is warranted to test specific mechanisms of change that contribute to the effective treatments of severe irritability disturbances in youth.

Conclusions

Persistent, elevated irritability is a hallmark transdiagnostic feature for common internalizing and externalizing problems in children

and adolescents. Even for children who do not meet full diagnostic criteria for any disorder, studies show that up to 22% of children presenting with persistent irritability in childhood are at risk of developing acute psychopathology in the short term (Copeland et al., 2015; Evans et al., 2020), as well as developing chronic psychopathology in adulthood (e.g., Stringaris et al., 2009). Yet there is growing recognition of the paucity of established evidence-based transdiagnostic programs available to specifically treat primary presenting irritability disturbances in youth. As evaluated in the previous section of this chapter, there is a small body of emerging evidence with some promising outcomes to date, to guide clinicians and future research in this field. The bulk of this evidence has been adapted from the extant evidence base for the treatment of pediatric anxiety, depression, and externalizing disorders. These emerging studies have predominantly tested CBT-based approaches with (e.g., Kircanski et al., 2018) and without exposure components (e.g., Waxmonsky et al., 2016); DBT (Perepletchikova et al., 2017) and IPT (Miller et al., 2018) programs with children and adolescents meeting criteria for DMDD. Notably, the most promising evidence in terms of DMDD remission rates are based on behavioral-based programs that have included individual and interpersonal emotion regulatory and prosocial behavioral skills training components (e.g., Miller et al., 2018; Perepletchikova et al., 2017; Tudor et al., 2016). However, as can be seen in the studies summarized in Table 26.1, there is a paucity of evidence-based transdiagnostic programs available to directly treat elevated, persistent irritability problems in children and adolescents from a dimensional (continuum) perspective. This is a problematic gap in the literature, considering that irritability disturbances are a common reason for mental health referrals in youth (Roy & Comer, 2020). Moreover, even for children with persistent irritability who do meet full diagnostic criteria for a specific disorder (e.g., MDD, ODD, GAD), psychotherapies for specific disorders do not adequately target the transdiagnostic nature of persistent irritability – and this is further demonstrated by studies summarized in Table 26.1.

It is noteworthy that PMT is a common element across the majority of programs tested for children with irritability disturbances, with and without DMDD, although therapeutic dosages have been variable. One of the key objectives of PMT is guiding parents to learn and apply behavioral management strategies as well as modeling adaptive coping and ER strategies to help their child learn more effective ways to cope with challenges and manage their emotions in a socially appropriate manner. Although the majority of the treatment studies reviewed in this chapter included practical ER and problem-solving skills training for the child therapy components, there is a notable paucity of studies that included didactic child–parent coping and ER skills training within therapy sessions. This is a critical gap in this emerging body of evidence for treating irritability problems in children. As aforementioned, the two related irritability models proposed by Brotman et al. (2017) and Kircanski et al. (2019) do not factor in how these children respond to stress and they overlook the role of interpersonal resources for enhancing coping and ER skills. This provides a timely opportunity to further extend this model to include how at-risk children experiencing enduring, debilitating irritability manage stressful circumstances, given that stress is likely to be a further catalyst for blocking the child's goal attainments and/or activating threat cues, and thus further fueling irritability and temper outbursts. How parents and caregivers respond to and manage the child's irritability and outbursts needs to also

be included in a more holistic model to explain the interpersonal/social effects of how irritability in children can be managed. Hence, a more integrative model that incorporates coping and ER processes (inclusive of downregulating prolonged negative emotions and upregulating positive ones) in the child's interpersonal interactions as well as intrapersonal functioning is likely to serve as a useful heuristic framework to further advance research in understanding the developmental trajectory and management of severe irritability problems in children and adolescents. Additionally, whether particular treatment components are more or less effective in managing irritability and strengthening adaptive coping and ER skills according to the child's developmental level has yet to be empirically tested and hence warrants future investigation using large studies.

From the ten treatment studies identified, only two of the studies reviewed in this chapter (Derella et al., 2019; Hawks et al., 2020) included ER outcome measures in addition to evaluating the effects of the therapy in reducing irritability and associated mood disturbances. Only one of the two studies, based on a young sample of children (aged 6–11 years, with a mean age of 8 years) and which included both ER and coping skills training in problem-solving for both children and parents, was found to lead to improvement in the use of ER skills (Derella et al., 2019). These scholars also found that improvement in ER skills also mediated the effect of the therapy program in managing irritability. However, the second study, by Hawks et al. (2020), failed to find a significant improvement in either ER skills or a decline in irritability. One possibility for these null results is that the majority of the small sample of children aged between 8 and 11 years had a comorbid diagnosis of ADHD in the Hawks et al. (2020) study. This suggests that children that display severe irritability comorbid with other externalizing disorders such as ADHD may need more prolonged or multiphased interventions.

Overall, given the promising pattern of findings from studies that have included ER and problem-solving skills training components, this raises the scope for further advancing conceptual models for irritability in youth to incorporate more holistically the role for both coping and ER flexibility, particularly as both irritability and ER are transdiagnostic constructs (see Figure 26.1). Indeed, there is a clear need for future large-scale RCTs that further test the efficacy of behavioral-based, coping, and ER components in the transdiagnostic treatment of irritability problems in children in future studies, as well as including coping and ER outcome measures to evaluate the treatment mechanisms across different developmental age groups. This line of inquiry will serve to further advance conceptual models for irritability to facilitate the assessment and treatment of irritability disturbances including for at-risk children. To that end, there is also a clear need for strengthening the evidence base of early interventions targeting the development of adaptive and flexible coping and emotion regulatory skills in at-risk children suffering from persistent irritability disturbances to prevent the onset of chronic psychopathology.

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27 Fostering the Development of Academic Coping

A Multi-level Systems Perspective

Ellen A. Skinner and Kristen E. Raine

Introduction

As soon as children enter formal schooling, they are faced with the demands and challenges of academic work. On the one hand, these challenges are explicitly designed as opportunities for children to learn and develop the competencies they will need to progress successfully in their educational careers. On the other hand, if demands overwhelm children's resources, they can be experienced as stressors and threats, to which children can respond with attempts to escape, fight back, or give up. One branch of study that examines how children and youth deal with the problems they encounter in their everyday schoolwork focuses on processes of *academic coping*. When children cope constructively, they exert effort, strategize, request instrumental help or comfort, and use the kind of positive self-talk that allows them to engage fully, persist, and learn more from encounters with challenging academic tasks. In contrast, when they are overwhelmed by academic stressors, children can try to avoid or conceal their problems, fall into helplessness, engage in negative self-talk, or blame themselves or others. These reactions can derail engagement and learning, and may even exacerbate students' difficulties by increasing their own distress or alienating those who could help.

Current Research on Academic Coping

Inspired by transactional models of stress and coping (e.g., Lazarus & Folkman, 1984), research on academic coping to date has focused largely on individual differences, examining the antecedents and consequences of different kinds of coping (e.g., problem-solving, escape). Figure 27.1 provides an overview of that research, including the ways of coping typically assessed (for definitions, see Table 27.1) as well as the personal and interpersonal predictors and academic outcomes examined most often (for details, see Skinner & Saxton, 2019). Taken together, this body of work highlights several trends. First, academic coping seems to play a role in students' academic functioning and success. Strategies drawn from adaptive families of coping (like problem-solving, information-seeking, self-encouragement, or profiles that combine multiple families) are linked to better functioning and achievement; just as coping from maladaptive families (especially escape, social isolation, opposition, or profiles that combine coping from multiple maladaptive families) is linked to poorer academic performance and higher levels of stress and distress. Most persuasive is evidence from longitudinal studies showing that coping can predict changes and trajectories of academic functioning and performance across months, the school year, or multiple years.

Second, tests of process models suggest that one way coping promotes or undermines academic performance is motivational – by increasing the likelihood that students reengage and persist versus give up in the face of academic demands. Third, mediational studies

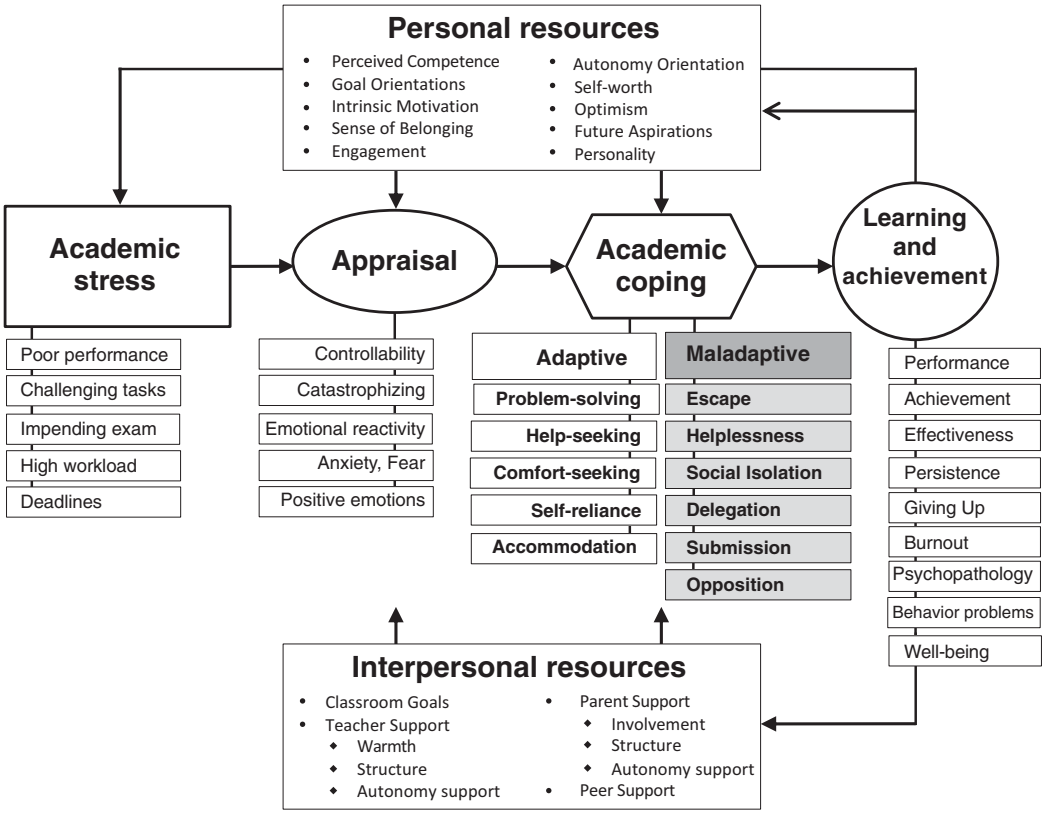

Figure 27.1 A transactional model of the coping process: Coping is triggered by encounters with stress; individuals' appraisals of their stressful encounters, along with personal and interpersonal resources, shape coping responses; and coping responses in turn contribute to coping outcomes, which shape subsequent coping processes by feeding forward into future stressful encounters, appraisals, and coping efforts. This model is used to organize the variables included in studies of academic coping. (Adapted from Skinner & Saxton, 2019).

also find evidence that coping itself may act as a conduit through which other positive supports (or risk factors) have a beneficial (or detrimental) impact on academic performance or functioning. For example, one way in which students' goal orientations seem to impact their achievement in late adolescence is by shaping their problem- and emotion-focused coping (Brdar et al., 2006). Fourth, coping is linked with a range of predictors, both personal (e.g., self-efficacy) and interpersonal (e.g., parent support), suggesting that students with higher levels of both personal and social resources are more likely to utilize adaptive ways of coping, whereas students who experience lower levels of interpersonal support and show higher levels of personal vulnerabilities also rely on more maladaptive strategies.

Finally, a set of about 15 studies has examined normative trends in mean-level differences and changes in academic coping across elementary, middle, and high school. Taken together, as depicted in Figure 27.2, they paint a worrisome developmental picture. Early in their schooling, students' coping seems to be on a constructive normative trajectory, with

Table 27.1 *Core ways of coping in the academic domain*

Family	*Definition, item example, and function*
Adaptive families and ways of coping	
Problem-solving	Attempts to figure out what to do to solve problems or prevent them in future encounters. *Item example*: "I try to figure out how to do better next time." *Function*: Sustain engagement in a challenging situation by trying out effective actions.
Information-seeking	Going to teachers or others for instrumental aid in understanding material or in figuring out how to learn more effectively. *Item example*: "I get some help to understand the material better." *Function*: Remove oneself from a challenging situation in ways that foster reengagement.
Comfort-seeking	Turning to others for emotional reassurance, consolation, and cheer. *Item example*: "I talk about it with someone who will make me feel better." *Function*: Replenish emotional resources when emotions are challenged.
Self-encouragement	Attempts to regulate one's flagging behavior or emotions by bolstering confidence and optimism. *Item example*: "I tell myself I'll do better next time." *Function*: Protect social resources by finding one's own emotional strengths.
Accommodation	Attempts to remind oneself why challenging academic work is personally important and worth the effort. *Item example*: "I think about how this is important for my own goals." *Function*: Find autonomous ways to fit into current constraints.
Maladaptive families and ways of coping	
Escape	Attempts to avoid or remove oneself from difficulties and poor outcomes. *Item example*: "When something bad happens in school, I quit thinking about it." *Function*: Remove oneself from a threatening situation (in ways that foster disengagement).
Helplessness	Stress reaction in which thoughts or next steps become unclear or disorganized. *Item example*: "When I run into a problem on an important test, I get all confused." *Function*: Sustain engagement in a threatening situation (even when the regulatory system is overwhelmed).
Social isolation	Attempts to avoid others or prevent them from finding out about the occurrence of negative events. *Item example*: "I don't let anybody know about it." *Function*: Protect social resources when threatened.
Delegation	Feeling sorry for oneself and one's tribulations; over-reliance on others. *Item example*: "I ask myself, 'Why is this always happening to me?'" *Function*: Deal with threats (even though one's own resources are exhausted).
Submission	Preoccupation with the negative or anxious features of a stressful situation. *Item example*: "When something bad happens at school, I can't get it out of my head." *Function*: Concede to environmental threats (in ways that create internal pressure).

Table 27.1 (*cont.*)

Family	*Definition, item example, and function*
Opposition	Blaming other people for the negative outcome. *Item example*: "I say it was the teacher's fault." *Function*: Resist environmental threats (in ways that amplify the experience of coercion).

reliance on maladaptive ways of coping declining as the use of adaptive strategies increases. However, these trends seem to be reversed across the transition to middle school during early adolescence. Even though students on balance continue to favor adaptive over maladaptive responses, adaptive coping drops abruptly while maladaptive coping spikes. Across middle and late adolescence, problematic trends come to an end: Coping seems to plateau and students appear to once again build on adaptive families, like support-seeking and problem-solving. However, coping never recovers to preadolescent levels. Given the links between students' coping and their engagement and tenacity in the face of

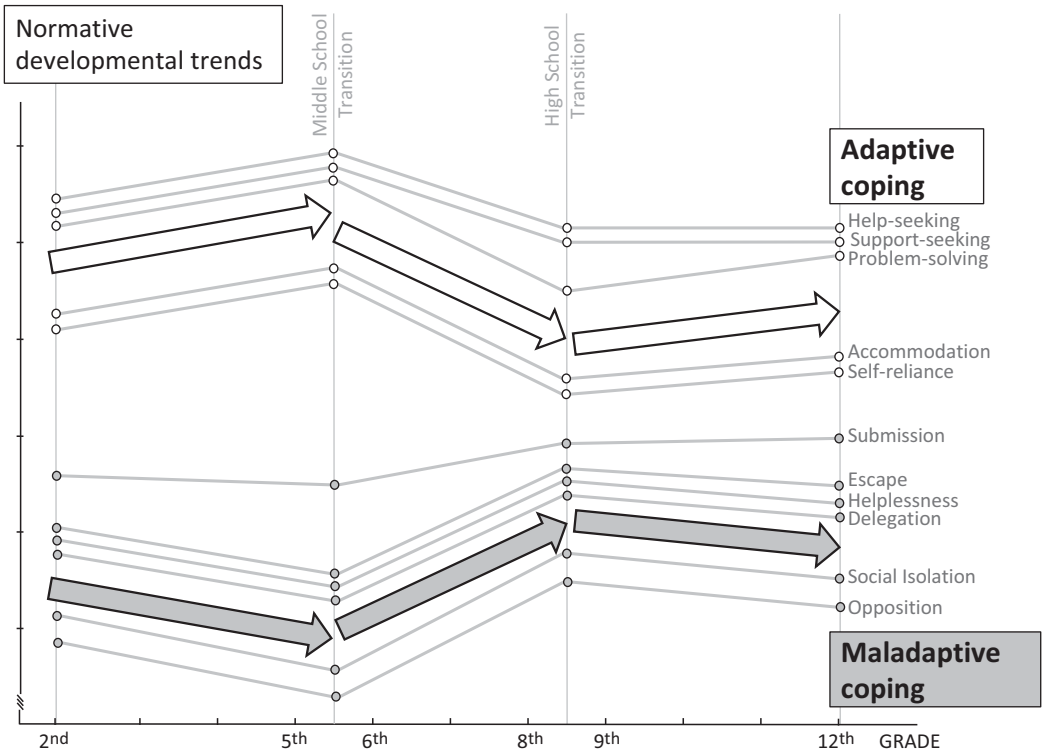

Figure 27.2 A general depiction of normative developmental trends in academic coping, in which coping shows a peak and decline in functioning from the beginning of elementary school until the end of middle school, followed by stability and some recovery across high school. (Adapted from Skinner & Saxton, 2020).

academic challenges, it is possible that these normative developmental patterns represent risk factors for disaffection, dropout, or decisions not to continue on to higher levels of education. Such trends, if they are widespread, suggest that parents, teachers, and program designers have their work cut out for them in trying to support developmental trajectories of coping that are more positive than the ones documented normatively thus far.

Purpose of This Chapter

Although research on academic coping, as it has been conceptualized and studied to date, has been helpful in uncovering these developmental problems, it is limited in its capacity to generate solutions. It cannot pinpoint the issues that contribute to these worrisome developmental trends or suggest antidotes for how such changes can be prevented or counteracted. We argue that the basic impediment at the root of the field lies in its conceptualization of coping. In the academic domain, as in most areas of coping, conceptualizations are dominated by transactional models (e.g., Lazarus & Folkman, 1984). These models were constructed to depict individual differences in the processes through which adults cope with stressful and traumatic life events, such as health crises, victimization, or bereavement. They were never intended to capture coping in children and youth as they learn to deal with everyday stressors in the contexts of daily life.

For the most part, adults have the capacities they need to cope constructively with stressors; children decidedly do not. For example, if problem-solving represents a way of coping helpful for dealing with a range of stressful situations, adults have the cognitive and metacognitive tools they need to employ it. Young children do not yet possess all these skills, and their capacities continue to develop across childhood, adolescence, and even into emerging adulthood. All of the ways of coping described as core categories (see Table 27.1) involve sets of underlying capacities and skills; and they are all developing as students move through their educational careers. Hence, the task of nurturing a repertoire of constructive strategies for coping with scholastic demands requires more than an understanding of individual differences. It requires an understanding of the development of academic coping.

Our primary purpose in this chapter is to present a multi-level systems conceptualization of academic coping, which we argue is more "developmentally friendly" (Skinner & Zimmer-Gembeck, 2007, 2016). To illustrate its utility, we explore five ways a systems view can offer insights about how social partners and ecologies can foster the healthy development of students' academic coping. These lessons touch on the development of regulatory and motivational processes, and since coping is seen as deeply social, the interaction partners, classrooms, and higher-order contexts that shape academic coping. In the process, we hope to contribute to a shift to more developmental and systems-oriented conceptualizations of academic coping, which we believe can better inform intervention efforts and guide future study of this important process.

Developmentally Friendly Conceptualizations of Coping

Over the last two decades, researchers focusing on childhood and adolescence have constructed conceptualizations of coping that are "developmentally friendly" (Compas et al., 2001; Coping Consortium, 1998; Eisenberg et al., 1997; Skinner & Wellborn, 1994; Skinner & Zimmer-Gembeck, 2007; Wolchik & Sandler, 1997), organized around two primary propositions. First, coping is defined as "action regulation under stress" (Compas

et al., 1999; Skinner & Wellborn, 1994). Building on standard transactional definitions of coping as "constantly changing cognitive and behavioral efforts to manage specific external and internal demands that are appraised as taxing or exceeding the resources of the person" (Lazarus & Folkman, 1984, p. 141), developmental conceptualizations ask: What are the processes whereby individuals are able to "manage" internal and external demands? These are viewed fundamentally as processes of *regulation*. From this perspective, academic coping encompasses the regulatory processes students need to manage emotional, attentional, motivational, cognitive, and behavioral responses when they encounter educational challenges and problems.

Consistent with dual-process models of regulation (Bridgett et al., 2015; Cole et al., 2018; Compas et al., 2014; Laurent, 2014; Nigg, 2017), coping entails (1) *action tendencies*, which refer to immediate spontaneous reactions to stressful situations (e.g., the impulse to engage or flee; these have also been referred to as stress reactivity); and (2) *action regulation*, which describes how people manage (i.e., mobilize, guide, energize, direct) these action tendencies under stress. From this perspective, the actual coping seen on the ground in everyday life reflects a balance between reactivity and regulation, with maladaptive coping the result of extreme stress reactivity combined with weak or disabled regulatory capacities; and adaptive coping the product of more constructive action tendencies and/or better developed regulatory capacities.

Coping as a Multi-level Adaptive System

The second proposition of developmentally friendly conceptualizations is that processes of reactivity and regulation are part of a complex adaptive system – the coping system (Skinner & Zimmer-Gembeck, 2007, 2016). The goal of this system is *adaptation*, meaning that it functions to detect, appraise, react to, deal with, and learn from the actual challenges, demands, and problems individuals encounter in their daily lives. Coping appraisals and responses emerge from this larger coping system, which operates on multiple levels, both above and below the plane of action where observable coping episodes unfold. Transactional models of coping highlight the level of action; systems views add processes underlying these actions as well as the social contexts in which coping actions are embedded. These are all considered parts of the larger system because they work together to generate the coping actions seen on the ground.

This systems conceptualization, pictured in Figure 27.3, views coping as a bio-psycho-socio-cultural process that unfolds across five levels (Skinner & Zimmer-Gembeck, 2016). The first is the *neurophysiological level*, which includes neurobiological subsystems, such as the amygdala and the hypothalamic-pituitary axis (HPA), that participate in organizing threat detection, appraisal, stress reactions, regulation, and learning during anticipated or experienced stressful transactions. These subsystems enable and constrain the functioning of higher levels, and also develop over time. An understanding of these neurophysiological processes is especially important in making sense of the coping of students who have a history of early adverse experiences, since one way such experiences can influence development is by reprogramming these biobehavioral systems (e.g., Boparai et al., 2018; Engel & Gunnar, 2020). The second is the *psychological* level, which entails the subsystems (attentional, emotional, motivational, behavioral, volitional, cognitive, and metacognitive) that create the stress reactivity (e.g., emotional distress, distracted attention, motivation to flee)

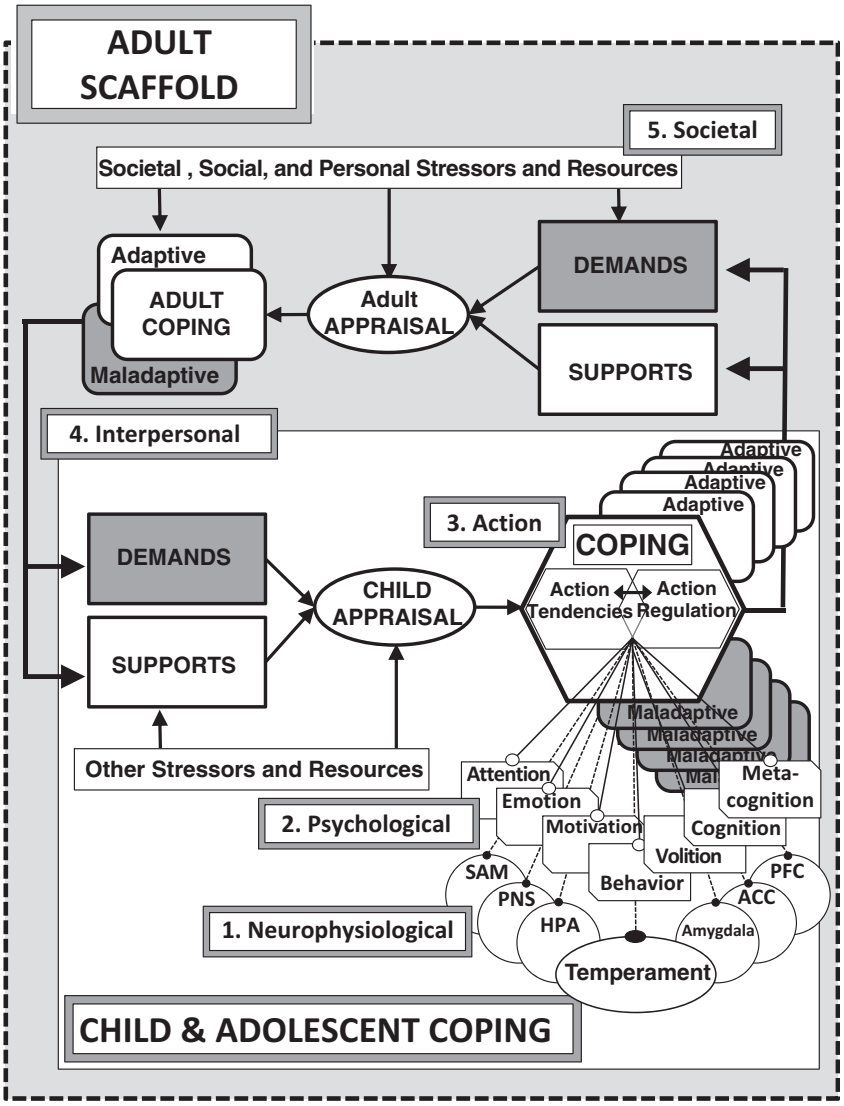

Figure 27.3 An integrative multi-level conceptualization of coping as a biopsychosocial process that operates at five levels: (1) the *neurophysiological level*, including psychobiological subsystems used to detect and react to stress and to regulate stress reactivity, most centrally, the sympathetic-adrenal medullary (SAM) axis, the parasympathetic nervous system (PNS), the hypothalamic-pituitary axis (HPA), the amygdala, and the prefrontal cortex (PFC), especially the anterior cingulate cortex (ACC); (2) the *psychological level*, including the attentional, emotional, and motivational subsystems involved in stress reactivity and regulation; (3) the *level of action*, including the behavioral, cognitive, and metacognitive subsystems that jointly generate action tendencies and that integrate and regulate them; (4) the *interpersonal level*, including participation in coping by social partners as well as interpersonal relationships (such as with caregivers, extended family, friends, peers, and teachers) that create the interpersonal matrix within which the structure and functioning of coping's many subsystems develop; and (5) the *societal level*, including the demands that specific niches within society allow to impinge on children and adolescents as they develop and the supports that are available to them, as well as the societal stressors and resources that influence their social partners and contexts, like neighborhoods, homes, and schools. (Adapted from Skinner & Zimmer-Gembeck, 2016).

that the regulatory system needs to organize in the face of demanding or stressful encounters. Coping must coordinate the impulses these subsystems urge in order to assemble actions that are sequentially coordinated with internal and external conditions. The third level is the plane of *action*, and here are located the action tendencies urged by underlying neurophysiological and psychological processes, as well as the behavioral, cognitive, and metacognitive regulatory systems that generate appraisals and integrate these tendencies into coping actions. This is the level at which information from the study of different kinds of regulation can inform work on coping. For example, research on the normative development of regulatory capacities (e.g., Cole et al., 2018; Diamond, 2002; McClelland et al., 2015) may help explain some of the age-graded trends documented in studies of academic coping.

The fourth level is *interpersonal*. From this perspective, other people are part of a student's larger coping system. Social partners (such as caregivers, teachers, peers, and friends) participate directly and indirectly in students' coping, and these interpersonal relationships create the social worlds within which coping's many neurophysiological, psychological, and regulatory subsystems develop. This level incorporates studies that examine how social partners both promote and undermine the healthy development of coping. The fifth level comprises the *societal* plane, and involves the resources and risks that societal forces drive into the stratified niches occupied by children and adolescents. Higher-order contexts shape the pathways students' coping will take both directly, based on the stressors and supports that reach them, and indirectly, because they enable and constrain the efforts of their social partners and the quality of their local contexts (i.e., schools and homes; Spencer, 2006; Wadsworth et al., 2018). In sum, we argue for a developmental systems conceptualization that defines coping as "action regulation under stress," and embeds it in a larger coping system that includes multiple levels below (neurophysiological, psychological) and above (interpersonal, societal) the plane of action where coping episodes unfold. At its most general, then, coping can be seen as a multi-level integrated adaptive system that shows regular age-graded shifts from birth to late adolescence.

Fostering the Development of Academic Coping: Five Lessons from a Systems View

A systems perspective highlights both challenges and potentials in nurturing the healthy development of academic coping. It offers researchers, educators, parents, and interventionists a view of the complex task students face in trying to cope constructively; it also provides them a multi-level menu of processes that can be used as levers to support the development of coping. To illustrate the utility of this approach, the remainder of the chapter explores five insights it can offer about how social partners and ecologies can promote the development of adaptive and counteract maladaptive coping (see Table 27.2). First, starting at the level of action, we summarize research on the development of self-regulation, tie it to qualitative shifts in coping during childhood and adolescence, and consider how support for the executive processes involved in regulation offer a pathway to nurture coping. Second, we turn to the psychological level, where we briefly outline what is known about the development of one psychological process, motivation, show how it may help explain some of the normative changes apparent in academic coping, and offer key ideas for how supporting students' motivation may also bolster their coping. Third, moving to the interpersonal level, we review research on the role

Table 27.2 *A multi-level systems view on how to nurture the development of academic coping*

1. ***Level of action***. To foster academic coping, social partners can work to strengthen "hot" regulatory capacities.
   - The development of regulatory processes starts at birth and undergoes successive qualitative shifts before and after children start school, including the emergence of voluntary self-control during early childhood.
   - Multiple processes contribute to regulation (e.g., language, attention, memory) and they can be used to support its development and to explain why students differ in their regulatory capacities.
   - Across childhood, regulatory abilities become more complex, efficient, internalized, and situationally attuned; however, regulation in "hot" (stressful) situations is more difficult at every age and is slower in its developmental progression.
   - Despite normative improvements, increased sensitivity to "hot" events (rewards, risks, social interactions) during early adolescence typically triggers a dip in regulatory functioning.
2. ***Psychological level***. To foster academic coping, social partners can support underlying motivational processes that promote constructive action tendencies and autonomous regulation.
   - Motivation influences coping by shaping students' appraisals of stressful events (e.g., perceptions of control).
   - Intrinsic motivation and autonomous extrinsic motivation can contribute to constructive action tendencies and infuse regulation with energy, direction, and tenacity.
   - Academic tasks and learning environments that tap intrinsic motivation and nurture the development of autonomous extrinsic motivation can support academic coping.
   - The normative development of academic coping follows the same trajectory as age-graded changes in academic motivation and engagement: progress across primary school, drops during early adolescence, and some recovery over the high school years.
3. ***Interpersonal level:*** Social partners (e.g., caregivers, extended family, teachers, peers) are part of the coping system.
   - They participate directly on the ground – before, during, and after coping episodes.
   - They contribute to the local contexts where students cope, and communicate the meaning of academic struggles and stressful encounters.
   - They support the development of the regulatory, psychological, and neurophysiological processes that feed into students' coping from the bottom up.
4. ***Societal level.*** Higher-order societal forces influence the developmental pathways that students' academic coping will take.
   - Structural forces (e.g., educational, economic systems) constitute and organize the schools, homes, neighborhoods, and communities students inhabit, creating stratified niches for diverse students.
   - Marginalized families and communities prioritize children and youth and enact adaptive cultural practices that protect and nurture their development and resilience.
   - Societal factors shape the immediate ecologies where students' academic coping takes place, and the resources their social partners, like parents, teachers, and peers, can access to support them in their coping efforts.
   - Higher-order forces can inform the design of interventions to support academic coping by transforming social systems; building pillar-like supports in schools and neighborhoods to lift these forces off students' development; and creating culturally attuned local interventions that foster a positive identity and collective action for social justice.

5. ***Developmental systems.*** The coping system is reciprocal, dynamic, and nonlinear.
   - Students' coping transactions feed back to influence the social relationships, stressors, and supports they experience as well as the underlying regulatory, psychological, neurophysiological subsystems that give rise to academic coping.
   - These reciprocal loops can create virtuous and vicious cycles that shape trajectories of academic coping, and cumulatively can contribute to qualitative shifts in how the larger coping system is organized.
   - The role of social partners in academic coping shows qualitative shifts as students develop and progress through their academic careers: A coping system that is initially organized by external co-regulation or co-coping with social partners shifts its center of gravity to coping that is increasingly intrapersonal, agentic, and autonomous.

of social partners in students' academic coping, highlighting the many ways that other people, like parents, teachers, and peers, participate directly in multiple steps of the coping process. Fourth, we move up to the societal level and discuss the ways in which efforts to support the development of students' coping can consider and incorporate higher-order macrosystem forces. Finally, we provide examples of what it means to look at coping as a reciprocal, dynamic, and nonlinear process. We believe that a multi-level integrated conceptualization of academic coping can scaffold a multi-systemic integrated approach to supporting its healthy development (e.g., Masten et al., 2021).

1. Level of action. A key way to foster the development of academic coping is by strengthening "Hot" regulatory capacities

A definition of coping as action regulation under stress ties coping to large bodies of empirical work on different kinds of regulation, including research on self-regulation and self-regulated learning, adaptive help-seeking, and the regulation of behavior, emotion, attention, and motivation (Cole et al., 2018; Compas et al., 2014, 2017; Duckworth et al., 2016; McClelland et al., 2015; Nigg, 2017; Skinner & Zimmer-Gembeck, 2016; Thompson, 2015). Figure 27.4 provides an overview of the overlap between some of these areas and the processes included as core categories of academic coping. As depicted by the shaded background in this figure, the subset of regulatory processes of greatest interest to coping are those that operate under stress. Regulation researchers sometimes call these conditions "hot" because emotions are high and goals are at stake (e.g., Metcalfe & Mischel, 1999; Zelazo & Carlson, 2012). Stressful transactions that engage coping are by definition "hot," although it is possible to argue that when students' difficulties with their schoolwork shift from experiences of challenge to ones of threat, encounters get even "hotter." Research on regulation serves two important functions for efforts to support the development of academic coping. First, it helps explain why coping can be so challenging for students. Second, because studies paint a picture of how and why these different kinds of regulation change with age, they can suggest strategies to foster the development of academic coping at different points in students' academic careers.

Challenges of Academic Coping and Regulation

Models of self-regulation help interventionists understand the challenges inherent in the task

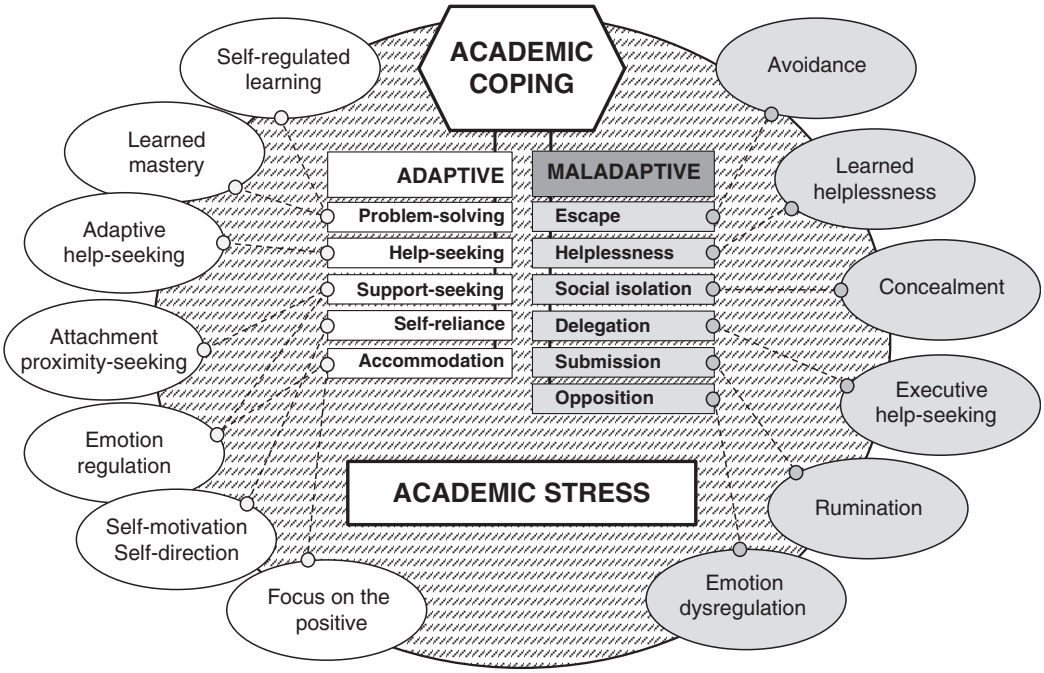

Figure 27.4 Academic coping as part of a network of regulatory processes that depict students' action when dealing with stressful academic tasks. Academic coping is embedded in academic stress (as indicated by the shaded circle in the background), so the strands of work from each area that will be most useful are those that examine the operation of the specific regulatory process under conditions of academic stress (as shown in the overlaps between each oval and the shaded circle). (Adapted from Skinner & Saxton, in press).

of coping by placing it in the larger arc of episodes organized around academic work (see Figure 27.5). Coping is called into action when the flow of students' participation in educational tasks is interrupted by challenges or problems. When demanding transactions (sometimes called conflict or resistance) exceed students' routine responses, action tendencies are triggered. These compelling urges to act (also called prepotent responses, reactivity, or impulsigenic processes) are implicit, stimulus driven, and involuntary. Such rapid responses, which do not require mental resources, are generally adaptive because they prepare students to deal with stressful encounters; for example, they can boost effort and support tenacity. However, action tendencies are not always constructive. They may spontaneously create compelling urges to disengage, escape, or fight back. Such reactions are closely tied to underlying stress neurophysiology, which is why, for students with a history of early-life adversity, stress is especially likely to trigger unproductive impulses.

When action tendencies cannot resolve stressful transactions on their own – either because boosting efforts is not enough or because action tendencies are preparing students to respond maladaptively – regulatory processes are needed. Such top-down processes, which are subjectively deliberate, slow, sequential, capacity-limited, and require working memory to operate (Cole et al., 2018; Nigg, 2017), introduce a second stream

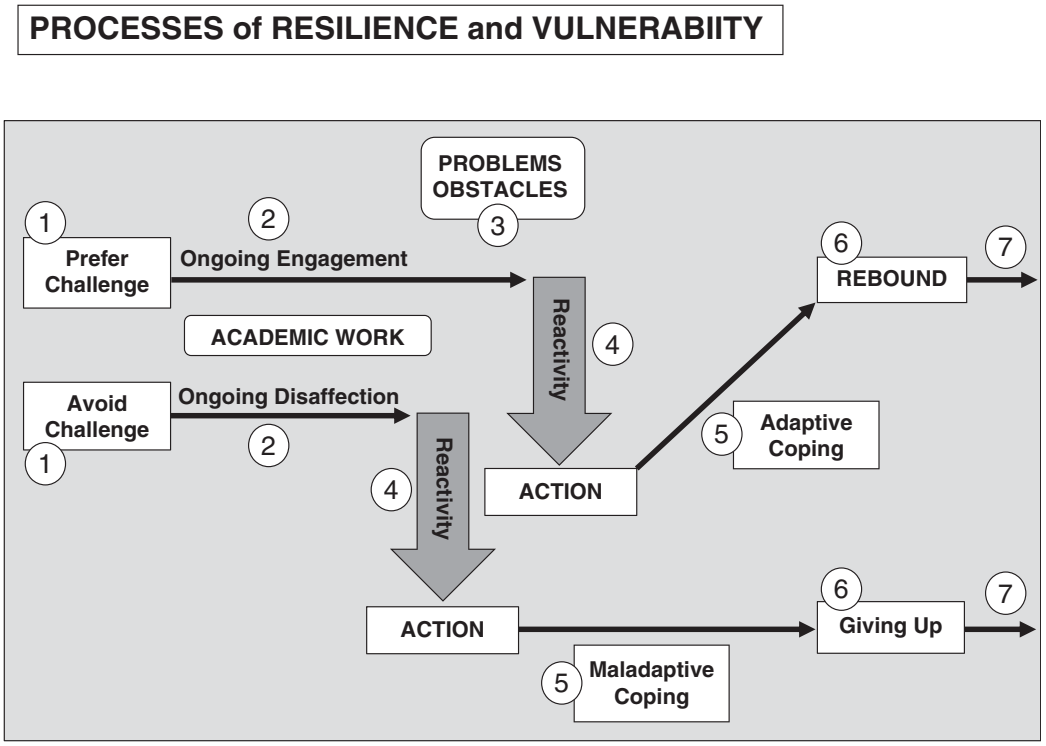

Figure 27.5 An episodic account of seven steps in the internal dynamics of motivational resilience and vulnerability in which (1) students either undertake or avoid challenging academic tasks and then (2) during ongoing engagement and disaffection with academic work, students (3) encounter problems or obstacles that exert a downward pressure on their motivation and (4) generate reactivity. In turn, through (5) a variety of regulatory and motivational processes, students either (6) rebound and reengage in learning activities or they withdraw, forfeiting opportunities for learning and satisfaction, which (7) feeds forward into subsequent episodes of task choice and engagement. (Adapted from Skinner et al., 2020).

of influence on actions that interacts with the bottom-up forces that shape action tendencies. It is as if these executive processes create a place *above* action (i.e., the cognitive plane) where students can hold alternative goals in mind (using working memory), shut down distracting action tendencies (using behavioral inhibition), and switch attention away from prepotent goals and toward alternatives (using executive attention).

To productively reengage with challenging academic tasks, students must use their burgeoning volitional capacities to bolster, curb, or redirect prepotent action tendencies. Coping (i.e., regulatory strategies, see Figure 27.4) represents tools that students can use to attempt this. Adaptive strategies allow students to more effectively deploy actions (e.g., via problem-solving, strategies of self-regulated learning, or other modes of organizing and sequencing behavior) and support motivation (e.g., via self-encouragement and commitment). Students regulate their action not only via their own cognitive and behavioral processes (like problem-solving or self-talk), but also through accessing "extrinsic" regulatory resources from trusted others (e.g., via help or comfort-seeking).

In some cases, however, these developing behavioral and cognitive regulatory tools are no match for the action tendencies generated by stress. Then, prepotent responses can take over, and students may flee (e.g., via escape) or "fight" (via venting or blaming others), shift into self-protection (e.g., via concealment or self-pity), or fall into rumination, confusion, or helplessness. As can be seen in Figure 27.5, some ways of coping (or regulation) lead students back to constructive reengagement with academic tasks and some make disengagement and disaffection more likely. From this perspective, coping responses observed on the ground are locations where prepotent stress reactions meet regulatory forces. Therefore, poor coping can be a regulatory issue – the product of extremely strong stress reactions and/or immature or incapacitated regulatory systems. As a result, research on regulation that can explain the nature and development of these regulatory processes is of great interest to those studying and supporting academic coping.

Qualitative Shifts in the Development of Regulation and Academic Coping

One way to uncover the forces that shape normative age-graded shifts in academic coping is to analyze how underlying regulatory processes themselves develop and converge during different developmental periods. In general, the development of self-regulation is a lifelong process that proceeds through multiple qualitative stages, and is scaffolded at every step by social relationships and contexts (e.g., McClelland et al., 2015; Nigg, 2017). It begins already before birth, as underlying neurophysiological and temperamental foundations are laid down prenatally that will eventually make the task of self-regulation (and coping) easier or harder (e.g., Skinner & Zimmer-Gembeck, 2016). The fundamentals of executive processes, such as attention and working memory, are present in newborns but they undergo qualitative transformations as infants and toddlers develop (Brownell & Kopp, 2007; Kopp, 1989). The healthy progress of these biobehavioral subsystems, such as the emergence of executive attention and the expansion of working memory capacity, is dependent on experiences in safe and rich social and physical worlds, including dependable care, secure attachments, and opportunities for stimulating interactions (Boldt et al., 2020; Pallini et al., 2018).

Early Years

Even with these nurturing conditions, however, executive processes do not coalesce as a force that has the capacity to make a dent in prepotent responding until the third year of life, when the developmental task of self-regulation becomes central (e.g., Diamond, 2002; Kopp, 1989; Zelazo et al., 2008). A key process that contributes to its emergence is the development of representational capacities in language (McClelland et al., 2015). As children learn to "use their words" to express desires and feelings, they can discuss and reflect on these motivational and emotional states, consider alternative goals suggested by others, employ words to take on those goals, and encourage themselves to focus on and enact these new behaviors. During early childhood, regulation undergoes perhaps its most important qualitative shift – it becomes voluntary (Brownell & Kopp, 2007; McClelland et al., 2015). This can be considered a shift from self-control or compliance based on co-regulation with adults to genuine self-regulation, initiated by an autonomous and agentic self. Again, the normative development of all of these neurocognitive processes is shaped by the quality of home and preschool contexts. Young children learn and exercise their regulatory capacities when they have

structured opportunities to follow routines and rules, respond to adults' requests for appropriate behaviors, and constructively negotiate interpersonal friction with peers. The transactions most relevant to coping are those, like emotion regulation, that take place in hot situations, involving young children's emotions, goals, and conflicts with others (e.g., Thompson, 2015).

Despite these normative trends, the developmental timing of the emergence and growth of such executive processes varies dramatically across children, based on temperament, other neurophysiological factors, and the nature of early experience. Given the centrality of language, attention, and working memory to executive processes, students who have attention difficulties or delays in language or cognition (which sometimes result from early experiences of adversity) will likely need additional support for self-regulation and coping. As a result, even before the first years of formal schooling, children show a wide range of regulatory capacities, and these differences are robust predictors of subsequent educational success (Duckworth et al., 2019; McClelland & Cameron, 2011), across levels of contextual risk (Distefano et al., 2021). As a result, executive processes, and self-regulation more generally, are often the targets of preschool programs designed to promote school readiness (Bierman et al., 2008; Blair, 2016; Blair & Raver, 2015; Diamond & Lee, 2011; Ursache et al., 2012). To the extent that they target hot regulatory capacities, these programs may also provide support for the development of academic coping.

Primary School Years

By the time they start formal schooling, children's regulatory capacities have already undergone multiple transformations, but they still have access only to basic executive processes (McClelland et al., 2015). Starting in middle childhood, students begin to strengthen and build on these capacities, combining them into higher-order regulatory processes like action-oriented problem-solving. Research on the development of regulation documents a hierarchy of executive processes (Best & Miller, 2010; Nigg, 2017), and these continue to show progress all throughout primary school, becoming increasingly more differentiated, complex, and context independent. A key transformation during middle childhood is the "cognitive revolution" – when self-regulatory strategies that were previously expressed as actions become more and more "cognitivized," that is, reconstructed on the psychological plane (Holodynski & Friedlmeier, 2006; Skinner & Zimmer-Gembeck, 2016). As a result, students have access to new regulatory capacities – for example, they begin to be able to intentionally reappraise stressful events in ways that shape their emotional reactions and coping choices. This allows them to integrate their emotional and motivational urges (now also accessible to cognitive reflection) with their executive processes, making self-regulation smoother, more autonomous, and less effortful. These developments also enable the emergence of more complex executive processes, like strategizing, sequencing, and planning.

The Middle Years of School

Starting in early adolescence, metacognitive capacities emerge, allowing more advanced forward-looking executive processes that can encompass longer-term goals and anticipate problems. These newfound capacities also permit students to more deliberately and flexibly use executive processes to coordinate their actions with the changing demands and resources available in specific situations. Coping capacities become more organized and flexible as these regulatory abilities emerge and are consolidated (Skinner & Zimmer-

Gembeck, 2016). The general picture seems to underscore developmental advances, but it is important to note that the hot regulatory processes used for coping are more challenging for children and youth to employ at all ages and also develop more slowly across the entire age range (Botdorf et al., 2016; Cohen et al., 2016). Early adolescence, especially, seems to be a time when heightened emotional and motivational sensitivity to certain hot environmental events, like rewards, threats, and social relationships, creates internal challenges to regulatory capacities and results in dips in self-regulatory functioning despite steady improvements in executive capacities (e.g., Casey, 2015; Cohen et al., 2016; Steinberg et al., 2017). In fact, some researchers propose that such heightened emotional and motivational reactions provide opportunities for adolescents to exercise and strengthen their growing regulatory and coping "muscles" under these hot conditions (Casey, 2015; Skinner & Zimmer-Gembeck, 2016).

The Development of Self-Regulated Learning and Help-Seeking

Research on self-regulated learning (SRL) and adaptive help-seeking pick up the thread of regulation at the end of childhood and extend it all the way through emerging adulthood (Karabenick & Gonida, 2018; Schunk & Zimmerman, 2013). Self-regulated learning, which embeds regulation in educational activities, refers to "the cyclical processes through which learners organize and direct their behavior, actions, and thoughts in order to attain specific goals" (White & DiBenedetto, 2018, p. 208). Self-regulated learning that takes place during stressful or hot academic tasks overlaps with academic coping (Pintrich et al., 1993). A primary goal of research on SRL has been to identify a range of learning strategies children and youth can use to plan, guide, reflect on, and improve their learning (Schunk & Zimmerman, 2013). The identification of learning strategies expands our understanding of the members of the problem-solving family of coping, but their use is cognitively demanding: The strategies themselves (e.g., concept mapping) are cognitively complex; their acquisition entails a protracted effortful process (e.g., Zimmerman & Cleary, 2009); they require metacognitive capacities to deploy (e.g., awareness of whether one has learned the material or needs help); and students must use their developing volitional capacities to get themselves to enact them, also based on a protracted process of internalization (Zimmerman & Schunk, 2011).

Across all the years of school, these complex cognitive and metacognitive capacities, which overlap with advanced executive processes, show regular age- and experience-graded progress as children and youth learn and then become able to apply these cognitive strategies more efficiently (as they become routinized), effectively (as students can better match strategies to tasks), and flexibly (as they modify and combine them), resulting in qualitative shifts from lower-level strategies (e.g., re-rereading) to ones involving deeper processing (like summarizing; Alexander et al., 1998). Although little research has explicitly examined age-graded developments in SRL, researchers generally agree that by late adolescence, students typically have the capacity for more refined use of SRL due to their ability to set appropriate proximal and distal goals, more accurately estimate competence, utilize more efficient and flexible cognitive strategies, delay gratification, and effectively regulate their affective responses to academic tasks (Wigfield et al., 2011). However, as they enter adolescence, students nevertheless evince *declines* in the performance of these actions – they show decreases in both help-seeking and self-regulated learning (e.g., Ryan et al., 2001).

These surprising trends, which parallel declines in academic coping, have led researchers to conclude that a full account of SRL and help-seeking must go beyond the examination of cognitive and metacognitive executive processes (e.g., Zimmerman & Schunk, 2009).

Summary: Development of Regulatory Capacities and Academic Coping

Viewing coping as action regulation under stress allows researchers to benefit from research on the development of self-regulation and self-regulated learning. Although distributed over multiple areas, studies converge on a picture of age- and experience-graded changes in the capacities of children and youth to self-regulate, and hence to cope with academic challenges and problems. This work suggests, first, that academic coping can be challenging. The regulation it entails requires children to use complex and effortful executive processes to intervene in (sometimes unproductive) impulses generated by deep-seated neurobiological and psychological subsystems. Constructing the coping capacities and tools needed to accomplish this task under stressful conditions represents a protracted developmental process. Second, the development of academic coping relies on the healthy development of a range of regulatory processes – like language, memory, attention, problem-solving, reflection, cognition, and metacognition. An important way families, practitioners, and interventionists can prepare students to cope adaptively is to support the early development of these processes, already in preschool (McClelland & Cameron, 2012; Ursache et al., 2012) or even before (Blair & Raver, 2015).

Third, across the primary and secondary school years, the dominant picture is one of progress as the regulatory capacities of children and youth become more complex, internalized, efficient, and tailored to internal and external conditions (Diamond, 2013; Carlson et al., 2013). In fact, these normative advances in executive capacities may underlie the positive age-graded changes in coping seen during early school grades. Despite students' burgeoning regulatory capacities, however, starting in early adolescence, adaptive coping drops and maladaptive reactions rise. These trends parallel findings for self-regulated learning (e.g., Zimmerman & Schunk, 2009), suggesting that an understanding of the development of regulatory capacities is not sufficient to explain the development of academic coping.

2. Psychological level. A key way to support the development of academic coping is by nurturing underlying motivational processes

Transactional models generally acknowledge the importance of motivation in explaining individual differences in coping, as is apparent in research on academic coping, where predictors are often drawn from motivational theories (see Figure 27.1). For example, studies indicate that students with higher self-efficacy and more mastery-oriented goals are more likely to appraise setbacks in educational tasks as challenges rather than threats and to utilize adaptive coping responses like effort exertion and strategizing (Skinner & Saxton, 2019). Developmental systems conceptualizations expand the incorporation of motivational processes by considering their role in both action tendencies and regulation, and exploring their development as a potential force underlying age-graded changes in academic coping. The central idea is that motivational processes can promote constructive action tendencies and infuse regulation with energy, direction, and tenacity. As a result, normative losses in motivation can undermine adaptive coping.

Intrinsic Motivation and Action Tendencies

A first way motivational processes shape coping is through their effects on students' action tendencies. Almost without exception, theories of self-regulation endorse a dual-process model that, as described previously, includes (1) bottom-up prepotent impulses and (2) top-down executive processes. Studies of self-regulation, however, focus almost exclusively on the functioning and development of executive processes; much less research has been dedicated to understanding the origins of action tendencies (Duckworth & Steinberg, 2015). Theories that do focus on these processes tend to label them as "impulsive" or "impulsigenic," emphasizing their role in interfering with more appropriate goal-directed behaviors and undercutting self-control (see Sharma et al., 2014, for a review).

Theories of motivation, which by definition focus on the energy, direction, and persistence of human action (Ryan, 2012), take a very different view. They consider such impulses (or, as action theory would label them, such action tendencies) as developmentally adaptive. From this perspective, humans come with an innate source of energy, sometimes called *intrinsic motivation*, that from birth propels an active curious intentional neonate and later an inquiring agentic busy toddler into exploration, learning, and focused interactions with the social and physical worlds. These interactions are goal-directed, in that even during their first years children have ideas about what they would like to accomplish (e.g., get all the tissues pulled out of the box before Mom arrives), but goal-directed actions are not yet steered by voluntary executive processes. Instead, they are guided by the intrinsic motivation system, which can be referred to colloquially as the "yum" and "yuck" system because it creates compelling urges (i.e., action tendencies) to approach interactions that are attractive (e.g., interesting, delicious, fun, enjoyable – "yum") and to withdraw or avoid interactions that are repulsive (e.g., worrisome, boring, frustrating, disgusting – "yuck"; Skinner & Zimmer-Gembeck, 2016). These bottom-up emotional and motivational systems, scaffolded first by implicit and then by explicit appraisals, are decidedly good news. They fuel the hundreds of thousands of interactions through which children learn and develop, moving them toward constructive and away from dangerous encounters, and keeping them engaged despite obstacles and setbacks.

Research in the academic domain confirms the importance of intrinsic motivation to students' engagement, learning, and achievement (Taylor et al., 2014). Despite its central role, however, longitudinal studies indicate that motivation for learning in school generally declines, starting in late middle childhood or early adolescence (Scherrer & Preckel, 2019). Hence, to promote the development of optimal academic coping, children need support to maintain intrinsic motivation and to bias it toward action tendencies that are constructive, that is, toward prepotent responses that are active, curious, interested, cooperative, and prosocial, even in the face of greater and greater educational demands. Such a bias is introduced via early experiences in calm, loving, dependable, and stimulating environments that dial down neurophysiological subsystems that subserve stress reactivity (e.g., HPA axis, amygdala) and buffer them with secure attachment relationships (Hostinar et al., 2014). To the extent that their initial reactions to academic challenges are positive and fueled by intrinsic motivation, students' regulatory systems have much less work to do. The task of coping becomes less one of pushing an unwilling rock up a steep hill, and more of channeling enthusiasm, fine-tuning strategies, and getting help from trusted others when needed.

A systems view, which highlights the motivational processes underlying regulation (see Figure 27.3), identifies the maintenance of intrinsic motivation and the development of positive action tendencies as crucial building blocks in the development of constructive academic coping. From this perspective, educators and program developers should carefully attend to the kinds of academic tasks students are asked to undertake. Educational activities that tap intrinsic motivation include those that are project- or problem-based, cooperative, fun, interesting, enjoyable, connected to community concerns, and relevant to students' everyday lives and individual passions. Such academic tasks naturally fuel engagement and tenacity, and provide rich opportunities for students to exercise and strengthen their regulatory and coping muscles. For example, in a study of sixth through eighth graders, teachers' use of motivating tasks (interesting classroom activities and assignments) was associated with higher use of strategizing and lower use of projection, suggesting that keeping tasks interesting may have increased the overall ratio of resources to demands students were experiencing (Subasi & Tas, 2016).

Extrinsic Motivation and Autonomous Regulation

A second way motivational processes contribute to academic coping is through their effects on the development of autonomous regulation. In contrast to the study of motivation that is intrinsic, much research focuses on *extrinsic motivation*, that is, on how to motivate students to engage in educational activities where no spontaneous interest or desire exists. Participation in these tasks, because prepotent responses are at best neutral (and, at worst, urge avoidance), requires effortful regulation. One of the most useful accounts of the development of extrinsic motivation is provided by self-determination theory (SDT; Ryan & Deci, 2000, 2020), which is centered on the notion of *autonomy*, defined as the experience of volition or willing endorsement of one's own actions. The alignment between one's actions and one's genuine desires creates a feeling of authenticity, authorship, or ownership (i.e., autonomy) that taps into underlying motivational energy, and so fuels constructive engagement, commitment, well-being, and productive persistence (Ryan & Deci, 2017).

From this perspective, both intrinsic and extrinsic motivation can be autonomous. Intrinsic motivation is inherently autonomous, since people willingly engage in tasks they find fun and enjoyable. And educators can hitch a ride on this energy by embedding extrinsically motivated tasks (like memorizing math facts) into intrinsically motivating formats (like games) or projects that require them (like running a store). However, extrinsic motivation itself can become autonomous, when students internalize the value of certain activities and so willingly endorse their participation in them. According to SDT, the process of internalization proceeds along a gradient from heteronomous to autonomous, starting with (1) *amotivation*, or absence of energy or desire; and moving to regulation that is (2) *external*, based on pressures or threats from others (e.g., "because my teachers make me"); to (3) *introjected*, based on pressures from the inside (e.g., "because I would feel bad about myself if I didn't"); to (4) *identified*, based on internalized values (e.g., "because it is personally important to me"). When the value and importance of tasks are thoroughly internalized, participation becomes autonomous. Such volition contributes to more constructive action tendencies, and regulation requires less energy because engagement is willingly endorsed. This connection is underscored by multiple studies documenting a link between

students' autonomy orientations and their coping – with an identified orientation showing positive connections to adaptive and negative connections to maladaptive coping, and an external orientation showing the opposite pattern of associations (Skinner & Saxton, 2019).

Hence, a second motivational pathway that can be used to support academic coping is by nurturing the development of autonomous self-regulation. According to SDT, and consistent with research on the internalization of moral principles (e.g., Hoffman, 1994; Kochanska et al., 2010), such regulation can be facilitated by close, warm, and secure attachments to adults (Kim et al., 2015); consistent demands, guidance, and support for living up to rules and expectations; and especially *autonomy support*. Practices of teaching (Ahmadi et al., 2022) and parenting (Grolnick et al., 2019) support autonomy to the extent they validate students' perspectives and feelings, prioritize students' desires and interests in teaching and learning, provide choice, facilitate open exchange and communication, and jointly establish rules and expectations; and do not use power exertion or love withdrawal, or otherwise try to coerce, shame, or control behavior.

A great deal of research has been dedicated to identifying interpersonal, pedagogical, and management practices that support autonomy in schools and at home, and establishing their experimental and correlational connections to students' autonomy, engagement, learning, achievement, and well-being (Grolnick, 2016; Grolnick et al., 2019; Reeve & Cheon, 2021). Although some parents and teachers may worry that autonomy support undermines important dimensions of practice, like adult authority or other aspects of structure (e.g., clear expectations for mature behavior, consistent limit setting, appropriate demands and consequences), it turns out that the most effective teaching and parenting seems to be high on both (e.g., Cheon et al., 2020; Grolnick et al., 2014). Caring, structured, and autonomy-supportive parenting and teaching cultivate the internalization of prosocial values, and lead students to endorse the hard work of learning and mastery; hence, they contribute to the development of autonomous regulation and coping.

Development of Academic Motivation and Coping

Over the last several decades, studies examining age-graded differences and changes in multiple indicators of student motivation have documented significant declines starting in early adolescence and continuing across the teenage years; for example, consistent declines have been found in markers of motivation like engagement, intrinsic motivation, enjoyment of learning in school, and key self-appraisals, such as self-efficacy, perceived control, achievement values, and mastery orientations (Wigfield et al., 2015). These normative losses do not seem to be solely the result of maturational factors associated with early adolescence (such as puberty or other neurophysiological changes). Instead, studies comparing students who attended schools organized in different ways, namely, those that included kindergarten to eighth grades versus those that included transitions in sixth or seventh grades, reveal that drops in motivational indicators are found at whatever age school transitions take place (e.g., Eccles & Midgley, 1989).

One explanation for these problematic trends relies on the theory of stage–environment fit, which postulates that such declines are the result of a growing mismatch between the changing needs of adolescents and the affordances offered by their new schools (Eccles et al., 1993). The changes

students often experience over the transition to middle or junior high school (such as fewer high quality relationships with teachers, more performance-oriented and competitive learning goals, harsher discipline, and fewer choices and challenges in schoolwork) are not a good match for adolescents who, based on stage-relevant developmental tasks, are increasingly ready for closer relationships with nonfamilial adults, more mastery-oriented goals, and greater challenge and autonomy in learning. If these motivational losses play a role in concomitant declines in academic coping (as suggested by studies indicating that students' engagement and disaffection predict changes in their coping over the school year; Skinner et al., 2016), then efforts to prevent or counteract such losses by providing experiences in the upper grades that are more attuned to the needs of adolescents (Eccles & Roeser, 2009) could also have a positive impact on the development of students' coping.

Summary: Motivation and Academic Coping

As shown in multiple studies, students' motivation contributes to individual differences in their coping by shaping motivationally relevant appraisals, such as perceived control and valuing of school (e.g., Figure 27.1; Skinner & Saxton, 2019). A systems perspective suggests that underlying motivational processes can also influence coping through additional channels: by helping to generate constructive action tendencies; by infusing regulation with energy, direction, and tenacity; by harnessing the power of intrinsic motivation; and by scaffolding the development of autonomous extrinsic motivation. Moreover, the normative losses that have been documented in students' academic motivation and engagement during early adolescence may help to explain the parallel declines found for academic coping during this same period; and intervention efforts to prevent or reverse those losses may also help to buttress the healthy development of academic coping.

3. Interpersonal level: social partners are part of the academic coping system

Current research on academic coping has identified multiple ways in which social partners, like parents and teachers (and to some degree peers) can contribute to the academic coping of children and youth. Consistent with transactional perspectives, students who experience higher levels of emotional and educational supports from parents and teachers (e.g., more involvement, structure, mastery goal orientations, support for learning, autonomy support) also show more constructive coping; in contrast, children and youth who report unsupportive experiences with parents, teachers, and peers (e.g., rejection, inconsistency, coercion, authoritarian practices, lack of support for learning) are more likely to show maladaptive ways of coping (Skinner & Saxton, 2019). A systems perspective, which considers social partners to be *parts* of the coping system, expands a consideration of the role of interpersonal relationships in at least three ways. As pictured in Figure 27.6, it highlights social partners' direct participation in coping interactions as episodes unfold; it draws attention to parts of the process that take place both before and after coping proper; and it underscores the role of social relationships in shaping the development of personal assets, like regulatory and motivational resources, that underlie students' capacity and willingness to cope with academic challenges.

Social Partners Participate during Episodes of Academic Coping

Social partners are most visibly part of the coping system when they participate in coping

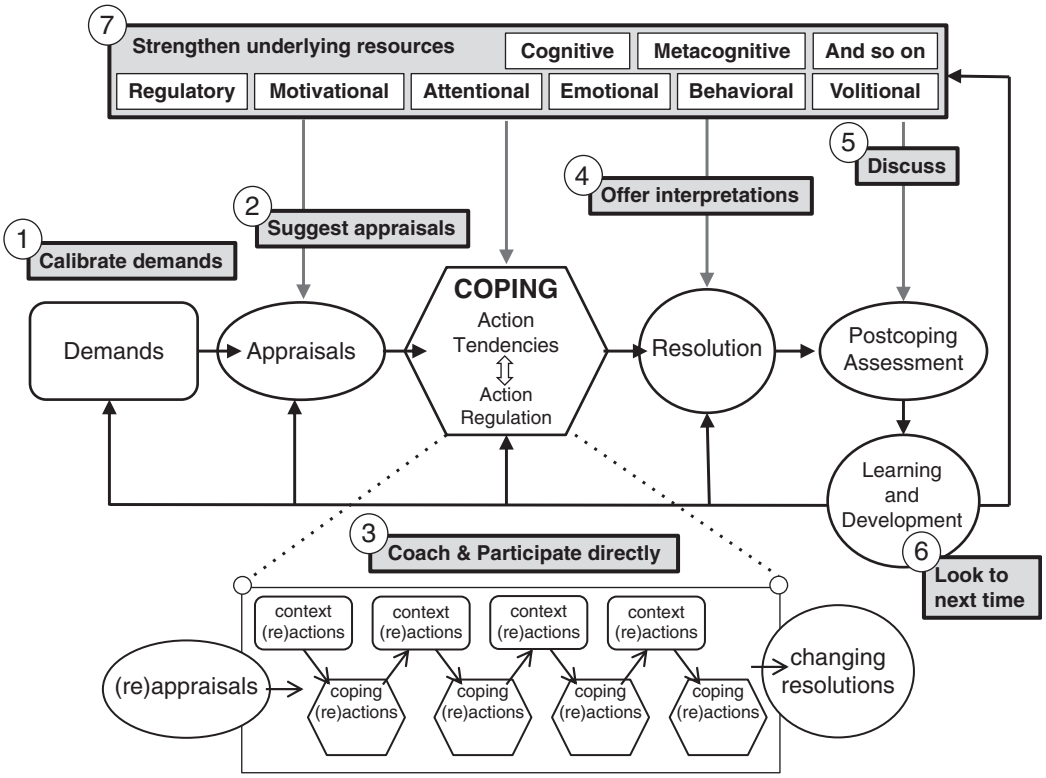

Figure 27.6 Seven ways in which social partners and interpersonal resources can influence steps in the coping process; they can (1) calibrate demands; (2) suggest appraisals; (3) coach and participate directly in coping episodes themselves; (4) offer interpretations of the outcomes of coping efforts; (5) discuss episodes once they are over; (6) look forward and plan for future encounters; and (7) strengthen underlying personal resources, like regulatory or motivational capacities.

episodes themselves. This includes parents, teachers, and peers who are actually present while children and youth are dealing with academic demands. During such encounters, partners can encourage continued engagement, actively recommend strategies, offer commiseration and emotional support, and bolster commitment and self-confidence; or partners can make things worse by blaming, rejecting, and coercing students instead. In contrast to adults, who provide direct support and help, peers are more likely to participate in coping episodes via "parallel play," that is, through their presence and companionship, and their own enthusiastic, engaged, and constructive coping with the same academic tasks (see Chapter 22, this volume).

An important entry point through which social partners can influence ongoing coping involves appraisal processes. This occurs partially through social partners' own appraisals of whether academic tasks are a *challenge* to be overcome through the application of abundant resources (e.g., hard work, strategies) or a *threat*, where demands exceed available resources. Social partners' appraisals may initiate a cascade: If adults or peers appraise stressors as threatening, this may add stress or evoke negative appraisals from children. Especially interesting in this regard are studies

that link the support provided by parents or teachers to student catastrophizing, a kind of appraisal that magnifies the distressing implications of negative events (e.g., "When something bad happens to me in school (like not doing well on a test), I feel totally stupid / like nobody will like me / like it's all my fault") and makes coping more difficult (Skinner et al., 2013; Skinner & Saxton, 2020).

Although little observational work has explicitly examined interactions between students and their social partners when they are actively coping with academic stressors, research focused on children's self-reports of the interpersonal resources available to them and their subsequent coping actions provide a window into the structure of these transactions. For example, if a child's parents regularly offer them effective strategies for dealing with their homework, those children may be more likely to turn to parents (e.g., use help-seeking) when they run into trouble; children may even be more likely to problem-solve on their own. Similarly, teachers who are warm and friendly may show students that they can be relied upon for emotional support (e.g., comfort-seeking) during academic challenges. It is easy to imagine how a parent or teacher who is actively involved in a student's learning and supporting a child's genuine interests could have an effect on coping, and not just in-the-moment coping actions – but also through the accumulation of such experiences over time. Future research could build upon these findings by explicitly examining actual dyadic coping interactions using intensive observational methods and linking them to longer-term assessments of developmental trajectories of coping.

Research on emotion and coping *coaching* also provides some information about how social partners can engage directly in coping episodes. Here social partners, especially teachers and parents, scaffold children's coping actions by helping them deal with their emotions constructively and suggesting task-appropriate coping strategies (e.g., Power et al., 2021). Coping coaching interventions focused on instructing students in effective ways to manage stressors in other nonacademic domains have demonstrated how knowledgeable adults may be able to directly teach children how to cope constructively (Compas et al., 2010). Other interventions teach caregivers themselves how to encourage adaptive coping in their children or students, guiding adults in how to offer struggling children effective strategies (Power et al., 2021). If this type of research were combined with observations of coping dyads it could provide evidence of the specific mechanisms through which social partners have an impact on coping during the stressful transaction itself.

Role of Social Partners before and after Academic Coping Takes Place

Many of the stressors studied in research on coping in children and youth (like parental divorce, health problems, or bereavement) are out of the control of the adults in children's lives. In this regard, coping in the academic domain is very different. Here social partners actually create the "academic stressors" children encounter during their educational experiences. Because the nature of the stressor itself plays a big role in how individuals cope (e.g., Tolan & Grant, 2009), teachers, and to a lesser degree parents and peers, can influence coping based on the academic work they assign – the types of tasks, their difficulty level, and the social and motivational conditions (in the home and classroom) where they are tackled. Teachers and other school officials are in charge of these educational activities, specifically whether they are engaging, intrinsically interesting, and attuned to the academic and developmental level of the child. From

this perspective, interpersonal contexts influence the larger coping system before the episode even begins, through the calibration (and recalibration) of academic tasks and demands.

Coping Climate

Parents, teachers, and peers likewise have an impact on the local contexts in which academic coping takes place. For example, coping can be shaped by the achievement goal orientation in a student's peer group or in the whole classroom, with constructive coping more likely when that atmosphere is focused on mastery and learning goals (e.g., Brdar et al., 2006). Or authoritative parenting as well as parenting that is high on developmentally appropriate limits and structure is associated with greater use of strategizing and less use of projection, while neglectful parenting is associated with the opposite profile of coping (Raftery-Helmer & Grolnick, 2016; Zimmer-Gembeck & Locke, 2007). Such connections suggest that the overall classroom climate sets a tone for coping, just as parents can set an overall family climate, determining whether children have a safe, supportive, low-distraction environment and plenty of time for homework.

Classrooms and home environments as a whole can also communicate to children what is at stake in educational activities that are challenging and during which students may struggle or make mistakes. For example, research on growth mindsets (Dweck et al., 2014; Dweck & Yeager, 2019), mastery goal orientations (Friedel et al., 2007), and unconditional parental regard (Assor & Tal, 2012) suggest that adults can set up environments that amplify the threatening aspects of academic difficulties, by communicating that such struggles imply inadequate amounts of fixed abilities, inferior performance compared to others, or loss of adult regard that is conditional on high achievement. In contrast, adults can set up more developmentally promotive climates that communicate the natural and helpful role of exertion, failure, and effective strategies in growing one's abilities, the intraindividual progress involved in mastery, and the steady caring and affection students can count on, even (and perhaps especially) when they struggle or fail.

Postcoping Assessment, Interpretation, and Reflection

Social partners can also play important roles *after* coping episodes are over. They may offer interpretations that frame mistakes and poor coping as opportunities for learning, and thus influence what children take away from stressful encounters. These postcoping assessments can influence how children view their own coping actions, providing realistic postgame reviews (e.g., where things went wrong) that still support positive self-conceptions (i.e., that preserve the child's view of themselves as worthy and capable). As part of the joint processing of these events, partners can help children come up with alternative actions for next time, encouraging them to learn from maladaptive coping episodes in order to expand their repertoires toward more proactive and effective coping in the future.

Research on interventions aimed at improving children's coping provide some support for the importance of such debriefing and reappraisal processes because they demonstrate how teachers and parents can help students reframe and learn from past experiences (e.g., Compas et al., 2009; Lochman & Wells, 2002). Although many of these interventions focus on helping children cope more constructively with difficult life events (like a parent suffering from depression), their success in shaping future behavior through reflection on alternative ways to handle past negative events suggests that social partners can also impact the coping system through their discussion of

and reflection on coping episodes themselves. Combined with successful interventions that teach parents and educators how to intervene with children directly (e.g., Power et al., 2021), this suggests that postcoping analysis and support may be fruitful avenues for fostering the subsequent development of children's coping.

Social Partners Contribute to the Development of Students' Resources for Academic Coping

A multi-level model of coping not only highlights the role of interpersonal relationships and social contexts as top-down influences on students' academic coping, but also suggests that social contexts influence the development of coping from the bottom up – by shaping the constituents of the coping system (see Figure 27.3). That is, social factors influence the development of action tendencies and regulatory capacities at the level of action, as well as the psychological and neurophysiological resources (from the levels below) that children and adolescents call on when they need to cope with academic challenges. As described briefly in previous sections, the development of the components of action regulation, namely action tendencies and executive processes, emerge from of a history of interactions with others (Sameroff, 2010). Social partners, especially parents but then later teachers and peers, have an essential role in the development of regulation, scaffolding its use as young children practice it themselves, and then slowly removing external supports as regulatory processes become more internalized as children get older.

Psychological Resources

Parents, teachers, and peers also shape the development of the psychological resources children use to cope. As discussed in the section on motivation, students' self-appraisals (such as self-efficacy, autonomy, or mastery goal orientations) can be seen as resources that support adaptive academic coping (e.g., Raftery & Grolnick, 2016, 2018; Skinner et al., 2013, 2016; Zimmer-Gembeck & Locke, 2007) and its development (Skinner & Saxton, 2020). All of these motivational appraisals have large bodies of research attached to them that examine the interpersonal influences that shape their development. The same can be said for the other the psychological resources that underlie the action tendencies and regulatory capacities that constitute coping (see Figure 27.3). In addition to motivation, these include emotion, attention, language, cognition, and metacognition, all of which can be considered psychological assets or liabilities that shape processes of academic coping. Each of these psychological processes is part of a larger body of research on their social determinants, examining how social partners and local microsystems contribute to their development. All these literatures reveal the centrality of interpersonal forces in shaping psychological resources and, through these pathways, likely also shaping the development of academic coping.

Neurophysiological Resources

Although we have not provided a detailed account of the role of neurobiological factors in the development of academic coping, nevertheless, as depicted in Figure 27.3, multiple such processes are central to the threat detection, stress reactivity, and regulation that comprise coping (Engel & Gunnar, 2020). All of these subsystems show regular age-graded changes that are "experience expectant" (Greenough et al., 1987) in that their healthy development relies on the presence of safe, loving, dependable, and stimulating social and physical environments (Lupien et al., 2009). As a result, social partners and the homes and classrooms they create are integral to the development of these

neurophysiological systems, and through them to academic coping. Social experiences shape how vigilant and reactive students' brains and bodies are to stress, how open their physiologies are to be comforted by others, and how intact the neurocognitive systems are that underlie attention, memory, language, regulation, and reasoning (Engel & Gunnar, 2020; Gunnar, 2017; Hostinar et al., 2014).

Summary: Social Partners and Contexts and the Development of Academic Coping

Social partners play an integral role in shaping the development of children's academic coping. They participate directly in coping episodes on the ground, but they also bookend coping encounters by shaping the demands and appraisals that precede them, and the interpretations and takeaways that follow. They also contribute to the local home and school contexts in which academic coping takes place and communicate to students the meaning of such encounters. Moreover, interpersonal factors are alive in every aspect of the regulatory and psychological processes that feed into students' coping from the bottom up. In fact, interpersonal forces shape the very neuroanatomical "machinery" children and adolescents use to cope. From a systems perspective, it is clear that other people are a crucial component of the system that gives rise to students' coping on the ground.

4. Societal level. The development of academic coping is shaped by higher-order macrosystem

Macrosystem forces, like the educational, economic, political, health care, and criminal justice systems, are considered parts of the larger coping system because they permeate and organize each level below. Structural forces differentially drive resources and risks into children's schools, homes, neighborhoods, and communities, creating stratified niches within which diverse children and adolescents develop. These structures magnify inequality because they are based on status hierarchies organized around socially constructed categories like race, class, gender, sexual orientation, immigrant status, and so on (e.g., Spencer, 2006). Their operation is underpinned by entrenched myths about the inferiority of people on the lower rungs of these hierarchies and cover stories, usually focused on meritocracy, about people on the higher rungs. Because the effects of risk and stress are cumulative (e.g., Evans et al., 2013; Munsch & Wampler, 1993), some students, especially those low on multiple status categories, grow up in conditions that are objectively hazardous to their development. At the same time, as described by strengths-based models, marginalized families and communities, because they prioritize children and youth, protect their development, and through the creation of culturally specific adaptive practices ensure that the majority show positive and resilient trajectories (e.g., Garcia Coll et al., 1996; Spencer, 2006). Most of the traditional literature on coping overlooks these higher-order forces. However, small but important bodies of work have begun to examine them more closely (see Spencer, 2006; Chapters 23, 24, and 28, this volume) and they can be used to identify multiple ways higher-order contexts influence academic coping and to inform interventions designed to support its development.

Stratified Niches and Entrenched Myths about Academic Struggles

A focus on macrosystem forces starts with the recognition that, because they shape all the other parts of the larger coping system, interventions to transform these higher-order factors are essential. Most central to academic

coping are the higher-order contexts that shape educational systems – their organization and funding, the state of school buildings and educational infrastructure, the quality of teachers' training, and the academic orientation of curricula. All impact the classrooms where children's schooling takes place, and also spill over into the family, as children bring home academic work or school-based stressors. Macrosystems also impact the resources social partners have available to carry out all the important tasks described in previous sections and, more specifically, their capacity to support students as they learn to deal with challenging academic work. Objectively hazardous local contexts also get "in the head" and "under the skin" of students by shaping psychological and neurophysiological processes that contribute to stress reactivity, coping, and learning (e.g., Evans et al., 2013; Lupien et al., 2009). They also influence students' prior academic preparation, and so determine how stressful educational tasks will be and the resources students have to deal with them.

Societal Defaults

A range of societal defaults in educational systems can be critiqued with respect to whether they make coping easier or more difficult. These include practices that rachet up the stakes (e.g., assumptions about what academic problems reveal about ability), learning tasks that isolate children from social scaffolding, and grading that does not allow students to improve their performance. Such practices can interfere with constructive coping and the corresponding messages (e.g., about the purpose of school, the nature of ability, and the inherent capacities of students from specific subgroups) can become lodged in teachers' and students' mental models about the meaning of academic struggles and coping.

Societal Change

An analysis of the pervasive and unequal impacts of macrosystem forces leads to the conclusion that one of the most effective intervention levers for supporting academic coping can be found in large-scale economic and educational transformations that create more developmentally supportive conditions for all students. Because the impacts of higher-order systems are present at all levels of the larger coping system, these types of structural interventions are an important goal for researchers concerned with how children manage academic demands and how their coping systems develop over time.

Lifting the Macrosystem Off the Development of Students' Academic Coping

Until such societal transformations are complete, a second way awareness of macrosystem factors can guide work on coping is to encourage interventionists and educators to create what Spencer calls "pillar-like supports" (e.g., 2006) to lift the pressure of these forces off of students as they develop. This chapter sketches an initial game plan for such efforts by referring to larger literatures that have identified multiple layers within the classroom that can incorporate supportive practices: (1) interpersonal environments comprising warm, caring, and vibrant communities of learners who share affectionate relationships; (2) mastery-oriented learning contexts, characterized by challenging, intrinsically motivating educational activities and mastery grading that rewards effort, allows for "do-overs," and insists on success; (3) fair disciplinary practices based on mutual respect, that contribute to the development of autonomous regulation and ownership; and (4) community contexts that focus on the importance of education's central mission to "incubate a better world in the hearts and minds of our students" (Benjamin, 2016).

Multiple lines of scholarship converge on this picture, including especially research on mindsets (e.g., Dweck, 2017), mastery learning orientations (Urdan & Kaplan, 2020), and self-determination (Ryan & Deci, 2017). These recommendations overlap with research on the development of executive processes, regulation, motivation, and academic coping itself (Skinner & Saxton, 2019). Interestingly, they also converge with research on the kinds of experiences that have been found to reverse or counteract the effects of early adversity on the development of neurophysiological systems involved in stress reactivity, regulation, and learning (Boparai et al., 2018; Sege & Browne, 2017). Such work suggests that these local climates and interpersonal supports may be especially important for students who have or are experiencing the downward pressure of multiple macrosystem forces.

The Meaning of "Maladaptive" Coping

As explained throughout this chapter, students' capacities to deal with academic challenges and demands are enabled and constrained by their developmental histories. Their past experiences create the system's current limitations and potentials. Hence, a systems perspective may help teachers and interventionists rework their mental models of the meaning of "academic struggles" and "maladaptive coping." Instead of individualizing and pathologizing unproductive coping, many researchers now prefer the terms "stress-affected" or "stress-adapted" (Wadsworth, 2015), and characterize coping as "reactive" to the experiences and messages children encounter in schools as well as in the broader society (Spencer, 2006). These same researchers highlight the malleability and resilience inherent in coping systems (e.g., Wadsworth et al., 2018). From this perspective, ways of reacting to and coping with academic stressors are not primarily the result of an individual student's bad attitude or problematic traits. Instead, they can be considered diagnostic of the whole system, providing actionable information about where in that system (past or present) strengths and areas for improvement may lie. This recognition can help social partners to view "maladaptive" coping, not as an irritating disruption, but as a visible entry point into a fascinating menu of options for supporting students' development. In this way, they can use their understanding of the coping system, from the state of students' stress neurophysiologies to grading practices and peer relationships, to guide their next steps in nurturing its growth and resilience.

Incorporating the Macrosystem in Interventions to Support Academic Coping

A third way that a focus on higher-order contexts can inform programs to support academic coping is by considering that goal more wholistically. Interventions can benefit from a consideration of how families and communities have (historically and currently) buffered children from these forces, and fold students' experiences of these higher-order factors into their design. Interventionists can work to strengthen existing community-based supports, learn from parents and communities about how to best nurture the development of diverse students, and consider wholistic interventions that target the development of coping as part of larger efforts to promote positive youth development (see Chapter 29, this volume).

Targeting the Mesosystem

Interventions may consider targeting the level of the mesosystem, specifically, strengthening meaningful connections between schools, families, and peer networks (an issue of long-standing interest in education science, Skinner et al., 2022), and recognizing that the assets of each can complement the working of the other.

For example, schools can bolster the family microsystem against stressors by providing meals, enriching activities, and ideally a safe, monitored place where children can be during the workday (DeJonckheere et al., 2017). In reciprocal fashion, families and extended communities bolster the school microsystem through school involvement, neighborhood solidarity, and the promotion of community identity and belonging (McIntosh & Curry, 2020). The functioning of the mesosystem may itself be facilitated or hindered by the exosystem of parents' places of work, which may enable or constrain their involvement in school or assistance with homework.

Building on Adaptive Cultural Practices

Moreover, macrosystem factors may also shape *how* social partners provide supports and whether certain strategies of support are more or less effective. Research focused on ethnic-racial, emotional, and coping socialization emphasizes that caregivers, extended family, and community members shift these practices depending upon environmental conditions (Dunbar et al., 2017, 2022; Hughes & Johnson, 2001). For example, African American and Black parents seem to become more involved or shift their parenting strategies depending on the levels of discrimination their children are experiencing at school. Specifically, African American mothers who perceived their children's kindergarten or first-grade teacher as being more discriminatory became more involved in their schooling (Rowley et al., 2010). Similar work with older children demonstrates that African American parents are more likely to socialize their children using preparation for messages about bias when their children discuss discriminatory experiences they have encountered at school (Hughes & Johnson, 2001). This work provides examples of how communities experiencing accumulations of stressors adaptively shift their socialization strategies to encourage resilience in their children in the face of difficulty, and how the manifestation of such supports may be qualitatively different when compared to communities who are not experiencing the same structural inequities. Such fascinating work, in addition to indicating the need for more situative and phenomenological investigation of the ways social partners prepare diverse children for and support them in demanding academic situations, can provide interventionists with a better road map for how to add to and support parents in their efforts. By examining the assets and adaptive cultural practices developed by marginalized communities (e.g., Garcia Coll et al., 1996), educators and interventionists can contribute to, learn from, and build on them in their own efforts to help create more supportive systems.

Incorporation of Efforts to Reform Macrosystems

Finally, an analysis of higher-order factors suggests that interventions to support the development of academic coping may need to take a more wholistic approach. Some coping interventions are highly specific, for example, they drill down on individual coping skills or strategies of self-regulated learning. Although such tutorials may be helpful for students whose larger coping systems are already optimized, a broader perspective may be more effective for the majority of students. Over the last several years, researchers have made important connections between the development of coping and programs designed to foster identity development and social action (e.g., Chapter 23, this volume) and positive youth development (e.g., Chapter 28, this volume; Tolan & Grant, 2009; Tolan et al., 1997, 2003). For example, a multi-pronged intervention that shows promise in buffering adolescents from both neurophysiological and psychological effects of exposure to high levels

of poverty-related stress was designed to teach of a broad range of engagement coping skills as part of a larger project to support the development of a positive social identity and collective social action to empower youth with the ability to connect with members of their communities and cope with poverty-related stress in positive and collaborative ways (Wadsworth et al., 2020).

Summary: Macrosystem Factors and the Development of Academic Coping

Systems perspectives emphasize multiple ways higher-order structural conditions influence the pathways along which students' academic coping will develop. Societal forces constitute and organize the stratified niches made up by schools, homes, neighborhoods, and communities. They shape the immediate ecologies of the classroom and home, where coping takes place, and the resources and assets their social partners, like parents, teachers, and peers, can access to support students in their coping efforts. Cumulatively, such perspectives contribute to more effective interventions to support the development of academic coping by targeting societal changes that transform these higher-order structures; build pillar-like supports within schools and neighborhoods to lift these pressures off the development of children and youth; and design coping interventions that, learning from diverse communities and caregivers, build on the strengths and assets they provide to illustrate the power of individual and communal coping actions.

5. Developmental systems. The academic coping system is reciprocal, dynamic, and nonlinear

A systems perspective on the development of academic coping highlights not only its multilevel complexity, but also its dynamics – the reciprocal and recursive interactions among its elements that give rise to changes and qualitative shifts in the coping system. In this last section, we highlight three examples of these dynamics: the feedback effects of students' academic coping on the social supports and stressors they subsequently experience; the centrality of coping episodes themselves as a site for the development of regulatory and other capacities; and the notion that the interpersonal coping system itself undergoes qualitative shifts from early childhood to emerging adulthood.

Feedback Effects: Academic Coping Shapes the Stressors and Social Supports Students Experience

Dynamic developmental models are all fundamentally based on the premise that interactions between individuals and their social partners (e.g., other people, tasks, objects) are the engines of development, with each interaction partner mutually influencing the other over time (Bronfenbrenner & Morris, 1998; Ryan & Deci, 2017; Sameroff, 2010; Skinner et al., 2019). These reciprocal exchanges suggest that in addition to feedforward effects of social partners, like parents and teachers, on children's coping, there may also be *feedback* effects in which children's coping influences the responses of their social partners (e.g., Skinner & Edge, 2002). More specifically, constructive coping strategies may actively pull in interaction partners, whereas maladaptive ones can push them away or exacerbate already tense relationships. For example, if children consistently come to teachers for help, adults are more likely to offer that child useful strategies in the future, even without an explicit request. In contrast, a child who uses escape or concealment to deal with challenging academic tasks may actively avoid engaging with others, leading to a lack of future support from these same partners.

As these interactions unfold over time, a reciprocal loop may be established that perpetuates and amplifies particular patterns of coping strategies and social reactions. A "virtuous" cycle can be created, if social supports lead children to use more adaptive coping strategies, which in turn result in the provision of greater subsequent supports. Over time, this dynamic should increase a child's ability to constructively cope with challenge. Alternatively, a "vicious" cycle could be established, where a lack of interpersonal supports leads a child to rely upon more maladaptive ways of coping, pushing their social partners further away, and escalating the use of unproductive strategies. If poor coping also contributes to poorer academic performance, which in itself creates more stressful educational experiences (a phenomenon known as *stress generation*; Liu, 2013), then virtuous and vicious cycles are further amplified. If these proximal processes continue to unfold over time, they may cumulatively impact the long-term trajectory of students' academic coping, functioning, and achievement (Skinner & Pitzer, 2012).

Academic Coping as a Site of Development of Regulation and Resilience Resources

Episodes of coping also feed back to shape the underlying regulatory, psychological, and even neurophysiological processes that gave rise to them. The development of coping requires the exercise of regulatory capacities under stressful conditions. However, there is a curvilinear relationship between stress and coping. If demands are too low, automatic processes are sufficient and no coping or regulation is practiced; however, if stress is too high, regulatory systems are exhausted or overwhelmed and again no growth takes place. Moderate levels of demand provide the kind of just manageable difficulty that creates a "plane of challenge" at which optimal levels of regulation are practiced. However, such participation is not always comfortable or easy to sustain. Social and motivational supports, which allow children and adolescents to practice their regulation at higher levels of demand, can expand this plane of challenge and so create a zone of proximal development. The broader this plane of action, the more and higher-quality learning that can occur. The goal of parents, teachers, and interventionists who want to foster the development of academic coping is to help children and adolescents spend time on the plane of challenge.

This zone – where students wrestle with their participation in demanding academic tasks – is ripe for learning and development, not only for coping, but also for regulation and all its components, including emotion, attention, behavior, motivation, and so on. Research on each of these topics describes the kind of sustained engagement and practice needed to foster their development, and in general these experiences map well onto episodes of coping, as noted explicitly by some researchers (e.g., Barrett & Campos, 1991; Kopp, 1989). In fact, research on neuroplasticity also identifies challenging goal-directed episodes as crucial to the healthy development of neurobiological systems underlying stress resistance (i.e., low reactivity) and stress resilience (i.e., quick recovery; Baratta & Maier, 2019; Chapter 5, this volume; Fleshner et al., 2011). As a result, episodes of coping can be considered high-value sites of developmental significance for fostering the growth of regulation and other capacities.

Qualitative Shifts in the Academic Coping System across the Educational Lifespan

Finally, a conceptualization of coping as a dynamic system alerts researchers and practitioners to the transformations academic coping may undergo as students progress

through their educational careers. As depicted by research on regulation, extrinsic motivation, and internalization, the coping system undergoes qualitative age-graded shifts in the roles played by social contexts, especially caregivers and other adults (e.g., Skinner & Zimmer-Gembeck, 2016). Caregiving changes, for example, from "external coping" during infancy (when caregivers take coping actions on the infant's behalf, based on the child's cues) to co-regulation during toddlerhood and direct participation during preschool age, followed by cooperation during middle childhood, coaching in early adolescence, and moving to monitoring and acting as a backup as adolescence progresses. The image here, as in many theories of scaffolding and apprenticeship (e.g., Sameroff, 2010), is one in which social contexts successively step back as children take on more and more responsibility for their own regulation and development, perhaps integrating the participation of friends, other peers, and then romantic partners at successive age grades (Barthel et al., 2018; Falconier & Kuhn, 2019; Valiente et al., 2020; Chapter 22, this volume).

Summary: The Developmental Dynamics of Academic Coping

The coping system is multi-level and dynamic, in that it includes not only feedforward effects in which processes from higher and lower levels influence the development of coping, but also feedback effects, in which coping episodes themselves influence the social relationships, stressors, and supports as well as the underlying regulatory, psychological, and neurophysiological subsystems that give rise to them. These reciprocal loops can create virtuous and vicious cycles that shape developmental trajectories of academic coping, and cumulatively can contribute to qualitative shifts in how the larger coping system is organized – for example, a shift in coping's center of gravity from external co-regulation or co-coping with social partners to coping that is increasingly intrapersonal, agentic, and autonomous. A multi-level and dynamic systems view can help researchers, practitioners, and interventionists appreciate the complexity of the task students undertake as they deal with setbacks and obstacles in their schoolwork. Given the promise and potential of coping as a part of academic achievement and resilience, such perspectives also remind adults of the opportunities and challenges they face in trying to support its healthy development.

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28 Youth Programs and the Development of Coping

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Introduction

There has been a multiplicity of efforts since the mid-1900s to facilitate programming with children and adolescents that provides developmental support, engages youth in prosocial activities, and connects youth with caring adults. Such efforts, referred to as "youth programs," aim to provide a place for youth to spend time after school, offer opportunities for youth to connect with a positive social group, or establish a setting in which youth can learn and hone personal talents, interests, and civic contributions. These efforts are generally offered universally, centering on a given neighborhood or geographic area rather than engaging youth based on more selective criteria (Roth & Brooks-Gunn, 2003, 2016). Prominent examples in the United States include Big Brothers Big Sisters (BBBS), Boys and Girls Clubs of America, and 4-H. In addition to regional facilities for these and other national programs, many communities provide local recreational, vocational, civic, or religion-affiliated efforts that can be categorized as youth programs (Larson et al., 2006). Thus, youth programs reach a significant portion of young people with engagement of children and adolescents across diverse racial/ethnic groups, residence types, gender identities, and socioeconomic strata.

Many descriptions of youth program principles, goals, and components specifically refer to helping youth with the stress and challenges of their day-to-day lives, suggesting that youth programs may be "coping" promoting. Coping, which can generally be understood as a process through which individuals manage the impact of stressful events and circumstances, has been extensively studied and is considered an integral skill for healthy adaptation across the lifespan (Masten, 2001). Reviews of the research on child and adolescent coping indicate that youth incorporate new strategies and refine their already existing skills as they age, applying these strategies and skills in an increasingly methodical manner to address developmental and environmental challenges (Zimmer-Gembeck & Skinner, 2011). In addition to investigating the processes of coping, research has demonstrated that effective coping is linked to a host of positive outcomes across educational and social domains, as well as associated with lower rates of both internalizing and externalizing symptoms of psychopathology, underscoring its importance in healthy development (Compas et al., 2001).

Despite the apparent overlap between youth programs and coping interventions, few links have been drawn between the study of youth programs and stress-coping frameworks nor is there much mention of such types of programs in the coping literature. Given that youth programs engage many more children and adolescents than specific coping interventions, this linkage may have important implications for optimizing the reach and impact of developmentally supportive interventions.

The present chapter is intended to provide such linkage, describe the basis for and value

of integrating these areas of interest, and suggest particularly opportune foci for future study. Coping intervention methods and approaches are examined as applicable to youth programs, and youth programs that are amenable to a coping perspective are discussed, emphasizing existing overlap and shared goals between the two areas. These discussions form a basis for proposed future directions for further integration. Closer alignment between coping interventions and youth programs could provide important new insights into youth development, enhance understanding of coping in natural settings, and expand the reach and effectiveness of youth programming.

Coping Interventions

As growing evidence suggests that coping is essential for healthy development (Modecki et al., 2017), researchers have called for the creation and evaluation of interventions to promote these skills and to apply stress-coping frameworks to understand broader intervention effects (Compas, 1998; Compas et al., 2001). As such, interventions have been developed based on the theoretical literature and tested to teach, build, and/or enhance youth coping skills with an adjacent goal of more generally understanding the benefits of coping interventions for youth. While the theoretical organization and specific approaches to coping interventions have varied (Compas, 1998), across studies there has been emphasis on the impact of the differential purpose of the youth's applied coping strategy (problem-focused versus emotion-focused; Lazarus & Folkman, 1984), the role of the youth's goals (primary versus secondary control; Rothbaum et al., 1982), the degree to which the youth is engaging with their stressor (engagement versus disengagement; Compas et al., 2001), and the youth's developmental stage (Losoya et al., 1998). Many of the specific interventions referenced in this chapter draw from these distinctions in their goals and design.

As is extensively covered in other chapters in this handbook, coping is a complex area of study, and there are numerous existing interventions, which fall beyond the purview of this chapter. Because the purpose of this chapter is to frame the possible linkage between stress-coping frameworks and youth programs, only select coping-specific interventions, as they are or may be related to youth programs, will be reviewed. However, some basic information about the current state of the coping intervention field is necessary so that informed comparisons regarding the makeup, goals, and impact of coping-specific interventions to youth programs is possible. The following section will provide a summary of coping interventions, highlighting elements relevant to youth programs.

Scope of Coping Interventions

Coping interventions range in intended impact from targeted treatment (i.e., for youth identified with psychopathology; Compas et al., 2001) to prevention (i.e., for youth identified at-risk). These interventions have been applied in schools (e.g., Frydenberg, 2004), after-school settings (e.g., Danish et al., 2004; Petitpas et al., 2017), and medical contexts (e.g., Compas et al., 2012; Wagner et al., 2011). Coping interventions have been implemented in person (e.g., Compas et al., 2010; Frydenberg, 2004) and online (e.g., Boring et al., 2015; Douma et al., 2019; Whittemore et al., 2012), with individual components (e.g., Barrett et al., 2001) and in groups (e.g., Compas et al., 2010; Douma et al., 2019). Additionally, they have been both youth- and youth and caregiver-focused (e.g., Compas et al., 2010; Wagner et al., 2011). Youth programs, which can be categorized as preventive

interventions, often occupy similar spaces as coping programs, such as after-school settings (e.g., Daud & Carruthers, 2008). They also apply similar approaches, including individual and group activities (Larson et al., 2006) that are conducted primarily in-person for children and their families (Catalano et al., 2004), although they are also potentially amenable to online platforms (see Ettekal & Agans, 2020 for examples of such efforts during the COVID-19 pandemic). These areas of overlap denote practical feasibility for the integration of coping interventions and youth programs.

Coping interventions have been intentionally designed to address stressors associated with myriad challenges, including physical (e.g., epilepsy; Wagner et al., 2011; diabetes; Whittemore et al., 2012) or mental health (e.g., depression and anxiety; Hart Abney et al., 2019) diagnoses. While most are developed to target a specific stressor (e.g., stressors associated with juvenile incarceration; Rohde et al., 2004), some more broadly target children and adolescents who may be vulnerable to stressors related to their identification with marginalized groups (e.g., LGBTQ+ youth; Craig & Austin, 2016) or those who are generally considered at-risk for negative developmental outcomes due to systemic or environmental factors (e.g., low socioeconomic status; Raviv & Wadsworth, 2010). Regardless of their approach, these interventions are more often targeted rather than universal, only reaching subsets of youth populations with specific characteristics or circumstances that qualify them for intervention. While youth programs differ in that they are more universal than targeted, this means they capture a diverse range of participants (Larson et al., 2006). Individuals within these programs may face a range of the aforementioned specific (e.g., a physical or mental health diagnosis) or more general (e.g., affiliation with a historically marginalized group) stressors. Thus, the broad reach of extant youth programs suggests applicability to a variety of groups, including those already targeted in coping interventions, and sets the stage for linkage between fields.

Approach to Intervention

Coping interventions vary in the mechanisms through which they attempt to promote effective coping and subsequently positive developmental outcomes. Most programs involve some form of psychoeducation, direct skill instruction, modeling, discussion, and practice. Often, the approach to psychoeducation and skill-building varies based on the intervention's framing (i.e., as problem-focused versus emotion-focused, primary versus secondary control, engagement versus disengagement, or a combination thereof), the specific stressor(s) participants are facing, and the participants' developmental stage(s). While there may be inherent overlap in the skills that are addressed across interventions, different strategies may more closely align with one framework, a specific stressor, or a particular developmental level. Regardless of the specific skills highlighted, these skills are often promoted through didactic instruction, video review, modeling, role-playing, and homework or other forms of guided practice; some interventions employ all of these approaches to skill development within the same program (e.g., Compas et al., 2010).

Peer engagement is meant to function in different ways across programs, though many include a social engagement component. In some programs, social support is identified as key to the coping process (Wilkerson et al., 2017). In others, group discussion is applied simply to highlight similarities among program participants and normalize challenges (Douma et al., 2019; Frydenberg, 2004). With either approach, because many coping

programs are offered in a group format, there is ample opportunity for connection.

Lastly, practice activities, whether guided or naturalistic, are implemented to promote the development of healthy coping skills through naturally occurring means (e.g., sports programming; Friedrich & Mason, 2018) or homework (e.g., Compas et al., 2010). Coping-specific interventions and youth programs share many structural similarities, such as offering social support as a means through which to promote positive developmental outcomes. On average, youth programs are often less structured, however, and rely more heavily on naturalistic experiences (Roth & Brooks-Gunn, 2003).

Research on Coping Interventions as Related to Youth Programs

Many coping interventions were developed with the intent to test their impact across developmental domains and, as such, there are a plethora of studies that have been conducted ranging from pilots to rigorous randomized controlled trials, some of which are detailed in other chapters within this handbook (e.g., Chapter 26). For our purposes, it is notable that the desired outcomes tested in these coping interventions often parallel those of youth programs, again suggesting that coping-specific interventions align in both intent and organization with youth programs. Both aspire to promote positive developmental outcomes (e.g., academic achievement or prosocial behavior) or relieve negative symptomatology (e.g., internalizing or externalizing psychopathology), for children facing both normative and specific challenges in their ecosystem.

One commonly cited meta-analysis that examined the effects of coping interventions on multiple developmental domains indicates that, while effect sizes are small-to-medium (0.02–0.12) on average, the overall trend points to improved psychosocial functioning among youth through coping intervention, with smaller effects for internalizing symptoms and larger effects for academic functioning (Clarke, 2006). However, the author of this meta-analysis also reported that variation in active coping only accounts for less than 2% of the variance in adolescent functioning across domains. Thus, programming should be expanded such that it addresses factors beyond simple coping instruction (e.g., social support). Youth programs may serve as an opportune venue through which to promote both coping and other factors that drive positive outcomes across psychosocial domains.

If this integration of stress-coping frameworks into youth programs were to occur, other research provides additional information regarding the types of coping that are effective and under what conditions. Results from a meta-analysis and narrative review of 212 studies of coping-specific interventions affirmed the relation between maladaptive coping and internalizing symptoms, as well as revealed that certain forms of adaptive coping were related to lower rates of externalizing symptoms (Compas et al., 2017). More specifically, based on their analysis, some forms of coping showed benefits for lower symptomatology in different domains (e.g., engagement/approach coping was associated with fewer internalizing symptoms, problem-focused coping was associated with fewer externalizing symptoms, and emotion-focused and primary/secondary control coping were associated with fewer symptoms across both domains). In contrast, other coping strategies were associated with higher symptom levels, such as coping through emotional suppression, denial, and avoidance. Thus, while these findings suggest that coping promotion is associated with symptom reduction and possibly other unmeasured, broader positive developmental outcomes, it is notable that the form and approach to coping may be

differentially impactful. This coping research can be immensely beneficial to inform which forms of coping promotion and skill development might be most applicable within youth programs.

Currently, it seems that even if coping skills are not explicitly addressed in youth programs, they are implicitly or informally being promoted in those interventions. Coping programs are based on the contention that stress is inevitable and multidimensional, that coping methods can have an impact on youth development, that the most effective coping skills can be trained, and that this training can be based in practical life challenges. Similarly, youth programs also approach intervention as an opportunity for children and adolescents to build and practice interpersonal skills, gain support and connection to others, and engage in thoughtful problem-solving that can mitigate stress, contribute to optimal development, and lead to lower risk and improved capabilities in academic, behavioral, and social functioning (Roth & Brooks-Gunn, 2003). In the following section we explore the current scope of youth programs, as well as similarities in the approaches between coping intervention and youth programs. Highlighting these points of overlap may promote further integration between these areas of study.

Youth Programs as Coping Interventions

Youth development programs arose as practical efforts to help support youth in managing stressful circumstances by connecting them to caring adults and emotional resources, as well as providing them with a safe and supervised setting for peer-to-peer interactions (Roth & Brooks-Gunn, 2003). To effectively compare coping-specific interventions with youth programs, it is important to understand basic background information about youth programs.

Scope of Youth Programs

Through the study of existing youth programs, some common and defining features have been identified (Roth & Brooks-Gunn, 2003). First, these programs are often strengths-based and developmentally grounded; they are intended to support youth in garnering and learning the skills and capabilities necessary for healthy development (Lerner et al., 2011). Unlike most coping interventions, which explicitly train the use of particular responses to an identified stressor or stress in general, the goals of these programs are less specific, but they generally aim to foster competent functioning, connection to adults and institutions, confidence, and the pursuit of goals, often across multiple developmental domains (e.g., academic, psychological, and social; Roth & Brooks-Gunn, 2003). The implicit theory of many such programs is that by promoting talents, providing support, and helping guide alignment of capabilities with resources, successful development is more likely with resultant decreased risk for academic failure, problem behaviors, and mental health concerns (Benson et al., 2006). Further, through youth programs, children and adolescents are often connected to high-resource, supportive, and competent adults meant to help scaffold healthy development (Sullivan & Larson, 2010). Through these relationships, youth can identify prosocial role models, gain social capital, and solidify connections to other resources (Jarrett et al., 2005). While not a necessary part of youth programs, coping development can be an explicit or implicit component of such programs, especially as youth programs intrinsically offer many naturally occurring, developmentally appropriate opportunities for coping (e.g., disagreements between peers and the experience of losing in a sports game).

A second key feature of youth programs is that these programs tend to be established as

settings rather than prescriptive programs with deliberate interventions (Larson, 2000). In other words, youth programs are offered as naturally occurring environments in which youth already interact. Common examples may include engagement with local Boys and Girls Clubs, interactions with an assigned mentor, or participation in preexisting after-school programs. Youth programs intentionally choose these settings, as they are meant to center the youth and inherently serve children and adolescents from a variety of backgrounds (Nicholson et al., 2004). Engagement in these programs may be based on location of residence, age group, or adverse life circumstances (e.g., qualifying socioeconomic status). Thus, while environmental risk may be a criterion for participation in some cases, children and adolescents often engage in youth programs irrespective of their individual risk, a key difference from coping programs. Further, the nature of youth programs as settings allows for extensive reach. In fact, some of the most popular youth programs, such as the Boys and Girls Clubs of America, alone reach millions of children per year according to their annual report (Boys and Girls Clubs of America, 2019). Thus, youth programs serve as optimal settings for understanding youth development across diverse samples of children and adolescents.

The stated purpose of youth programs can vary, and most refer to an intent to bolster youth's identity development (self-esteem, confidence, purpose; see Eichas et al., 2015), sense of social and personal responsibility (see Salusky et al., 2014), and/or civic connection and engagement (see Stoneman, 2002). Across programs, the role of adults is described as aiding youth-directed developmental progress, providing examples of appropriate behavior, and facilitating supportive connections with others. These shared and consistent central intents of youth programs have been distilled into a framework of positive youth development (PYD; Guerra & Bradshaw, 2008). Through the PYD framework, healthy development is operationalized as the expression of five specific characteristics (5 Cs): competence, confidence, connection, character, and caring (Lerner et al., 2005). These five aspects of positive development include constructs central in coping theory (e.g., competence, connection) and those that are closely aligned with or consistent with coping conception applied to youth (e.g., caring).

Research on Youth Programs

Formal evaluation of youth programs, such as through randomized controlled trials, has been less frequent than that of coping-specific interventions in part because most operate as services rather than as scientific projects, and there is significant variability in the youth experience within programs, impeding confident evaluation. More commonly, programs are evaluated through qualitative descriptions or case studies (Roth & Brooks-Gunn, 2016). However, some empirical evaluations of programming have been conducted as a response to inquiries in the field of youth development, as well as an increased emphasis on data-based funding (Arnold & Cater, 2011; Lerner & Chase, 2019; Yohalem & Wilson-Ahlstrom, 2010). Youth programs, such as those reviewed in later sections, are starting to measure their impact on coping even if there is no inclusion of explicit coping instruction.

Proposed Rationale for Integration of Stress-Coping Frameworks and Youth Programs

Despite some differences in focus, it is apparent that there is significant potential value in linking stress-coping frameworks with youth programs. Although not formally utilized,

most youth programs incorporate what can aptly be characterized as a coping approach; they include procedures for identifying stressful experiences and circumstances, and they provide support for building and applying effective coping strategies at developmentally appropriate levels. Already, many youth programs make direct or tangential reference to coping principles either in their aims (e.g., "build … resiliency to help them thrive today and tomorrow" [4-H, n.d.], or "learn positive ways to manage stress" [Boys and Girls Clubs of America; National Youth Outcomes Initiative, n.d.]) or in their outcome evaluations (e.g., or "higher collective efficacy, use of refusal skills" [G.R.E.A.T., n.d.]). Thus, coping research and youth program development may be complementary, and there is mutual advantage in intentional integration with resultant positive impacts on developmental theory and the children and adolescents served by these interventions. Additionally, because both literatures offer promise for being culturally tailored and culturally responsive, there is reason to believe that integration is feasible and appropriate for use with youth from diverse backgrounds.

With enhanced integration between these approaches, scientists may gain a new understanding of the mechanisms through which to promote positive youth development and how coping may be applied to and utilized in naturalistic contexts with diverse youth. For instance, if coping researchers either examine how youth programs are already promoting coping skill development, regardless of intent, or implement/evaluate an existing coping intervention within the context of a large youth program, they may learn more about coping development and how coping facilitates positive youth development. Additionally, youth programs generally offer an opportunity for more extensive reach and evaluation of stress-coping frameworks. While coping interventions tend to be small and targeted, youth programs can access millions of children per year; thus, with even more explicit integration, there is increased opportunity to evaluate differential effects of coping and coping-adjacent skill development for different subpopulations.

Lessons from Extant Youth Interventions

Coping Programs as Youth Development-Promoting

Coping programs already include multiple factors that promote youth development. First, they have been connected to key skills and competencies associated with positive outcomes for children and adolescents. Coping interventions have been shown to increase knowledge and understanding of coping skills (Wagner et al., 2011), use of primary and secondary control coping (Craig et al., 2018) or other active/engagement coping (Douma et al., 2019), and problem-solving skills (Plante et al., 2001). They have also demonstrated effectiveness in decreasing depressive symptoms, the appraisal of stress as a threat (Craig & Austin, 2016), externalizing behaviors (Rohde et al., 2004), and maladaptive coping strategies (e.g., withdrawal and nonproductive tension reduction; Eacott & Frydenberg, 2009; Frydenberg, 2004). Additionally, preventive coping interventions have been linked to better academic achievement (Frydenberg & Lewis, 1999) and overall psychological functioning (Douma et al., 2019). There is evidence that some coping programs increase self-esteem and healthy self-expression to adults (Rohde et al., 2004), as well as self-efficacy for facing challenges (Bugalski & Frydenberg, 2000). Because these interventions bolster skills that promote youth short-term and long-term success, coping promotion can be seen as a mechanism for healthy youth development.

Second, many coping interventions already operate from a strengths-based perspective, using children and adolescents' natural strengths, interests, and experiences to build new skills. Most programs promote flexible coping and encourage youth to select variations that best fit their individual interests and needs. For example, programs may promote "seeking diversion" as an effective coping mechanism but allow youth to determine how they might choose to apply this skill in practice (Craig et al., 2018). Other coping interventions center around specific aspects of a youth's identity or experience. For instance, the AFFIRM intervention, an eight-module coping skills intervention for sexual and gender minority youth (SGMY), includes significant attention to the unique stressors faced by SGMY (Craig et al., 2018). Further, other programs, such as the Best of Coping (BOC) and Coping for Success interventions, begin by examining youths' existing coping patterns, either altering (if maladaptive) or strengthening (if adaptive) skills (Frydenberg & Brandon, 2007). Thus, there are many existing ways of applying strengths-based, individualized approaches to coping programs that also serve to promote broader healthy youth development.

Third, many coping interventions involve elements meant to transform youth into active agents in their own development. Not only do coping interventions almost universally provide some form of psychoeducation regarding the makeup and utility of coping skills, but most also involve the provision of relevant stressor-specific information. There are examples of programs that provide psychoeducation about depression for children with depressed parents (Compas et al., 2010), statistics and reasons for divorce for youth coping with parental separation (Boring et al., 2015), or prevalence rates and factors that affect seizures for youth with epilepsy (Wagner et al., 2011). This information lays the groundwork for the application of healthy coping skills (e.g., fact-based cognitive restructuring), and it transforms youth into active and informed participants in their own lives, subsequently increasing their ability to select appropriate coping strategies.

Further, many coping programs involve explicit discussion about how to seek information to support active coping. For example, within the Op Koers Online coping intervention for preventing and reducing psychosocial problems in youth with chronic illnesses, two learning goals include information-seeking/information-giving and increased knowledge of self-management and medical compliance (Douma et al., 2019). In one session, group leaders ask participants to document questions they have about their medical condition and "look for answers." Later, they evaluate sources of information as a group to increase efficacy for obtaining reliable information. In another session, youth are prompted to find information about treatment and noncompliance. They then work through personalized examples to problem-solve and improve coping. The Op Koers intervention not only bolsters effective coping, which has been shown to increase medical compliance and psychosocial functioning (Blount et al., 2008), but it also promotes skills for gathering and applying information to overcome future challenges. Similarly, the Children of Divorce–Coping with Divorce program (Boring et al., 2015), a self-paced online intervention to improve coping in youth facing parental separation, transforms youth into active agents in a different manner, leveraging user input to tailor the content provided to each individual. In this intervention, youth develop a personal goal and provide feedback to customize program content to address the issues that are most important to them (Boring et al., 2015). Thus, youth are required to reflect on and

advocate for their own needs and preferences. This practice increases engagement and centers the youth's voice in the learning and development process, a concept that is central to youth programs (Ward & Parker, 2013).

Fourth, many coping interventions recognize the importance of bolstering coping self-efficacy (i.e., the belief in one's ability to productively cope with situations; Bandura, 1997; Park & Folkman, 1997). The concept of coping self-efficacy parallels the goals of many youth programs that aim to increase a child or adolescent's confidence in their capacity to face challenges (Lerner et al., 2005). Self-efficacy is posited to align with skill development; Bandura's self-efficacy theory suggests that improving coping skills through education and practice will improve self-efficacy for applying these skills and thus for generally managing stressors (Bandura, 1986). Extant coping interventions promote self-efficacy in a variety of ways with all attempting to, at a minimum, increase knowledge of coping skills. Further, many provide direct instruction on or exposure to new coping techniques (e.g., relaxation exercises), problem-solving approaches to determine how to successfully apply skills in new situations (Weisz et al., 2003), and cognitive restructuring methods to increase overall confidence in one's ability to use skills across contexts (Wagner et al., 2011). For example, the BOC intervention (Frydenberg & Brandon, 2007), a school-based group coping skills curriculum, touts the ultimate goal of promoting the self-confidence and competence needed for youth to proceed through challenging situations with mastery (as defined by Seligman et al., 1995). This program builds understanding of and strategies for coping, and it also engages youth in developing competencies for effectively communicating, solving problems, making decisions, setting goals, thinking optimistically, and managing time (Frydenberg, 2004). An evaluation of the program demonstrated that participants' coping self-efficacy significantly increased compared to nonparticipants (Frydenberg, 2004). These broad skills can foster capabilities essential for thriving in youth and beyond, as well as confidence for managing inevitable future challenges.

Finally, while many coping interventions center around bolstering skills for coping with a particular set of demands or within a specific context, these skills can also be generalized and applied to a variety of challenges, thus contributing to overall positive development and future success for youth. Framing coping skills as developmental assets emphasizes the ongoing gains youth receive from garnering this set of competencies. Many programs, even those that target a specific stressor, involve some discussion to generalize skills to broader contexts. For example, the AFFIRM intervention for SGMY involves session activities particularly designed to promote hope and self-efficacy for future coping, including preparing youth to "respond to discrimination or harassment in social situations" (Craig & Austin, 2016, p. 139). Thus, while rooted in present stress and skill development, coping programs are well-suited to promote long-term and adaptive skills that can benefit youth far beyond the bounds of these interventions.

In sum, many coping programs, though not self-identified as youth programs, are already operating from a broader developmental, thriving perspective. These coping programs' overarching goal of facilitating the development of adaptive coping responses to stress parallels the goals of many youth programs. By developing individual competencies, using personalized and strengths-based approaches, working to augment coping self-efficacy and empowered engagement in the context of challenges, and fostering future-oriented thinking, it is clear that coping programs contribute to the preparation of youth as well-rounded,

active agents in their development. Thus, it can be beneficial for coping researchers to think of coping as the individualized, active engagement of youth when faced with challenges and in the management of their own development.

Youth Programming as Coping-Promoting

Just as coping programs can be used to foster youth development, lessons from youth programs can be used to bolster coping interventions. Extant youth programs offer insight into how to harness strengths in naturally occurring environments to promote youth engagement and growth. Further, the social nature of many youth programs may lend itself to enhancing coping outcomes through the facilitation of peer interactions and high-quality relationships with supportive adults. Finally, many youth programs have already begun to recognize coping both as a mechanism to promote positive youth development and as an indicator of successful youth programming. Thus, lessons from the design, implementation, and evaluation of youth programs can be used to strengthen existing coping-enhancement efforts.

While the standardized or modularized approach of many coping interventions allows for implementation fidelity and skill specificity, this form of intervention occurs outside of a child or adolescent's real life and instead within a more regimented environment (e.g., online modules, hospital-based groups). Given the strength of other youth programming approaches in accessing young people in their natural contexts, it may be helpful for coping researchers to integrate lessons from broader youth programming to inform their methods and setting selection. Moving coping development from regimented intervention environments to more naturalistic settings (e.g., schools, after-school programs, community centers) may increase youth engagement and better facilitate the generalization of these skills into "real world" settings.

Some coping programs have already taken a more naturalistic versus standardized approach to coping promotion. One example is the Coping Through Football intervention, which engages individuals with chronic mental illness in small soccer games facilitated by mental health practitioners and soccer coaches (Friedrich & Mason, 2018). Applying a qualitative approach, researchers assessed the effects of this free-form intervention on participant coping and self-reported outcomes. Participants acknowledged that this intervention improved their relationships and emotional well-being, provided opportunity for diversion and exercise, and increased their passion for the game. They identified many of these themes as boosting their ability and self-efficacy for coping with their mental health challenges, which parallels results of prior qualitative evaluations of coping through sports interventions (e.g., McElroy et al., 2008).

Other youth programs that operate in these natural settings have also examined their role in coping development. Two sport-focused after-school programs showed that taking an assets-focused approach to coaching resulted in improved coping as evidenced by youth self-report of the use of positive coping skills (e.g., coping through energy/tension release through play), better emotion regulation (e.g., after losing a game), and decreased use of maladaptive coping strategies (Danish et al., 2004). Further, both studies highlight evidence that coping functions as a promoter of positive development by building character (e.g., sportsmanship), competence (e.g., effectively managing stress through physical activity, self-regulating during frustration), and connection (e.g., teamwork, teammate relationships). In sum, youth programs can simultaneously

promote coping and broader positive development through existing activities and in natural settings.

The social nature of youth programs, including both peer interaction and engagement with nonfamilial adults, offers an important supportive base through which to promote coping skill development and practice. Social support theory suggests that greater social support results in resilience, easier ability to access skill sets, and increased aptitude in navigating challenging contexts (Boyce, 1985). In other words, social support is posited to buffer against adversity and to promote skill development. This supposition has been reflected in coping research with evidence to suggest that the availability of social support can increase the likelihood that youth will use social or other-oriented coping skills (e.g., talking to someone or seeking help with problem-solving). Further, social support can improve youth self-esteem, autonomy, and self-efficacy for using coping skills (Masi et al., 2011; Uchino, 2009). Many of the extant coping interventions operate in the group environment with developers positing that sharing emotions and experiences, as well as developing peer relationships, can positively affect coping and adjustment in the context of stressors (Clarke & DeBar, 2010). However, these groups are often limited by low participant numbers and scheduling challenges. Youth programs often have greater capacity for reaching youth, because they are situated in naturally occurring settings (DuBois et al., 2011). These programs offer similar benefits through organically forming youth relationships in a supportive environment. Further, in comparison to stressor-specific coping programs, broader youth programs may include children and adolescents with a greater variety of natural coping skills and/or who have already dealt with some of the challenges other participants may be facing. By viewing supportive peer and youth–adult relationships as assets for promoting positive development and working to foster these connections, coping programs can better facilitate skill development and thriving among children and adolescents, as well as provide longer-term supportive relationships (Donlan et al., 2015).

Further, mentoring interventions, one of the most widely applied forms of youth programming, serve as another avenue for coping development through meaningful relationships with supportive adults. Some mentoring interventions have begun to explore their role in coping development. While more investigation is needed, results of program evaluations present preliminary evidence for the ways in which mentoring relates to coping and positive development. Three evaluations of various BBBS organizations offered brief references to the role of coping in their programming. First, Grossman and Tierney (1998) hypothesized that mentoring would inhibit youth substance use and delinquent behavior by "providing youths with good role models, helping them to cope with peer pressures, to think through the consequences of their actions, and to become involved in socially acceptable activities" (Grossman & Tierney, 1998, p. 413). Second, Dolan et al. (2011) proposed that mentoring programs serve to improve participants' perceived social support, which in turn increases their ability to cope effectively with life stressors through use of these social connections. Third, DuBois and colleagues (2002) suggested that when mentors form a strong enough relationship with youth, it can serve as a venue through which youth can develop "important psychological and behavioral assets, including … abilities for coping" (DuBois et al., 2002, p. 24). They posited that this process occurs when mentors help youth navigate challenging life events through modeling or providing instruction on

appropriate coping efforts. These three evaluations highlight relationship quality as key to facilitating this process and cite research linking greater perceived social support to the development of more active, solution-focused coping (e.g., Petersen et al., 1991). An evaluation of a wilderness mentoring program also championed the importance of positive youth–adult relationships for promoting coping and ultimately thriving, emphasizing the additional role of "enriching life experiences, which are both structured and voluntary, that the youth and mentor can share" (Norton & Watt, 2014, p. 339). Research suggests that these enriching collaborative activities, coupled with mentor-facilitated reflection can promote healthy coping skill development and support subsequent resilience and positive development (Russell, 2006). Overall, extant youth programs that apply a mentoring approach highlight that the social support of the mentor–mentee relationship and application in reflective real-world scenarios can promote youth coping skill development.

Similarly, the promotion of known youth development constructs can be used to bolster coping development. For example, Erdem and colleagues' (2016) evaluation of a BBBS program identified PYD competencies, conceptualized through the 5 Cs model (Lerner et al., 2005), as mediators of the relation between mentor support and coping skills among other indicators of emotional and behavioral functioning. Finally, Zhu and Shek (2020) describe their quasi-experimental evaluation of a cultural adaptation of the Positive Adolescent Training through Holistic Social program as aiming to "cultivate and enhance youths' PYD attributes, which enable them to cope with developmental challenges in an adaptive manner and maintain healthy functioning," suggesting that a focus on PYD capabilities and resources can bolster the development of coping (Zhu & Shek, 2020, p. 2). Thus, there is evidence that coping and youth development are strongly intertwined and that the promotion of either one will reinforce the other.

Many youth program developers are beginning to recognize the benefits of coping promotion as a conceptually central process for promoting positive development and as an indicator of healthy development. Some youth programs that follow a more prescriptive, curriculum-focused approach to promoting broad youth development competencies have included coping instruction within their programs. For example, the Positive Youth Development Collaborative (PYDC) included a session on "understanding and coping with stress and learning stress-reduction strategies" (Tebes et al., 2007 , p. 240). This curriculum (see Tebes et al., 2007 for more details) was integrated into an after-school program that involved engagement with cultural and community organizations and fostered adult–youth partnerships. Thus, the PYDC is a strong example of how youth programs might integrate more direct coping skills instruction while maintaining natural opportunities to promote coping through community engagement and social opportunities. As another example, the Bicultural Competence Skills Approach (BCSA; Schinke et al., 2000) is an intervention of 10–15 sessions that provides direct skill instruction in communication, coping (e.g., positive self-talk, relaxation), and decision-making through an integrated lens of both Native American and popular American cultures. This program aims to bolster social support networks through engagement with prosocial peers, family, and tribal members. The BCSA demonstrates aspects of quality youth programming through its accessible community setting, social support focus, and cultural strengths perspective while integrating explicit coping skills training (i.e., instruction, modeling, coaching, feedback). Both of these programs resulted in reductions

in substance use and healthier attitudes toward drugs and alcohol (Schinke et al., 2000; Tebes et al., 2007). In sum, many youth programs have recognized the benefits of coping for reducing risk and fostering positive development.

However, although one can find reference to coping in some program descriptions, in most cases (including those already listed), there is no available curriculum or guidebook outlining specific instructional activities. In most cases, coping is mentioned as one of several positive development goals and is linked to adaptive outcomes but not analyzed separately for its impact on these outcomes. Thus, while youth programs have engaged in clear preliminary efforts to recognize the value of coping and integrate coping skill instruction into their interventions, more work is needed to understand the role of coping in these youth development processes.

Overall, the youth programs literature suggests coping enhancement interventions would benefit from implementation in children and adolescents' natural contexts and from greater emphasis on the promotive nature of positive peer and youth–adult relationships. Similarly, there is opportunity for youth programs to better integrate activities from coping interventions (e.g., psychoeducation, discussion, direct skill instruction) or to reinforce existing opportunities for coping development (e.g., self-regulation in the context of losing a game, coping with peer conflict in different situations, managing school stress, turning to their mentors for advice) in naturally occurring activities or contexts. Even without changes to their existing activities or curricula, youth programs should strongly consider assessing their impact on the development of coping due to its essential role in youth development and its promise for helping participants reach these programs' desired goals.

Cultural Considerations in Coping Interventions and Youth Programs

Both coping interventions and youth programs serve children and adolescents from diverse backgrounds. Thus, it is imperative that they consider culture at all points of contact. There is growing acknowledgment of the bidirectional interrelation between individual and environment at multiple ecological levels (Bronfenbrenner, 1992) and the impact of these processes on youth development (Lerner et al., 2009). Further, there is immense research underscoring the need to consider cultural factors in youth programming and intervention design (Overton, 2015; Tolan & Grant, 2009; Wiium & Dimitrova, 2019). Cultural consideration can inform intervention selection, support the enhancement of intervention effects, and facilitate the identification of cross-cultural elements that may promote generalizable effects (Williams & Deutsch, 2016).

Both the coping and youth development literatures, as well as some resulting interventions, have already demonstrated thoughtfulness and attention to cultural considerations. The coping literature, for instance, emphasizes the importance of promoting individualized coping with the acknowledgment that there are both cross-cultural similarities and distinctions in coping. Research has identified cultural differences in stress and resilience pathways and coping mechanisms, and suggests that acculturation, self-construal, and individualistic-collectivistic identities impact coping approaches (Kuo, 2011). While many aspects of identity can influence coping, the most prominent variations have been examined across different national and racial/ethnic populations (e.g., Kuo, 2011; Ungar et al., 2007). For example, extensive work has been conducted to explore identity as an aspect of coping in African American

youth, highlighting religious and spiritual engagement, racial socialization, and cultural pride as contributors to healthy coping, resilience, and positive development (Spencer et al., 2003). Similarly, there has been attention to the experiences and coping practices of immigrant and immigrant-origin youth (e.g., James, 1997; Tummala-Narra & Sathasivam-Rueckert, 2016). While the coping field values and aims to promote culturally specific coping approaches, recent work has also focused on universal aspects of coping that are beneficial across cultures (Kuo, 2011). Future coping interventions should be thoughtful about culture within their intended samples and be sure to promote both culturally specific and cross-cultural coping approaches (Clauss-Ehlers, 2008).

Many youth programs also have an existing culture-specific or context-specific focus (e.g., for African American males, for youth living in low socioeconomic status urban communities; Williams & Deutsch, 2016). These programs often explicitly acknowledge that the youth they serve are facing circumstantial and structural stressors/impediments and that coping with these is essential to strong identity formation and successful development. For example, many youth programs target specific populations facing environmental- or identity-related challenges. Programs have been created to support LGBTQIA+ groups (e.g., Centers for Disease Control and Prevention, 2017), racial and ethnic minorities (e.g., Neblett et al., 2012), families facing community violence or living in poverty (e.g., Tolan & Grant, 2009), and HIV-positive communities (e.g., Arnold & Rotheram-Borus, 2009). Further, these programs have been widely implemented, and efforts have been made to responsibly adapt these interventions to function effectively in their cultural context (e.g., Wiium & Dimitrova, 2019). Researchers developing new interventions should consider who their intervention is for and in what context it should be implemented, integrating lessons from prior research.

Youth programs also operate from a cultural strengths approach, framing community and culture as resources for promoting positive development (Lerner, 2009). The idea of harnessing youth and community strengths to foster positive development in the face of cultural, identity, or general developmental challenges is aligned with and complements coping. There is a burgeoning discussion of the ways in which culture can be harnessed to serve promotive and protective functions. For example, Neblett and colleagues (2012) identify racial and ethnic identity, ethnic-racial socialization, and cultural orientation as key pathways for promoting positive development in minority youth, particularly for improving self-concept, healthy cognitive appraisals, coping strategies, and overall adjustment. Greater attention is needed to examine promotive youth development processes for individuals from even more groups and varied backgrounds.

Work by Smith Lee and colleagues (2020) offers an example of what culturally responsive integration of youth development and coping in a high-risk population might look like. This study, though not an intervention, examined religiosity and spirituality as cultural assets in a sample of 31 Black male young adults and how these assets interacted with traumatic loss through homicide to impact their development and mental health (Smith Lee et al., 2020). Through qualitative interviews, these authors identified religious/spiritual coping as a means through which young Black men can "a) … process pain in the aftermath of homicide, construct meaning, and find hope, b) reduce fear of fatal victimization, c) protect against retaliatory violence and trauma recidivism, and, d) foster posttraumatic growth" (Smith Lee et al., 2020, p. 8).

This work offers a great example of how to view culturally specific coping (in this case religiosity and spirituality) as a positive developmental asset appropriate for promotion through youth programming.

Overall, culture and community needs must be taken into consideration when integrating stress-coping frameworks and youth programs, as they can be used to provide a more enriching and effective experience for youth development (Institute of Medicine, 2002; Thomas, 2004). Program developers must consider systemic barriers and cultural and identity stressors that intended populations might be facing. They should adopt a strengths-based approach to highlight and amplify existing personal, community, and cultural resources to promote adaptive coping and youth development. These considerations should be apparent in design, implementation, content, and measurement (Clauss-Ehlers, 2008).

Future Directions

The present chapter was intended to show the clear overlap and mutual compatibility of youth programs with coping study and highlight the advantages for coping researchers of focusing on youth programs. To help move toward more collaboration between coping scholars and youth programs leaders, we suggest several areas of work be prioritized.

First, we recommend that coping researchers collaborate with relevant youth programming representatives (e.g., program directors, designers, and evaluation experts) to learn about how youth programs are structured, uncover the basis for youth engagement in organized programs, and explore the intended impact of such programs on children and adolescents. The goal is to develop and apply a formal conceptual model of youth programs utilizing coping concepts and frameworks. This undertaking may include qualitative description efforts and a rich exchange that results in not only a sensitive and sophisticated model but also a shared language that can be used as the basis for meaningful and scientifically sound evaluation. Currently, youth program professionals may neither formally conceptualize helping youth as entailing specific coping processes nor be aware of stress-coping frameworks.

Further, as coping researchers learn more about the variation in how youth programs are structured, the types of necessary evaluations and the best approach to studying these programs using experimental design can be understood. This collaboration is likely to make evaluation not only more sensitive to any impact but also more useful for practice, as results may be rendered from an evaluation that reflects the practical considerations that can guide community-based youth programming. The mutual understanding that will come with such collaborations can help researchers overcome challenges, such as recognizing that what appear to be different processes of helping may reflect some underlying shared coping-promoting procedure. For example, a youth might be gaining support for problem-focused coping from the patience of a counselor when disputes arise in a basketball game, as well as working with other participants on how to obtain access to the court during busy times. In sum, greater familiarity between coping researchers and youth program leaders will increase all professionals' understanding of the nuances of each area, increase their awareness of shared mechanisms of influence, and support them in developing a common language for moving youth development efforts forward.

While such information is broadly accessible in the literature or may be discernible apart from specific experiences, there are likely to be individual differences between programs that warrant specific attention. One important

challenge is the heterogeneity of experiences within the same youth program. One individual may be benefiting by practicing new social skills with prosocial peers, another may be learning problem-solving skills through sports, and a third may be experiencing dependable adult support through a mentorship relationship with an adult staff member. Coping researchers can clarify the multiplicity of possible coping processes in a given setting, as well synthesize the shared process of impact of what, at face value, might appear to be divergent activities.

Second, through this collaboration, we recommend coping researchers work to better study the naturalistic coping opportunities that occur within youth programs. Because there often are not prescribed activities or set curricula in such programs, there may not be any specific task that is designated as "coping training." Instead, coping may be occurring naturalistically in many instances and through various relationships. As coping researchers are investigating youth programs, ample thought must be put into how to evaluate time spent on coping development and how to identify opportunities for coping if coping is not explicitly built into the program or curriculum. One approach may be to conduct observations and note naturally occurring opportunities for coping. For example, if a group of children is playing basketball at their local Boys and Girls Club and one child steals the ball from another player, there exists a natural opportunity for coping skill use. Researchers should note such instances/opportunities in an effort to gain an exhaustive understanding of coping in the context of youth programs. With that information, coping researchers can consider how to more intentionally promote coping development and use. To continue the same example, if sports are identified as an opportunity for coping, there may be an opening to provide structured time to process the results of winning or losing a game within the youth program's model.

These two foundational steps can provide direction for the explicit formulation of a program's impact as coping promoting and guide evaluation that can measure the efficacy of a program on its intended goals, including variations in impact by exposure level, participant characteristics, and program implementation (i.e., what of the expected activities are implemented). This more formal evaluation should not only serve scholarly interests but also provide more sound and informative evaluation results for practitioners, administrators, and funders. Additionally, it will be important to study how formalizing or increasing emphasis on coping support and skill improvement could be undertaken in youth programs, testing if such explicit attention to coping enhances impact for children and adolescents. Relatedly, evaluation efforts could help clarify how program participant characteristics and needs relate to impact, and conversely, how program approaches and activities might be better attuned to diverse needs. These findings are likely to provide some of the more effective and useful directions for the training and management of staff in such programs. Identification of what staff skills, approaches, and perspectives are related to impact can be translated to preferred training and employment emphases.

Summary and Conclusion

Due to existing overlap in their goals and approaches, as well as their benefits for children and adolescents, connecting these two areas of importance in promoting healthy youth development – stress-coping frameworks and youth programs – seems likely to yield rich understanding and multiple practical improvements for both areas of work. More specifically, integration between coping

interventions and youth programs may clarify or illuminate new mechanisms that promote positive youth outcomes, bolster scientific awareness of how coping develops in naturally occurring settings, enhance the effectiveness of preexisting and future youth programming, and expand the reach of a wide range of coping-promoting interventions. Extant theoretical literature and program evaluations lend support for this integration.

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Numbers: **bold**=table, *italics*=figure; an additional reference within a span is listed first (e.g. *1333*, 1329-1338).
Small words (and, as, for, in, of, through) *are* alphabetised.