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Preface

A group of friends are sitting at a laid table. Their hands move to pick up and pass plates full of appetizing and well-presented things, and in the meantime the conversation flows pleasantly, creating one of those moments of conviviality that we then often remember with great pleasure. What can the social psychology of nutrition tell us about these people and their food choices? Quite a lot. For example, why they choose certain foods and not others, who they prefer to eat with, where they like to buy food, how much they are willing to spend, what value they place on the quality of what they eat, the aesthetic appearance, whether it is healthy, light, or sustainably produced food for the environment and for workers.

What if some of these friends want to change their eating habits, e.g., go on a diet or become vegetarian, or maybe just try something they have never eaten before? Will he be successful? What phases will he go through before he actually does it? And what information, advice, experiences of other people will be able to influence this path, support it or, conversely, hinder it? In this case, too, the social psychology of eating offers us answers. It tells us, for example, how behavioral changes can be built up in interaction and with the support of others, but only if these others are in agreement with the needs of the interlocutors, with their desires, their motivations, and ultimately with what they (more or less consciously) want.

In this volume, we will see how the theories and methods developed in the field of social psychology can be usefully extended to the study of food choices and how they change, creating a discipline we can call the social psychology of eating. A systematic volume on this discipline was still lacking. We have therefore passionately devoted ourselves to this endeavor by describing the major contributions that research in the field has made so far and showing how much remains to be explored in this largely unexplored area of research. An investigation that certainly seems worthwhile, as the initial results already give us many clues as to how we can promote optimal food choices for our quality of life and the environment.

In Chap. 1, we first define the field of study of the social psychology of eating, which considers the cognitive, emotional, relational, value-based, and behavioral factors underlying food choices and changes. We then show the importance of integrating the approach of this discipline with that of other disciplines dealing with

food choice from different angles (medical, economic, political, sociological disciplines, etc.).

In Chap. 2, we focus our attention on the processes that regulate the development of eating habits and behaviors, as well as the personal and contextual factors that lead us to reinforce or change these behaviors. We then examine the different phases that characterize our relationship with food, from purchase to transport, from storage to preparation and consumption. In doing so, we show that in each of these phases, the various psychosocial factors play a fundamental role, which are then discussed in detail in the four chapters that follow.

The study of cognitive factors, which is the subject of Chap. 3, is important for understanding the way we receive, interpret, and apply food-related information and the reasons that guide our food choice decisions (e.g., health, well-being, or protection of the environment).

In Chap. 4, we look at the fascinating world of emotions in relation to our eating behavior. The link between food and emotions is strong, even if we are often not fully aware of it and struggle to recognize it. The results of this emotional entanglement are sometimes positive for us, but sometimes not exactly conducive to improving our health and well-being, for example when food becomes the main means to reduce negative emotions.

We are also often not fully aware of how our food choices are influenced by others. This is discussed in Chap. 5, where a series of key constructs of social psychology are also examined, such as stereotypes, norms, social identity, and values. These constructs play a relevant role in understanding food choices. Choices that are often not easy to change. Past habits and experiences tend to reverberate on our future choices, and many of our eating behaviors quickly become automatisms that are difficult to change, even when we want to do so. Chapter 6 deals with this, also revealing what are the steps that can instead lead us to successfully change in the desired direction.

The last four chapters of the volume focus on the theme of food communication, trying to understand how it is possible to relate effectively with people to support them in food choices consistent with their resources, their health, and their well-being. Given that obviously everyone is free to do what they want with their lives (therefore also to eat what they want), the question of how institutions, bodies, or companies can support people in a process of change in the direction of greater health, well-being, or sustainability appears crucial. Public campaigns on the subject of healthy eating often do not have the hoped-for success, and this probably happens because communication on these issues does not always truly resonate with the resources and motivations of the people for whom it is intended.

In Chap. 7, we explore how a message on nutrition is developed, and we also look at the issue of credibility of sources (e.g., from the World Health Organization to food influencers). A topic, namely that of the source, that is central to any communication process, and even more so when we talk about food, i.e., something that is extremely important to us, that we put into our bodies, and that can do us good or, conversely, harm us. Chapter 8 focuses instead on the content and style of messages about food, which, to be effective, must use the psychosocial factors discussed in

the previous chapters of the volume. In this chapter, we learn about the extent to which the choice of content or the positive or negative connotation of messages needs to be carefully evaluated when designing any communicative intervention on these topics. And in Chap. 9, we address perhaps the most important and thorny issue, that of message-recipient harmony in food communication. Individual differences between recipients, for example in terms of regulatory focus, self-efficacy, or values, need to be carefully considered if we are to truly "tailor" the communication to our interlocutors, thereby increasing the likelihood that the exchange will be a truly "happy" one.

And so we come to the final chapter of the volume, Chap. 10, which is devoted to digital communication. Here, the focus is on whether a collaboration between the social psychology of eating and artificial intelligence can be fruitful in developing food communication that is truly attuned to the needs of the interlocutors. The analysis explores the risks, but also the opportunities, associated with using automated communication systems to support food decisions. Among the most important opportunities is the possibility of promoting dietary change on a large scale, reaching large numbers of people in a short time and at lower cost. This is possible thanks to the ability to enrich and accelerate people's profiling, modulate communication interventions based on the profiles, and provide data to monitor achievement in real time. The chapter presents examples of how integration between models of the social psychology of eating and models of artificial intelligence has already begun. The volume concludes with this openness to the future, convinced that the development of new technologies, if guided starting from knowledge and full respect for people's needs, can help to fully improve their humanity.

In writing the volume as a whole, we have taken into account, as far as possible, the possibly diverse backgrounds of our readers in terms of their abilities and interests. As mentioned earlier, the reference concepts are those of social psychology applied to the topic of nutrition. However, even those unfamiliar with psychology can approach the text with confidence, as the concepts are always defined and explained first and then applied to the specific area of food choices. Everyone should be able to find their preferred reading path. Students of courses related to psychology or nutrition will be able to study the book systematically to approach the theories and methods of this scientific discipline. Professionals (doctors, nutritionists, politicians, marketing experts, etc.) who are involved in people's food choices for various reasons will find some "tips" to learn more about the wonderful and complex mechanisms that govern food choices. And finally, a simply curious person can learn more about how they themselves think about food, perhaps increasing the awareness and control that can be so useful when we want to step out of our schemas and start a process of change.

At the end of this work, we would like to thank Maria Morandi and Laura Picciafoco who have produced with precision and patience many of the tables and figures proposed in this volume. We would also like to thank Marco Piastra for the valuable advice on the content of Chap. 10, and Aurelio Mottola and Alessandra Pagani who, with kindness (but also determination), set the deadlines useful for turning an idea into something concrete. Sharon Panulla and Hemalatha Velarasu

have accompanied us in all phases of the realization of the book for Springer Nature. Our thanks also go to them. And we thank the many colleagues who have provided the raw material for this volume, theories and research data that enable the social psychology of eating to grow ever faster and provide answers to problems that affect our quality of life and the environment. And last but not least, we thank our students, whose enthusiasm, curiosity, and questions inspire us every day to deepen our research on such a fascinating topic.

Milan, Italy — Patrizia Catellani
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Contents

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Patrizia Catellani is a full professor of Social Psychology at the Catholic University of Milan, Italy. She is director of PsyLab (Psychology, Law and Policy Lab). She is a member of the Scientific Advisory Board of the European Social Survey (ESS) and of the PNRR Fostering Open Science in Social Science (FOSSR) research infrastructure. Her research focuses on reasoning, decision-making, and communication in different social and political contexts. She has explored how food and health communication can be made more effective in promoting healthy and sustainable purchasing and consumption decisions. An extension of this research direction focuses on the integration of social psychology and artificial intelligence. The goal is to develop digital communication systems that promote health, well-being, and sustainability through personalized framing. Quick profiling is used to identify optimal communication strategies for behavior change, taking into account individuals' resources and motivations. Related research areas have explored the impact of prefactual communication aimed at promoting public policy, for example on climate change mitigation and adaptation, by strategically framing possible future scenarios to appeal to and persuade audiences. Other research areas explore how people develop different representations and alternative explanations of events with political, legal, or personal relevance. The focus is on counterfactual reasoning and communication ("If... then..."), and on the conditions that can promote a complete and truthful analysis of events or, conversely, a strategic representation of the past that highlights possible better or worse alternatives that are compatible with one's own worldview. She is the author of some 130 publications, including journal articles and books. The detailed profile and all activities can be found at www.patriziacatellani.com

Valentina Carfora is an associate professor of Social Psychology at the International University of Rome, Italy, and a cognitive behavioral therapist. Her research activity focuses on predicting and promoting healthy and sustainable behaviors, especially related to food choices (e.g., reduced meat consumption, regular consumption of fruits and vegetables, organic food purchasing). Her main activity is concerned with: socio-cognitive models to explain healthy, environmental, and purchasing

behavior; persuasive communication, with particular reference to assessing its effectiveness in changing behavior (affective messages, cognitive messages, normative messages, self-monitoring messages); personal and social identity, by examining the processes of identity construction and their power to support behavior change; the role of anticipated emotions in predicting behavior change; the role of social norms in promoting sustainable eating habits; the use of artificial intelligence to design tailored communication to promote healthy and sustainable behaviors. She has participated in and coordinated several research projects funded by the European Union, the Lombardy Region, the University of Naples "Federico II," and the Catholic University of Milan. She is the author of about 40 scientific publications, including journal articles and book chapters. She edited the eBook "Mind the Sustainable Food: New Insights in Food Psychology" published by Frontiers in Psychology (2021). She is also a member of the Associazione Italiana Psicologia (AIP) and the Associazione SIPSA (Società Italiana di Psicologia della Salute).

Chapter 1
Introduction

1.1 The Social Psychology of Eating

It is an evening in July. A friend of ours posts a photo on social media of a table set, with many people sitting around it, having dinner on a terrace by the sea. What do we "read" in this photo and how do we react to it? Even a cursory glance at this photo can tell us a lot about our friend. For example, what she likes to eat, how she presents the dishes to her friends, and who she is sitting with at the table. If we start from this photo and what we know about our friend, we can try to draw further conclusions. For example, we can think about her food literacy (what she knows about food and how to prepare it), her feelings about food, and how much her background, family, and current social relationships influence her food choices. The factors that influence her choices can vary. For example, depending on how important health, well-being, or the environment are to her, she may prefer to buy fish from open waters rather than farmed fish, etc. And even now, when she eats with friends, their comments and behaviors may influence her. Perhaps her long-term goal of replacing animal proteins in her diet with plant proteins can lead to an effective change in her eating behavior.

The **social psychology of eating** *examines the cognitive, emotional, relational, value-related, and behavioral dimensions underlying food choices.* It borrows from theories and methods of social psychology by assuming a reciprocal influence between people and their environment and examining how this influence occurs through communication (Carfora et al., 2021). Although the history of nutrition is as long as that of humankind, it is only since the twentieth century that scientific research has confirmed the close connection between nutrition, health, well-being, and the environment. At the same time, consumers began to move away from the idea that food merely satisfies a physiological need and became more attentive to the consequences of their food choices. The increasing knowledge of the close

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relationship between humans, food, and the environment makes the so-called "omnivore dilemma" an important and topical issue (Pollan, 2008). The omnivore dilemma refers to the typical difficulties that humans, as omnivores, have in determining their diet. Several attempts to resolve this dilemma are now leading to a potential turning point. The increasingly urgent demand for authenticity and sustainability in all its forms offers an opportunity to fundamentally rethink the relationship between people and food.

Within this general framework, the social psychology of eating offers theories and methods useful for understanding the factors behind **sustainable food choices**, that is, choices that promote the health and well-being of individuals while not harming the environment, respecting workers' rights, being safe, fair, and culturally acceptable (WHO, 2019).

Figure 1.1 illustrates how the psychosocial dimension of food choices, which is the focus of this volume, can be usefully linked to other dimensions that are also associated with and influence food choices. First, there are different types of food choices: what food to eat or not to eat (food selection), in what quantity (chosen portion sizes), when (timing of consumption), and how often (frequency of consumption) (Conner & Armitage, 2013). All these decisions are primarily influenced by the properties of food (quality, nutritional value, availability, etc.; Sect. 1.2). However, there are a number of other dimensions that influence our choices and are located at both the micro and macro levels. Our main focus is on the psychosocial dimension, which is located at the micro level and concerns people's cognitions, emotions, social relationships, values, and habits related to food choices. The psychosocial dimension is in turn linked to other micro-level dimensions: the sensory dimension (e.g., taste), the physiological dimension (e.g., hunger and satiety), and the

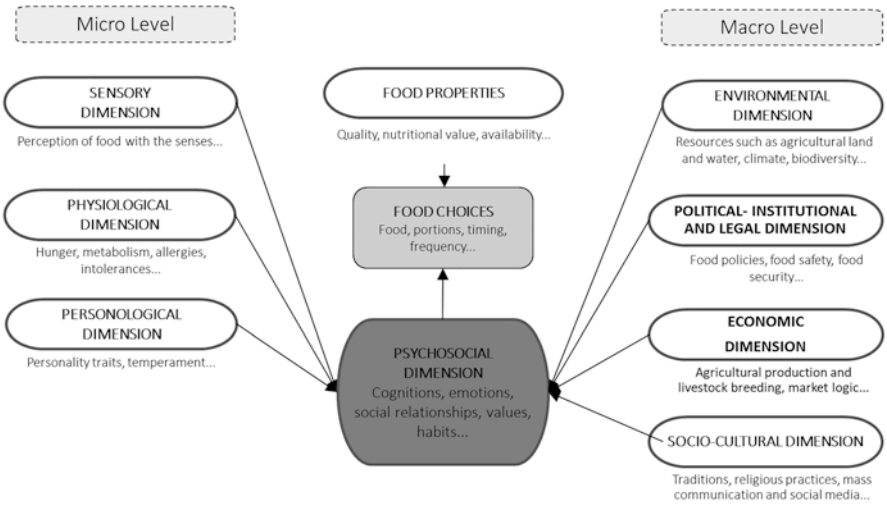

Fig. 1.1 Relationships between the psychosocial dimension and other dimensions in food choice

personological dimension (e.g., personality traits) (Sect. 1.3). On the other hand, as shown in Fig. 1.1, the psychosocial dimension is also linked with a whole range of dimensions that are more macro-level: environmental, economic, political-institutional, legal, and socio-cultural dimensions (Sect. 1.4). These dimensions are very important, for example, in terms of what food is or is not available, how it is produced and processed, its relevance for consumption, etc. However, they also have an impact on the psychosocial dimension, because they determine the framework in which people think about food, feel emotions about eating, and refer to food in defining their social, territorial, religious, and political identity. They also influence the expression of values in relation to food and the formation of habits and lifestyles. Let us now briefly look at each of the dimensions we have just listed and illustrate with some examples the role they play in our food choices.

1.2 Properties of Food

Foods can be defined as *edible products for human consumption*. Foods can be raw, processed, or cooked and are consumed for nutritional, growth, health, or pleasure purposes. They contain nutrients (proteins, fats, carbohydrates, vitamins, and minerals), non-nutrients (i.e., substances without nutritional value with bioactive effects or pharmacological properties, such as substances with antioxidant activity), and anti-nutrients (i.e., substances that interfere with the absorption or action of nutrients, such as oxalic acid or avidin). Finally, they may also contain undesirable compounds due to chemical or biological impurities (CREA, 2017).

Foods can be classified according to various criteria, such as their origin (animal, plant), their product characteristics (production and use properties), their processing methods, and so on. In Box 1.1 we have listed a selection of the most common definitions of food in the food market and among consumers. Table 1.1 shows a classification that is particularly important for the relationship between nutrition and health, namely, the classification into homogeneous food groups from a nutritional perspective (Food and Nutrition Research Centre, CREA, 2017). This classification is an important point of reference when drawing up guidelines for a healthy diet. The five main food groups are classified according to their main nutrients. Within each group (e.g., “fruits and vegetables”), subgroups of foods with different product characteristics can be distinguished (e.g., “fruits” and “vegetables”). At the same time, within each sub-group, it is possible to distinguish different types (e.g., “fresh fruit,” “dried fruit”) that can provide a different amount of the typical nutrients of the group at the same weight. In Italy, the Healthy Eating Guidelines provide for five main food groups: cereals and products derived from them; tubers; fruits and vegetables; meat, fish, eggs, and pulses; milk and dairy products; and dietary fats. Table 1.1 also summarizes some consumption tips for each subgroup.

Box 1.1: General Definitions of Food

Typologies of Food by Production Method

- **Organic food**. Food produced using methods that meet organic farming standards. Standards vary around the world, but in general organic farming includes practices that aim to recycle resources, promote ecological balance, and conserve biodiversity. Organizations that regulate organic farming may restrict the use of certain pesticides and fertilizers. Many countries require producers to obtain special certification in order to market food as organic within their borders.

Seasonal food. Products grown at a particular time of year, when the harvest or taste of a particular type of food is at its best (e.g., peas in May).

Natural food. This definition, widely used in food labelling and marketing, has a variety of often vague or misleading definitions. It often refers to unprocessed foods whose ingredients are all natural (in the chemical sense of the word) and thus convey a connection to nature, for example, cereal products.

Local food. These are foods that come from production and processing sites no more than 70 km from the point of sale (e.g., chestnuts harvested and sold near the forest where they were harvested).

Typologies of Food by Type of Preservation

- **Fresh food**. Food that has not been preserved and has not yet spoiled (e.g., freshly harvested vegetables and fruit that have been properly treated after harvest; freshly slaughtered meat; freshly caught fish).

Frozen or quick-frozen food. Food that is frozen to slow its decomposition by converting residual moisture into ice and inhibiting the growth of most types of bacteria. A food can only be frozen on an industrial scale with ad hoc equipment. In this case, the freezing process is very fast and manages to bring the temperature down to −80 °C. The frozen product has a similar appearance to a fresh one, which cannot be said of a frozen product made with a home freezer (e.g., frozen soup cubes, slices of frozen fish).

Long-life food. Food that is normally stored in the refrigerator but has been processed so that it can be safely stored at room temperature (e.g., packaged freeze-dried eggs, which can be stored for a long time compared to fresh eggs).

Typologies of Foods According to How They Are Prepared or Consumed

- **Finger food.** Food intended to be eaten with the hands (e.g., in Ethiopian cuisine, various dishes are rolled in injera bread).

Street food. Ready-to-eat food and beverages prepared and/or sold by traders. Usually local, regional, ethnic cuisine, often eaten while walking, including on the occasion of fairs and popular festivals (often, but not

(continued)

Box 1.1 (continued)

exclusively, it also involves finger food, for example, hot dogs, skewers, pretzels, pizza rolls).

Traditional food. Traditional foods and dishes may have a historical background and be referred to as national, regional, or local dishes (e.g., fish and crisps, tacos).

Rural food. Dishes typical of a particular culture, prepared from affordable and inexpensive ingredients and usually spiced to make them more palatable. They often make up a large part of the diet of people living in poverty or on lower incomes than the average for their society or country (e.g., pottage in the UK, bread and oil in Italy).

Whole food. Unprocessed and unrefined plant foods or as little as possible processed and refined before consumption (e.g., whole grains, tubers, pulses, fruit, vegetables).

Pre-cooked food. Foods that are sold already or partially cooked to allow for long shelf life and quick preparation (e.g., pre-cooked rice, pizza, or pasta).

Types of Body-Controlling Food

- **Dietary food.** Any food or drink whose recipe has been altered to contain less fat, carbohydrate, or sugar so that it is part of a weight-loss diet (e.g., sugar-free cola).

Foods high in protein. Almost all high-protein foods are of animal origin and are considered complete proteins containing all the essential amino acids (e.g., eggs, milk, meat, fish, and poultry).

Functional food. Foods to which an additional function is assigned by the addition of new ingredients or other existing ingredients. Foods can only be defined as functional if their ability to positively influence one or more physiological functions has been scientifically tested (e.g., products containing probiotics, which consist of living microorganisms such as lactobacilli and bifidobacteria, that can positively influence the balance of the bacterial intestinal flora and help strengthen the immune system).

Medicinal food. Foods specially formulated and intended for the dietary management of a condition in which there is a particular nutritional need that cannot be met by the normal diet alone. In Europe, the European Food Safety Authority defined in 2015 what characteristics a food must have to be designated as a "food for special medical purposes (FSMP)". A food for special medical purposes may, for example, be useful for the dietary management of a specific disease or condition for which there are specific nutritional requirements.

Aphrodisiac food. Foods that cause arousal or sexual desire (e.g., oysters, chili, chocolate).

Table 1.1 The food groups with the nutrients that characterize them, their respective subgroups, types of food, and recommendations for consumption

Food groups	Subgroups	Types	Tips for consumption
Cereals and derivatives, tubers *Nutrients*: Complex carbohydrates, dietary fiber, vegetable proteins, B-complex vitamins, magnesium	Cereals and derivatives	Bread, pasta, rice, other cereals (corn, oats, barley, spelt...), bread substitutes (breadsticks, crackers...), sweet baked goods (biscuits...), breakfast cereals	Consume whole grains, as they are richer in fiber and nutrients
	Tubers	Potatoes	Eat potatoes in moderation because of the high glycemic index and limit fried potatoes
Fruits and vegetables *Nutrients*: Dietary fiber and sugars, β-carotene, vitamin C, potassium, bioactive compounds	Fruit	Fresh/naturally preserved fruit Dried/dehydrated fruit	Eat a variety of them, at every meal and as a snack between meals Limit the consumption of preserved and candied fruits, as they are rich in sugar, and of preserved vegetables, as they are rich in salt and/or fats
	Vegetable	Vegetables (including green beans), leafy salads	Eat a variety of them, at every meal and as a snack between meals
Meat, fish, eggs, and legumes *Nutrients:* High quality proteins, trace elements (especially iron, zinc, and copper), B complex vitamins (especially vitamin B12)	Meat	Red meat (beef, pork, sheep, horse, game), white (chicken, Turkey, other poultry meat, rabbit), processed and preserved (ham, bresaola, bacon...)	Give preference to lean and non-preserved meat Limit the consumption of fatty meats and sausages, as a link between high consumption and chronic diseases has been demonstrated
	Fish	Fish, crustaceans, and mollusks, fresh/frozen or preserved	Consume preferably fatty fish and the one with a high content of omega-3 polyunsaturated fatty acids, whose anti-inflammatory properties can reduce the risk of cardiovascular disease. Limit the consumption of preserved or processed fish due to its high fat and salt content
	Eggs		Consume an egg 2–5 times a week and also take into account the eggs included in recipes
	Legumes		Legumes provide significant amounts of starch and fiber, protein, iron, and other trace elements, which make them a good substitute for foods of animal origin

(continued)

Table 1.1 (continued)

Milk and dairy products *Nutrients:* Calcium, phosphorus, high quality proteins, vitamins (B2, B12, and A)	Milk	Milk/yogurt	Prefer semi-skimmed milk and yoghurt because of the lower content of saturated fat
	Cheese	Cheese <25 g of fat/<300 kcal (mozzarella, feta...), cheese >2 g of fat/<300 kcal (parmesan, gorgonzola…)	Prefer fresh cheese, which contains less fat because of its lower saturated fat content
Seasoning fats *Nutrients:* Essential fatty acids, fat-soluble vitamins (especially vitamin E)	Butter, other fats	Butter, animal fats, vegetable fats	Limit consumption as they are a concentrated source of energy Prefer olive oil (especially extra virgin olive oil) because of its high nutritional quality, which is associated with a positive effect on blood lipid levels and the cardiovascular system

Adapted from CREA (2017)

There is an international consensus on the importance of classifying foods into food groups. However, this classification is not entirely uniform due to differences in consumption habits between countries. For example, coconut products are a separate food group in some Pacific islands, as are bananas in Central American countries and insects in Thailand. In Europe, too, there are major differences in the classification of groups, ranging from four food groups in Germany to 8 in Denmark and 12 in Greece. In all countries, however, the food group classification is an important reference point for developing public campaigns to promote healthy eating.

1.3 The Psychosocial Dimension

In this book we will have the opportunity to deal in detail with the various factors that make up the psychosocial dimension and their influences on choice and diet. Therefore, in this section we will limit ourselves to a brief description of these factors (Fig. 1.2).

First of all, food choices are determined by **cognitive factors**, *that is, beliefs, expectations, and motivations that underly the choice* (Chap. 3). These factors include our knowledge about how we select, prepare, and consume certain foods. They also include our positive or negative evaluation of food, our preferences, our perceptions of what is good or bad for us, and so on. Finally, the reasons that lead us to buy or eat different foods, such as value for money, their sensory appeal, or their impact on our well-being or the environment.

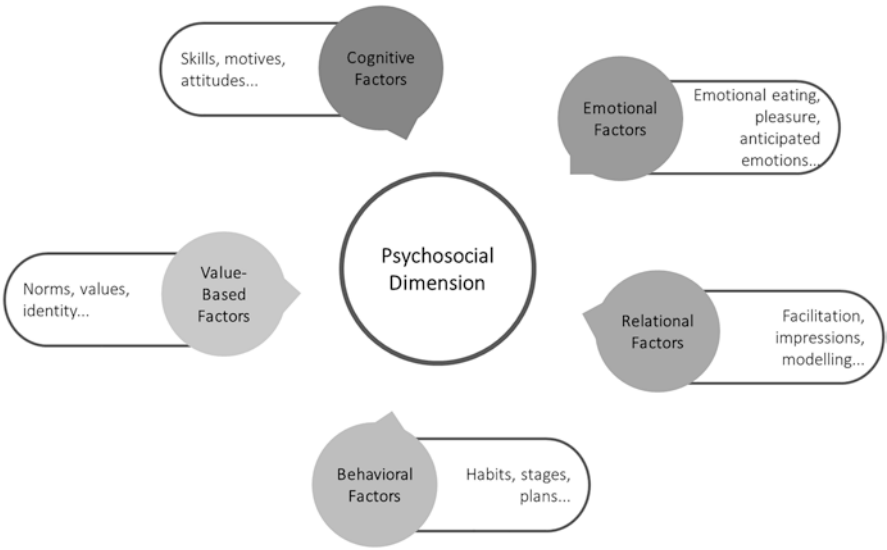

Fig. 1.2 Factors of the psychosocial dimension of food choice

Closely related to the cognitive factors are the **emotional factors**, *that is, the non-rational components associated with choice, such as the emotions we experience before, during, and after eating, or our impulsive tendencies about food* (Chap. 4). Food can be used as a strategy to regulate emotions, such as when it is a means to calm down and relax. In addition, food gives pleasure, not only in the sense of satisfying food impulses, but also as a sensory experience (e.g., when we enjoy food by appreciating its taste) and as a symbolic experience associated with communities and cultural meanings. Finally, we can mentally simulate what feelings we will experience in the future after eating or not eating a particular food, and this can strongly influence our decisions.

Similar to cognitive and emotional factors, **relational factors** are about the *relationship between the individual and other people or groups and how this relationship can influence food choices* (Chap. 5). From this perspective, food intake can be seen as an intersubjective communicative act. On the one hand, individuals learn the norms of eating behavior by observing the behavior of others, for example, the amount of food that is considered "normal" in a particular situation or the norms of good table manners. On the other hand, individuals also often choose certain dishes to communicate something about themselves to others, for example, their social identity, social status, and values. Choosing an appetizer of caviar oysters in champagne sauce, for example, can convey to the onlooker that we have a high standard of living, or at least want to give that impression. Similarly, choosing a vegan burger in a restaurant that serves mostly meat can show that we have a strong sensitivity to environmental issues or animal welfare.

Relational factors are closely related to **value-based factors** (Sect. 5.9)*, which are seen as goals and purposes that determine our food choices*. The values we ascribe to food can vary and include enjoyment, well-being, health, environmental protection, or sociability. For example, our motivation to choose food produced according to sustainable production standards or to respect animal rights can be attributed to the value dimension. The values in question are also largely a consequence of the assimilation and internalization processes of normative social reality, that is, what the members of a given community develop in terms of shared beliefs and norms.

Finally, **habits** *are about how lifestyle and past experiences influence food choices* (Chap. 6). They influence people's ability to maintain their eating habits over time or, conversely, to be open to change by pursuing new goals, monitoring their progress, and being consistent in their choices.

1.4 Other Micro Dimensions

The psychosocial dimension and food choices are closely related to other micro-level dimensions that are characteristic of each person. First of all, the **sensory dimension** *refers to the way in which the chemical-physical properties of food are perceived by the sense organs and provoke more or less intense reactions in the*

person. Sensory perception, which comes into play when approaching a food, during preparation, and tasting, plays a fundamental role in food selection and involves all our senses. With regard to taste, the results of research on innate influences show that there is an innate preference for sweet taste (Desor et al., 1973). However, this innate preference is strongly influenced by the nature and variety of food experiences, especially at developmental ages. After the sense of taste, the sense of smell is the sense most involved in the perception of food. The olfactory receptors come into contact with the substances we eat both before and during food intake, through the internal connection between the nasal cavity and the throat. Therefore, it is sometimes difficult to distinguish between taste and smell perceptions, which is also reflected in the terms we use to define certain smells, such as "sweet," "sour," and so on. As the sense of smell plays a fundamental role in the selection and absorption of nutrients, changes in olfactory abilities (e.g., in older people) can also lead to changes in the amount and variety of nutrients ingested (Riera et al., 2017). As with vision, the color of food can also influence taste perception. For example, red foods are perceived as sweeter and yellow foods as sourer; popcorn is perceived as saltier when eaten from a colored bowl than from a white one; more transparent drinks are perceived as more refreshing, etc. (e.g., Harrar et al., 2011; Zellner & Durlach, 2003). In addition, some research on the relationship between touch and eating has shown that the temperature and texture of foods influence the perception of their taste (Wilson & Brown, 1997), and harder foods are often perceived as less palatable (Tournier et al., 2009). Regarding the relationship between hearing and eating, we know, for example, that the sound of chewing varies according to the consistency and type of food, and that this influences the perceived palatability of food (Masuda & Okajima, 2011).

Our food choices are also closely related to the biochemical reactions triggered by food in our bodies. The **physiological dimension** *includes our vital functions, such as the processes related to hunger and satiety, the effects after food intake and absorption, the genetic predisposition to certain allergies or intolerances, and metabolic activity*. Metabolic activity (also called energy expenditure or energy metabolism) refers to the energy produced by oxidation processes that convert the chemical energy contained in food into thermal and mechanical energy needed for life functions and human activities. The physiological dimension may also include the close relationship between nutrition, well-being, and health. Advances in medical research are increasingly showing the close relationship between the type of diet and the greater or lesser likelihood of suffering from various diseases. For example, the diagram in Fig. 1.3 shows that many lifestyle factors (psychological stress, lack of exercise, excessive calorie intake, unhealthy diet) are closely associated with the development of abdominal obesity, that is, an excessive accumulation of fat tissue in the abdominal cavity. Through various mechanisms, abdominal obesity is associated with an increased likelihood of developing various diseases that are also not related to the digestive system, such as immune system disorders or hypertension (Fontana et al., 2021). It is therefore obvious that it is possible to identify diets that may or may not improve the health and well-being of the world's population. One of the most interesting proposals in this direction is the Mediterranean diet, which we discuss in Box 1.2.

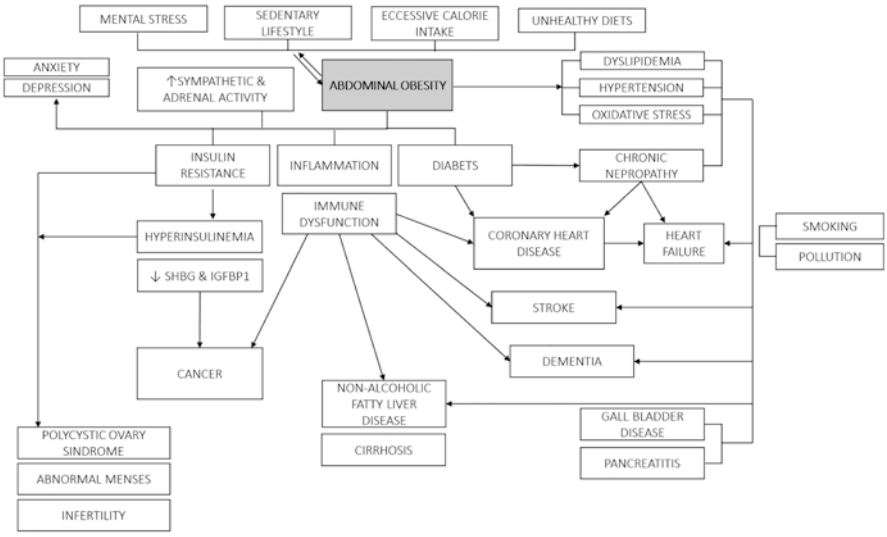

Fig. 1.3 Relationships between lifestyle, abdominal obesity, and the occurrence of various diseases. (Adapted from Fontana et al., 2021)

Box 1.2: Mediterranean Diet: The Perfect Mix to Protect Health and the Environment

The Mediterranean diet is a traditional dietary pattern characteristic of Mediterranean olive-growing regions (Willett et al., 1995). In 2010, this diet was recognized as an intangible cultural heritage by UNESCO, as it helps to transmit a set of knowledge, symbols, and rituals related to the production, preservation, preparation, and consumption of food, which form the basis of the cultural identity and continuity of Mediterranean communities (UNESCO, 2013). The Mediterranean diet is characterized by the consumption of a variety of fresh, local, and seasonal foods. Its dietary pattern is represented by the so-called **food pyramid**, which is divided into foods that should be consumed daily, weekly, and monthly. The main foods of the Mediterranean diet are plant-based (e.g., fruits, vegetables, legumes, nuts, olive oil) and should be consumed daily. Dairy products, fish, seafood, eggs, cheese, yoghurt, and white meat should be consumed weekly. Finally, sweets, red meat, and processed meat should preferably be consumed monthly (Willett et al., 1995).

A number of studies have shown the positive effects of the Mediterranean diet on physical and mental health. This diet contributes to the prevention of cardiovascular disease, obesity, metabolic syndrome, diabetes, various cancers, osteoporosis, and premature mortality (Diolintzi et al., 2019; Sánchez-Sánchez et al., 2020). It also protects brain function in the sense that it is a

(continued)

Box 1.2 (continued)

protective factor against cognitive decline, dementia, Parkinson's disease, and depression, and increases quality of life (Diolintzi et al., 2019; Veronese et al., 2016). The Mediterranean diet also offers numerous environmental benefits. As the **double pyramid model** (Poli, 2010) shows, a balanced, healthy, and sustainable diet like this goes hand in hand with protecting the environment. The foods we should eat more often for our health also tend to have a low impact on the climate, measured by their carbon footprint, that is, the carbon dioxide emissions for production.

Finally, among the micro-factors underlying food choices, we can also include the **personological dimension**, that is, *the influence of personality traits and individual temperament on food choices*. For example, the relationship between food choices and the five personality factors defined by the Big Five model (McCrae & Costa Jr., 1997) has been studied: extroversion (how extroverted or socially extroverted a person is), openness (how much a person seeks out new experiences and feels comfortable doing so), neuroticism (how anxious or depressed a person is, how much a person feels general discomfort), empathy (how comfortable a person feels in interpersonal situations, how much a person avoids conflict and seeks interpersonal harmony), and conscientiousness (how much a person is neat, precise, reliable, and detail-oriented). Openness and conscientiousness have been found to be more strongly related to propensity for healthy eating (Goldberg & Strycker, 2002). In addition, the study of the relationship between personality traits and preference for new foods has shown that food neophobia (i.e., aversion to new or unfamiliar foods) is negatively associated with openness and extroversion (Machado-Oliveira et al., 2020).

1.5 Macro Dimensions

As already mentioned, at the macro level, other dimensions also influence food choices and interact with the psychosocial dimension. This is especially true for the **environmental dimension**, that is, the places where we live and have food resources. Spaces and food are closely linked. The production, processing, and consumption of food take place in specific places and, at the same time, structure these places by giving them form and content (Pettenati & Toldo, 2017). In eastern countries, for example, the characteristics of the territory favor rice cultivation. In these countries, rice fields are an integral part of the rural landscape. Within this bidirectional relationship between food and the environment, the environmental impacts of food production systems occupy a prominent position. To measure the impact of our food on the environment, we use the so-called "carbon footprint," which indicates the amount of carbon dioxide released during the production of food along the

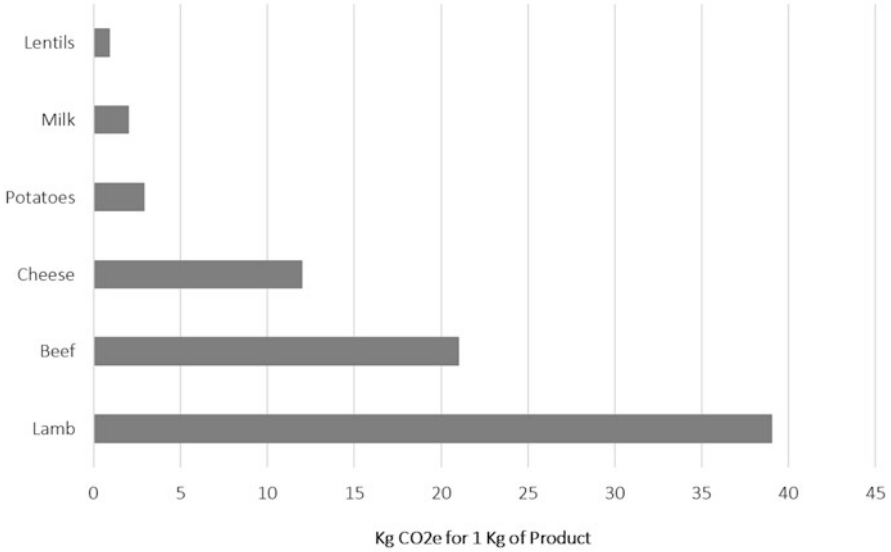

Fig. 1.4 Examples of the carbon footprint of some foods in terms of equivalent carbon dioxide (CO_2e) emissions for the production of 1 kg of the product. (Adapted from Oakes, 2019)

production chain. By looking at the carbon footprint of the different foods we consume, we can assess the impact of our diet on the environment (Fig. 1.4). One of the foods with the largest carbon footprint is meat. In fact, livestock is one of the food sectors with the largest environmental impact, as it alone is responsible for 16.5% of annual global greenhouse gas emissions (Oakes, 2019).

The environmental dimension is closely linked to the **political-institutional and legal dimension**. In order to provide the population with the best possible diet in terms of nutritional value and quality, the fundamental objective of food policy is to ensure a healthy, complete, and safe diet with minimal health risks. For example, food policy is about ensuring that there are no contaminants or deficiencies of any kind that can cause acute or chronic harm, or even increase the risk of morbidity from certain diseases such as cancer. Food policies can be divided into food security and food safety policies. Food security policies aim to ensure adequate nutrition of the population, that is, sufficient intake of calories and nutrients. Food safety policies, on the other hand, aim to minimize the health risks of foods and instead maximize the quality components, that is, those that can improve their nutritional effectiveness (Sodano, 2006). An example of food safety measures is the 2018 EU Novel Foods Regulation, the result of a long legislative process and complex debate within the European institutions, which aims to regulate foods defined as "novel," that is, any food that has not been "consumed in a relevant way" before May 1997. This category includes novel foods (e.g., edible insects), foods from new sources, new substances used in food (e.g., plant sterols), and new food production processes and technologies (e.g., nanotechnologies).

The **economic dimension** has to do with the production of food and its price in the market. The economic dimension includes the systems of food production, from the industrial chain to the small farmers. It also includes the attempt to design food production systems according to the rules of the circular economy to ensure nutrient-rich and environmentally friendly produced food for the entire world population. The circular food economy is a production and consumption model in which existing materials and products are shared, borrowed, reused, repaired, remanufactured, and recycled for as long as possible. The goal is to extend the life cycle of food, and thus reduce waste and food waste.

How many times have we heard about food culture? The origin of the **socio-cultural dimension** of food is commonly traced back to the discovery of fire. As Lévi-Strauss (1962) noted, cooking food with fire was one of the inventions that made humans more human. Cooking thus symbolically marked the transition from a natural dimension of food practices to a more cultural dimension. This dimension leads to the codification of food rules, sometimes involving a complex set of rituals, recipes, traditions, and taboos. Even though humans, as omnivores, are willing to eat almost any food that can sustain them for survival reasons, different cultural contexts limit the range of what is considered edible. For example, some insects are known to be considered delicacies in many eastern countries, while they are generally avoided in western countries. On the other hand, foods such as snails, birds, frogs, or offal may be considered delicious in some Western countries, while they are considered disgusting in others. The line between delicious and disgusting is indeed fluid and is largely dictated by culture. The emotion of disgust itself is quite idiosyncratic, that is, it is linked to the cultural characteristics of certain communities and societies.

When it comes to the cultural dimension of food, it is also useful to consider the distinction between material and immaterial culture. *Material culture* refers to all the concrete and tangible aspects that a society produces: objects, artefacts, technology, and consumer goods. *Intangible culture*, on the other hand, includes intangible cultural elements such as traditions and customs that are passed down from generation to generation and provide a sense of identity and continuity to a community. In general, food, understood in a narrow sense as edible entities, is considered a fundamental element of a society's material culture and is also a clue that helps to distinguish cultures from one another (Koensler & Meloni, 2019). Whether it is English fish and crisps, Spanish paella, or Mexican burritos, every culture has many traditional dishes to be proud of. Material food culture and its associated practices have long played a key role in creating and maintaining social identities based on ethnicity, nation, gender, and class (de Solier & Duruz, 2013). When food is viewed more broadly as tradition and habit, it becomes part of intangible culture in this way. For example, the Mediterranean diet has been recognized as intangible cultural heritage by UNESCO since 2010 because it not only consists of a set of typical dishes, but also represents a lifestyle, a way of living in harmony with one's own body, other fellow human beings, and the environment.

The intangible culture of food also includes the symbolism associated with the act of eating and its religious connotation. In most religions, food is a means of social bonding, and the sharing of certain foods constitutes a real community glue. In Christianity, for example, the human relationship to food is inserted into the dimension of the encounter with God. In the sacrament of the Eucharist, the wine and the host have a symbolic value for the communion of souls and the constant remembrance of the suffering of Christ. Many religions are also characterized by prohibiting the consumption of certain foods or restricting them to certain periods of the year. For example, Christianity forbids the consumption of meat and sausage on Good Friday; the Islamic religion prohibits the consumption of animal blood, pork, camels, or already lifeless animals, crustaceans and amphibians, alcohol, and fermented beverages; Judaism considers pork or animal flesh without a cut hoof, game, crustaceans, and mollusks to be impure foods; Hinduism considers all forms of animal life to be sacred and therefore requires a vegetarian diet; for Buddhism, it is essential to live vegetarian in order to attain wisdom and compassion.

The study of the relationship between the socio-cultural dimension and food choices involves the relevant contribution of the sociology of communication, which focuses its attention on the effects of symbolic mediation, especially with regard to the use of mass media, including new media. Mass media (such as the Internet, radio, press, and television) exert a significant influence on our food choices. Just think of the appetite we feel when we see advertisements for tempting foods, which surprisingly are mainly broadcast during mealtimes. The mass media conveys the content of the food industry, which not only wants to promote the purchase of its products, but also to create habits and consumption patterns. An example of this is the so-called "TV dinner," the habit of eating while watching TV, which dates back to the 1950s when the frozen food company Swanson & Sons advertised a pre-cooked turkey that could be eaten in front of TV. Over time, we have seen increasingly aggressive advertising campaigns aimed at finding and promoting methods of food consumption that are compatible with the hectic lifestyles of today's world. Social networks (Facebook, Twitter, Instagram, TikTok, etc.) also have a significant impact on our food consumption, especially if we choose to follow pages or influencers who recommend, with more or less competence, which foods we should prefer and which we should avoid (see Sect. 7.3). The relationship between food and social networks is essentially based on two areas, the aesthetic and the relational: social networks are often used as a virtual shop window for dishes and recipes, but also offer considerable opportunities to connect people interested in the same food topics.

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Chapter 2
Food Choice

2.1 Food Choice Process

Millions of people, if not billions, are shopping, cooking, or eating at this very moment. Our distant relative who emigrated to the United States may be eating a hot dog he bought on the impulse during a break at work. Or perhaps he prefers the pasta with sardines that his wife prepared for him and that he took to work in an airtight container. Instead, our yuppie friend who lives in the United Arab Emirates might be having lunch in a luxury restaurant with the sheikhs of his clientele, enjoying falafel and camel burgers. When we think of these situations and these dishes, we may feel pleasure or revulsion, a desire to emulate or distance ourselves. In any case, our thoughts, emotions, and evaluations depend to a large extent on how our food preferences have developed and consolidated over time, through courses that can also vary greatly from person to person.

Our tastes and food preferences result from certain choices that gradually become habitual and automatic. A useful model to describe how our food choices are structured throughout life is the **Food Choice Process Model** (Sobel & Bisogni, 2009), shown in Fig. 2.1. According to this model, food choice depends on three main dimensions that have a cascading relationship: life course events and experiences, influences, and the personal food system (see also Falk et al., 1996; Furst et al., 1996; Connors et al., 2001). Let us examine these dimensions individually.

In the course of their lives, people accumulate a number of experiences with food and in some cases these are very important experiences (e.g., when they marry or change their place of residence). Based on these experiences, a set of expectations emerge about what to do and/or how to behave in different food situations. Therefore, people develop a pattern of food-related *trajectories* that include thoughts, feelings, strategies, and actions related to food that remain relatively stable and consistent throughout life (Devine et al., 1998). At the same time, there may be certain *transitions* in a person's life that involve a change, loss, or reinforcement of certain eating

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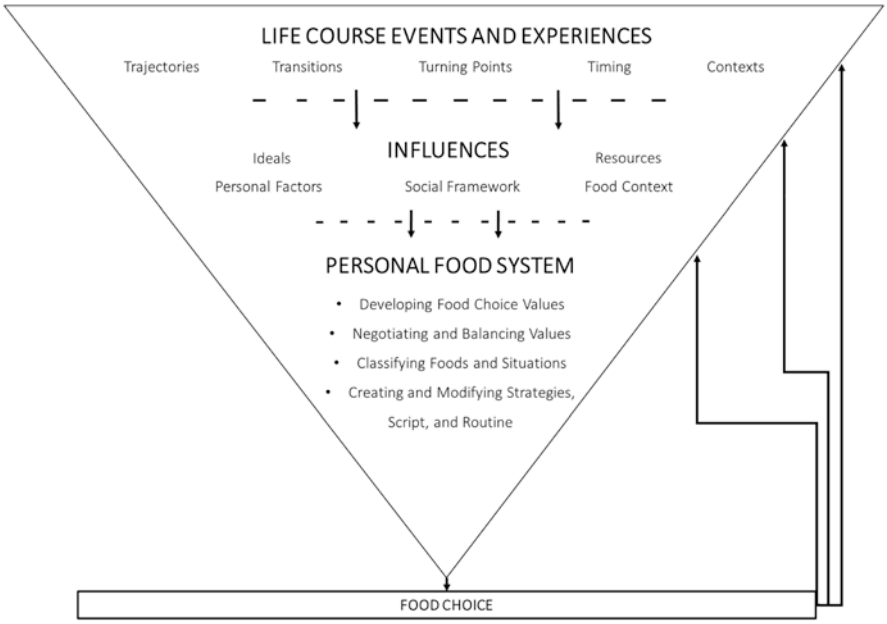

Fig. 2.1 Food choice process model. (Adapted from Sobal & Bisogni, 2009)

habits. For example, the transition from study to work is often associated with a change, albeit gradual, in eating habits. Instead, we speak of *turning points* when sudden changes occur, such as moving to another country, which makes it difficult to maintain previous eating habits and leads to a major change. Thus, food choice trajectories are linked to specific *timing* and *contexts* and can change over time.

The factors that influence food choices are numerous. Often these influences move along two polarities, which include, on the one hand, *ideals* regarding food, that is, norms learned through socialization and acculturation, and, on the other hand, the available *resources* within which we choose and consume food. Food choices are also influenced by *personal factors*, that is, physiological and psychological characteristics; *social framework*, which includes relationships with communities, organizations, groups, and networks; *food context*, that is, environmental circumstances that surround food consumption.

Life experiences and influences then lead to the development of a **personal food system**, which in turn manifests itself in various activities that the person uses more or less consciously in connection with food choices (see also Furst et al., 1996; Connors et al., 2001). Let us consider these in turn.

The **value negotiations** sometimes take place consciously, in the sense that the person reflects on their hierarchy of values and considers which values they should take most into account when making choices. This is more likely to occur when it is difficult to find a compromise quickly and easily between several values that are considered important. In this case, decision dilemmas are triggered because it is

necessary to satisfy some values by sacrificing others. However, the negotiation of values takes place much more often unconsciously, as people tend to be automatically guided by their prevailing values. In our daily lives, we have little time to spend on food choices. Therefore, we use heuristics or shortcuts in the selection process that lead to a quick classification of the different alternatives. One important shortcut is that we use our hierarchy of values as a guide: We choose based on the value we think is most important and leave others out. For example, for a person with cardiovascular problems, the value of health protection may come first and become the main criterion of choice, at the expense of other values such as taste or comfort. Although it is often difficult to rely on multiple values for a single choice, a balance can be sought over longer periods of time that include numerous choices. Again, people can adapt in different and differentiated ways. For example, a person might sacrifice the value of "health" when having dinner with friends at the weekend and instead put it first when choosing meals to eat at home during the week.

Classification of foods and situations is another necessary activity that is often automatic and unconscious. The classification criteria used are used to decide whether to eat a particular food. In addition to the primary criterion of the edibility or non-edibility of the chosen food, there are purely individual criteria and other criteria that arise from the social meanings of the food acquired through its relationship to others (see also Box 1.1). An apple pie, for example, may fall into numerous different categories, such as "high-calorie food," "source of sugar," "Sunday dessert," "food for my child's birthday," and so on.

Developing a personal food system also involves the person committing to developing and reviewing **strategies, scripts**, and **routines** for their eating behavior. Strategies are heuristics or rules that people develop to translate the value they place on a choice into an actual choice. They help simplify eating decisions by providing guidelines that are applied quickly and automatically. Some of these strategies are described in the following text.

- **Elimination**. It consists of avoiding or excluding certain ingredients or foods. For example, vegetarians decide to stop eating meat, or a person who wants to lose weight decides to avoid sugar in coffee or tea.
- **Restriction**. The person chooses to restrict or regulate the use of certain ingredients or foods. For example, a person who prefers the flexitarian diet model (see Sect. 5.8) may decide to restrict consumption of meat, dairy products, and derivatives without giving up sporadic consumption of animal proteins.
- **Substitution**. The substitution of one food with another. For example, a person may decide to replace their consumption of animal meat with meat alternatives once a week.
- **Adding**. This strategy consists of improving or increasing foods by adding ingredients. For example, a person may decide to increase their intake of fruits and vegetables to reach the recommended three servings per day, or they may fortify vegetables with raw extra virgin olive oil.

- **Variation**. In this case, you decide to change the usual ingredients used to prepare or eat certain foods. For example, I might decide to eat a sandwich by removing the crumb to reduce carbohydrate intake.
- **Routinization**. It consists of ritualizing the choice of certain foods, for example, having a fruit snack during the day or always eating yoghurt for breakfast.

Strategies such as those just described facilitate food choices by making them more automatic and habitual, so that we do not have to classify or negotiate the values of the choice every time we have to select a meal. The strategies used form a *repertoire*, that may vary from person to person. It may include, for example, the use of one dominant strategy, the simultaneous use of different strategies, the sequential use of different strategies, or the use of different strategies depending on the situation.

Strategies often lead to temporally and spatially sequential and interconnected sequences of actions, which can be defined as scripts. *Scripts* involve expectations about how we should behave in certain situations. They are real action plans that consist of repeated sequences and usually always similar behaviors. For example, when we enter a supermarket that we know well, we tend to always adopt a sequence of similar behaviors, perhaps automatically going to certain rows of shelves and not others. By adopting established scripts and routines, we can save mental energy and move into realities that seem familiar, predictable, and therefore reassuring.

2.2 Theory of Planned Behavior

The model of the food choice process discussed so far provides a general overview of the aspects that most influence eating behavior. The various influences examined can be divided into the following groups:

- Intrinsic factors, such as socio-demographic factors, personality, cognitive factors, and social support.
- Extrinsic factors, including policies (e.g., government taxes on alcohol consumption) and legal restrictions (e.g., the illegalization of a substance recognized as harmful to health).

Psychological research has looked in depth at intrinsic factors, particularly cognitive and social factors, as these factors mediate the effect of other determinants that cannot be changed (e.g., social status) and are more open to change than other intrinsic factors (e.g., personality) (Conner & Norman, 2015; Conner & Armitage, 2006, 2013). The most widely used socio-cognitive theory to predict eating behavior is the **Theory of Planned Behavior** (Ajzen, 1991), according to which people base their actions on an expectation of the outcomes of their behavior. When this expectation is positive, people form the intention to perform the behavior. Intention is determined by three basic components: attitude toward a particular behavior, subjective norm, and perceived behavioral control (Fig. 2.2).

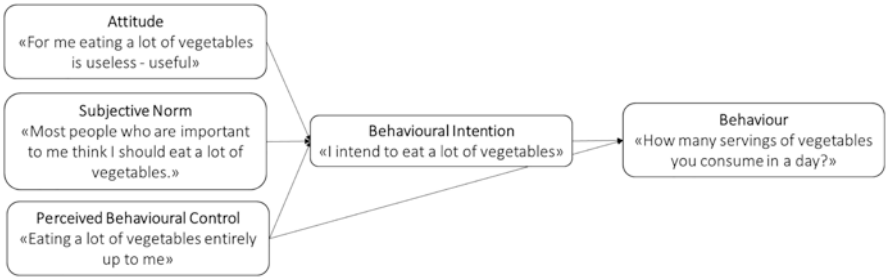

Fig. 2.2 Theory of planned behaviour. (Adapted from Ajzen, 1991)

Attitude *can be defined as a learned disposition to respond positively or negatively to a particular behavior* (Ajzen & Fishbein, 1980). For example, if people believe that eating a lot of vegetables will benefit their health, their attitude toward vegetables will be more positive. As a result, they are likely to develop a stronger intention to engage in this behavior. We will revisit the topic of the influence of attitudes on food choices in more detail in Sect. 3.3.

Subjective norm *refers to the perception that significant others approve of a behavior*. The construct refers to the perception of social pressure on the performance of a behavior. For example, if a person sees their family members eating a lot of vegetables and feels that they would approve of the behavior, they will have a high subjective norm, which is likely to affect their intention to eat vegetables. We will discuss subjective norms in Sects 5.4, 5.5 and 5.6.

Perceived behavioral control *is the perception that external constraints, that is, time, economic resources and opportunities, and internal constraints*, that is, knowledge and skills, are under individual control. The perception of behavioral control in relation to eating vegetables implies the belief that one can eat vegetables under a variety of circumstances and that one can do so despite any obstacles. For example, if a person believes that they can easily find vegetable dishes, have the time to buy them, and are able to cook them, they will be more likely to intend to eat vegetables.

In the Theory of Planned Behavior, perceived behavioral control turns out to be not only one of the strongest antecedent factors in the formation of **behavioral intention**, but also a variable that directly influences behavior. For an intention to become a **behavior**, it is important that the person feels able to overcome any personal or environmental obstacles that may arise, even suddenly.

In summary, the intention to engage in a particular eating behavior is more likely to occur when the attitude, subjective norm, and perception of behavioral control are favorable. This intention, in turn, is more likely to be transformed into actual behavior if you perceive some degree of control over the possibility of implementing the behavior.

As we shall see later in this volume, subsequent developments in research have shown that the inclusion of additional factors increases the predictive power of the theory of planned behavior. These include, in particular, anticipated emotions (Sect. 4.3) and past behavior (Sect. 6.1).

2.3 The Phases of Food Choice

Eating behavior is not just about eating a particular food. It is divided into several phases that precede, accompany, and follow the actual consumption: shopping and transporting, preparing, and serving, eating, storing, or discarding leftover or expired food, and discarding or throwing away (Fig. 2.3). Each of these phases involves different decisions about whether, what, how much, where, when, how long, with whom, and how to carry out that phase. In each phase, the decision-making process may be more or less conscious and influenced by the socio-cultural contexts to which it belongs. Finally, it is not said that all phases are always present. For example, some foods do not need to be prepared before they can be eaten, other foods (or parts of them) may be discarded before they are evenly cooked, and so on. Let us now briefly discuss the different phases of eating, bearing in mind that some of them will also be covered in the following chapters of the book.

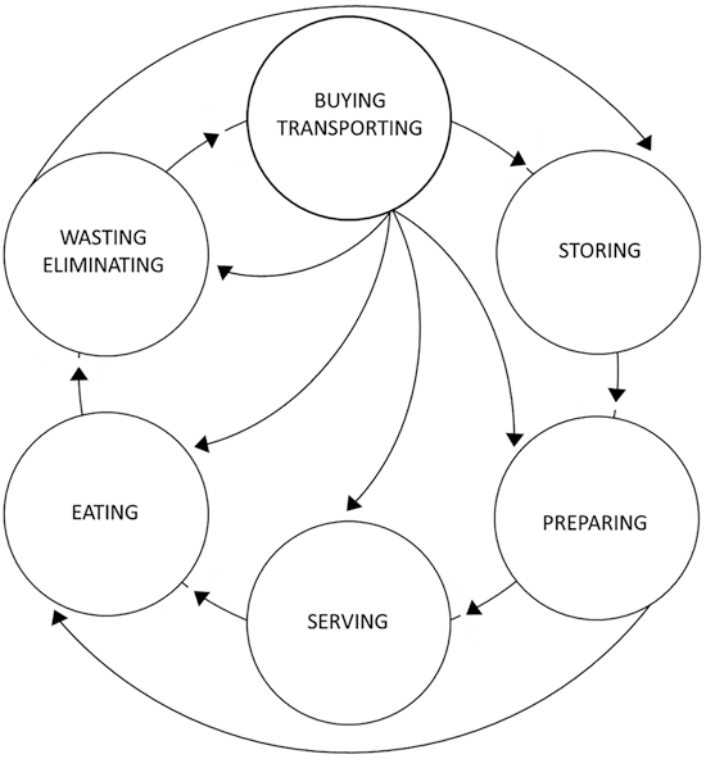

Fig. 2.3 The phases of food choice

2.3.1 Shopping for and Transporting Food

Several dimensions play a role in purchasing behavior, some of which relate to the food itself, others to the production chain and how the food looks when we buy it. Consumers may not pay attention to all of these dimensions, but they can all have an impact on their decisions, even if they are not always aware of it. Since we have already talked about the characteristics of food in the first chapter (Sect. 1.5), we will now go into more detail about the other factors.

Product packaging is a means of ensuring safe and efficient delivery to the consumer. It is also the first useful communication tool to evaluate the product, distinguish it from other offerings in the market, and reinforce brand identity. Packaging features influence most consumers' choices at the crucial moment of the purchase decision. Since it is difficult to obtain concrete information about the quality of the food product before purchase, the so-called "attributes" of the food packaging are perceived as the first indication of the quality of the product.

It is useful to distinguish between verbal and visual attributes (Kauppinen-Raisanen et al., 2012). Verbal attributes include, for example, information about the ingredients, which can be compared with information about similar products. Visual attributes, on the other hand, include colors, graphic shapes, pictures, and illustrations that immediately create expectations about the content of the product. The two types of attributes trigger different types of cognitive processing. While the processing of verbal attributes requires greater and conscious cognitive effort, processing visual attributes is mostly automatic and unconscious (Mueller et al., 2010).

The verbal attributes of packaging include, first and foremost, the food label, which is defined by the internationally accepted definition as: *any tag, brand, mark, pictorial, or other descriptive matter, written, printed, stenciled, marked, embossed, or impressed on, or attached to, a container of food or food product* (EU Regulation, 2011). As food labels are a fundamental and integral part of any process by which a food is placed on market, they provide a unique opportunity to convey product information at the very moment a decision about food is made. They help to reduce the uncertainty that arises when assessing the quality of a product before purchase, thus facilitating the decision. In addition to mandatory information, labels increasingly include references to food quality, such as origin from sustainable and environmentally friendly production, high nutritional value, and low level of processing (Kaczorowska et al., 2021). Sometimes, these are **certification labels** that refer to the ethical, environmental, and social aspects of the production processes used. Such labels are aimed at responsible and conscious consumers who are looking for natural, low-processed, ethical products or products that are suitable for their diet (e.g., plant-based, gluten-free, or vegan diets). They are therefore destined to attract the attention of those consumers who see concern for health and the environment as a form of responsibility for their own protection and the protection of others. The percentage of these consumers in society is not very high, but it is increasing due to the growing awareness of everyone's responsibility to protect our planet. However, a multitude of certification marks can also lead to doubt and confusion among consumers, especially those who are not very familiar with such certifications.

Among the verbal attributes of food, we increasingly find information on traceability, an element that is indeed important to ensure the safety and quality of products in the food chain. The European Commission (2007, p. 1) defines **traceability** as the *ability to track any food, feed, food-producing animal, or substance used for consumption, through all stages of production, processing, and distribution*. Food origin is information that can trigger a complex mental network of cognitive and affective associations linked with the country of origin of the product. The more positive consumers are about a country, the more positively they evaluate that country's products and the more likely they are to buy them (Barbarossa et al., 2016; see also Sect. 5.8). Consumers rate food from countries whose production processes and expertise they respect and whose people they value more positively. Traceability systems not only improve perceptions of food safety, but also provide specific information about a product's social and environmental impacts and help consumers make better informed purchases (Islam & Cullen, 2021).

Another important factor in choosing food is the **place** where it is bought. The purchase of food can take place in different places (supermarkets, markets, small retailers, bars, restaurants, etc.), and the place plays an important role in the so-called **food supply chain**, that is, the *set of activities that focus on the production, processing, distribution, and marketing of food*. The food supply chain can be short or long. The *short food supply chain* (also called short channel or direct sales) is characterized by the fact that food products only travel a short distance and only a limited number of production steps, in particular intermediate trade steps, are required to establish direct contact between producer and consumer. It is therefore a food supply chain based on local production and independent of large retailers. The *long food supply chain* is characterized by the distance between the place of production and consumption (e.g., the supermarket) and many intermediaries. When shopping in supermarkets and hypermarkets, consumers are influenced, often unconsciously, by different and established marketing strategies (for more details, see Box 2.1). Ultimately, the decision to buy short- or long-supply-chain food depends on numerous demographic, economic, and psychosocial characteristics of the consumer, in addition to random factors.

The choice of where to shop is doubly linked to another decision, namely, the choice of **food transport**. This aspect should not be underestimated when we examine what influences our eating behavior. The type of transport influences the products we consume in the sense that it makes the choice of certain products more likely or less likely. For example, it is practically impossible to buy frozen food or packaged ice cream if the distance between our shop and our home is too great. The choice of transport also becomes important when there is difficult health condition. For example, a person who has musculoskeletal problems may not be able to carry shopping bags for too long and may therefore choose to make small purchases several times a week. This decision would possibly have the effect of buying more fresh food and reducing the food waste associated with storing many products in the pantry.

The transport problem is even eliminated if you buy from online retailers that offer a home delivery service. In addition to people with health problems, this type of shopping can also be beneficial for those who have limited time or are far from the retailer of the product they want. Although even today most grocery shopping takes place in physical locations (PWC, 2020), more and more grocery retailers, even if small, are offering the option to shop through e-commerce platforms that can be accessed at any time and that offer the option of home delivery. The benefits of online shopping include the ability to select different foods at leisure, analyze their characteristics in more detail, and make comparisons within a wide range of products. The online view often makes it easy to filter product offerings and make comparisons between equivalent products based on many aspects such as price, manufacturer, calorie content, and so on. Finally, especially for those who prefer the quick purchase of a prepared meal, there are now many companies that offer online meal ordering and delivery services, acting as an intermediary between the restaurateur and the customer.

A final important factor influencing the purchase decision, which is also strongly related to psychological dimensions, is the **time of day** people go shopping.

One might think that it is better to do one's shopping before meals because then it is easier to decide what one wants and not to throw away food that one does not want to eat. However, it seems that just the opposite is true. When you are hungry, you not only tend to buy more food, but also more high-calorie food. This is confirmed by studies that have compared consumer behavior when shopping on an empty stomach and vice versa after eating. In one such study (Tal & Wansink, 2013), a sample of participants was randomly divided into two groups: One group (the "hungry") was asked to go shopping in the late afternoon without having eaten anything in the previous 5 h; the other group (the "satiated") was asked to first have a snack and then go shopping. The results of the study showed that the "hungry" ones bought on average two more calorie-rich products than the "satiated" ones. So, the recommendation not to go to the supermarket with an empty stomach is quite justified. Making a list of foods before buying is also a good strategy to reduce the frequency of "impulsive" purchases. Along these lines, other studies have shown that the total calorie content of the chosen meal decreases when food choices are made with some lead time and not immediately before lunch (VanEpps et al., 2016).

2.3.2 Food Preparation

Food preparation involves processing raw materials into edible food using a variety of techniques to change the shape, temperature, and moisture/dryness of the food. You can cook every day or cook several days in a row and then freeze the different meals. Preparing food properly at home can have a positive effect on your health in several ways. You eat fewer calories, choose smaller portions, consume less fat, salt, and sugar, and eat more fruits and vegetables instead. However, achieving these

goals requires good nutrition literacy, the formation of which involves several cognitive processes that we will discuss in the next chapter. It has been shown that the potential benefits of people's nutrition literacy are not only in terms of nutrition and health, but also in the form of greater confidence in themselves and their own abilities (Reicks et al., 2014).

In addition to the cognitive dimension, food preparation also includes the emotional and relational dimension. For some people, for example, cooking is a chore, for others it is a great passion, and of course the feelings associated with it vary accordingly. In addition, the preparation of a dish can be influenced by the emotional state, energy, and enthusiasm that the person has at a particular time of day. Regardless of culinary skills, those who have been involved in the preparation of a dish usually find it tastier and more enjoyable than when it is prepared by others. This is one of the reasons why semi-prepared products (e.g., instant cake mixes that require minimal preparation, such as adding of fresh eggs or milk) are quite successful in the market. Homemade food is not only more welcome, but also often perceived as healthier, more natural, and lower in calories than "ready-made" food (Brunner et al., 2010).

The relational dimension plays an important role in learning and in food preparation itself in many ways. Initially, many of our food preparation skills come from imitating others, be they confidants, friends, cooks, or influencers (see Chap. 5 to learn how others influence our food choices). Later, when we think we have developed competence and autonomy in the kitchen, we often strive to develop individual variations that allow us to stand out from others on the one hand and be appreciated on the other. The relational dimension can also be crucial in food preparation. For example, as you know, some like to cook alone, while for others, working together in the kitchen is an important moment of a friendship or a romantic relationship, if not essential. After all, the motivation to participate in the preparation of food or not is often closely linked to the presence of other people. Many cook because preparing healthy and nutritious meals is a way for the family to fulfil their duty as parents, or because cooking is an opportunity to get together with friends. On the other hand, people living alone are often less interested in investing time and energy in preparing meals that they will eat alone.

Although the psychosocial factors we have talked about certainly play an important role in how each of us prepares food, the end result often depends on the interaction between these factors and other, more objective factors (or constraints), especially the time, money, and equipment that each can use to prepare food. Often, time is one of the most limiting factors in preparing food at home, and this can be due to a variety of reasons, such as pressures related to tasks, personal commitments, and interpersonal relationships. However, reactions to the lack of time vary greatly from person to person. Some avoid cooking by consuming ready-made meals, eating out, or ordering takeaway food. Others limit preparation time by using semi-prepared ingredients. Still others develop alternative strategies to overcome the lack of time, such as cooking at the weekend and freezing meals for the following week or planning in advance for what to cook and when. Perceptions of time spent cooking also vary according to individual characteristics: some see cooking as

a stressful task that needs to be done as quickly as possible, while others see it as an enjoyable pastime. Decisions about meal preparation also depend on financial possibilities, which may, for example, lead people to cook at home more often to save money or, conversely, if there are no economic difficulties, to delegate meal preparation to people who help around the house. Finally, the availability of equipment and utensils needed for cooking has a strong influence on the individual approach to food preparation, which allows optimizing the time spent and often leads to a better final result.

2.3.3 Serving and Eating

Now that the food is prepared, it is a matter of serving it and eating it naturally. Research has amply demonstrated that the *presentation of food*, and more generally that of the table and the environment, strongly influences the consumption of food. The way food is presented on the plate, for example, affects how we evaluate the food itself and how much of it is consumed. We tend to eat less when foods are presented in separate units and not mixed with other foods (e.g., chocolate divided into individual cubes rather than a single piece, or a plate of pasta and meat sauce separated in the dish; Nielson et al., 2018). Although unhealthy foods (e.g., deep-fried snacks) served separately are perceived to be less calorific overall (and this could lead to eating more), this type of serving still increases eaters' self-control, which ultimately reduces the amount consumed (Ai et al., 2021).

In addition to food presentation, food choice is also influenced by *portion size*: large portions have been shown to increase food consumption, which is way small portions are recommended as a weight control strategy. From this point of view, it can be useful to prepare meals with controlled portions (e.g., single portions), to bring reduced packages to the table, or to use modified tableware (e.g., a plate divided into different sized sections depending on the type of food). There are also several three-dimensional portion control devices on the market that can be used to measure the volume of food, for example, portion glasses or plates and cutlery with visual suggestions that are helpful in measuring quantities. Proper use of these portion control aids can help you plan meals in moderate amounts and "correct" a misconception of portion sizes at the time of serving. However, not all commercially available portion control aids have been shown to be scientifically sound, and the debate about their actual effectiveness is still open (Vargas et al., 2021).

Several studies have investigated whether *table design* influences the acceptance and consumption of the food offered. The environment in which we eat (kitchen, dining room, etc.) and its furnishings (chairs, utensils, etc.) also influence food intake (Sobal & Wansink, 2007), in the sense that they influence our decisions about the type and quantity of food selected and consumed. And that's not all. Lighting, temperature, and sounds in the room where one eats also have an influence (Stroebele & De Castro, 2004). The sensory enjoyment of food thus depends on a large extent on the place where it is consumed.

2.3.4 Storing, Accumulation, and Waste

Research on the psychosocial aspects that determine our daily food storage behavior is limited. An important factor in this regard is certainly our food literacy (Sect. 3.1), which provides us with the basic knowledge of how to shop different foods appropriately to prevent poorly preserved foods from being harmful to health (e.g., selection of packaging and temperature and humidity conditions suitable for storing different foods). On the other hand, we know more about how storage can be leaned to *panic buying*. This behavior is often seen when consumers fear possible future shortages or a sudden price increase. For example, due to the earthquake and nuclear crisis in Japan in 2011, consumers hoarded a lot of salt in Beijing, Shanghai, Chongqing, and other cities, out of concern for the socio-political situation (Su, 2010). Another example is what happened during the pandemic COVID-19. In this case, restrictions on travel outside the home caused many families to build up or expand their food reserves and buy a large amount of food that far exceeded normal consumption levels (Cavallo et al., 2020).

The phenomenon of buying and storing food in a crisis or panic situation is complex and due to various psychological processes. For example, emotionality and sensitivity during the pandemic COVID-19 were positively correlated with the intention to hoard food (e.g., Hassen et al., 2021). The perception of a possible shortage in the availability of certain foods, a very serious socio-political situation, or health risks also increases the tendency to hoard behavior (e.g., Ahmadi et al., 2022). In addition, emotional factors such as fear, stress, and anxiety lead to greater stockpiling in situations where there is a perceived danger or crisis (e.g., Omar et al., 2021; see also Chap. 4). In addition, accumulation behavior is determined by social influences (Chap. 5), such as food stockpiling (Rosu et al., 2021), social media messages (Naeem, 2021), and government policies (e.g., Prentice et al., 2022). Finally, food accumulation also depends on reference values (Sect. 5.9). For example, after WHO defined the COVID-19 outbreak as a pandemic, food accumulation was more pronounced in countries whose inhabitants had high levels of individualism than in more collectivist countries (Ahmadi et al., 2022). Among the negative consequences of food accumulation behavior there is certainly food waste, which occurs as a result of having bought more food than necessary.

Food waste can be defined as *a phenomenon in which healthy and edible substances are lost, degraded instead of being used, or consumed by parasites at some stage of the food chain* (FAO, 2011). Although waste can occur at various points in food production, consumers certainly play a key role in determining the total amount of food waste, especially in the most developed countries. At the level of individual consumption, the main reasons for waste are that people cook more than they eat and that food is not consumed by its expiry date. Research has highlighted several socio-demographic and psychological factors associated with food waste in the home (Del Giudice et al., 2016; La Barbera et al., 2014, 2016).

In terms of socio-demographic factors, men waste more than women, people with low levels of education waste more than people with high levels of education, and small or high-income families waste more than large or low-income families (Riverso et al., 2017). In terms of psychological factors, several studies have referred to the Theory of Planned Behavior (Sect. 2.2) and have shown that intention to reduce food waste is predicted by a combination of several factors, namely, a positive attitude toward waste reduction, the perception that significant others expect us to do so (subjective norm), and the perception that we are able to reduce waste (perceived behavioral control) (Riverso et al., 2017). Concerns about the environmental consequences of waste have also been shown to reduce the habit of waste, in contrast to moral and economic concerns, which do not seem to be sufficient (La Barbera et al., 2014). These findings pave the way for building communication campaigns to promote food waste reduction that use content related to environmental protection (Chap. 8).

Box 2.1: Marketing Strategies in Supermarkets: Shelf Marketing
The reader will have noticed that almost all supermarkets have the same arrangement of products in the display. He has probably also had the experience of not finding a basic product, like flour or sugar, when he looks for it. These experiences are not random, but are carefully studied by marketing professionals. The arrangement of products in a supermarket is the subject of the so-called shelf marketing, a sales strategy aimed at drawing consumers' attention to a particular product. For example, everyday goods, such as salt and sugar, are often the hardest to find and are placed far away from the entrance and the checkout. This choice is based on the goal of getting consumers to walk around the supermarket and look at numerous shelves, increasing the likelihood that they will buy products they did not originally intend to buy. Another shelf marketing strategy is to place fruit and vegetable counters at the entrance of the supermarket. Through their colors and scents, they offer the consumer a kind of "welcome" and give the impression of being in a small open-air market rather than a large supermarket. In addition, bulky and heavy products such as soft drinks and water are placed near the boxes to avoid the weight and bulk discouraging the consumer from making other purchases. Also, in each food category, the cheapest products are usually on the lower shelves, making them less easy to reach. Instead, the best-known and most expensive brands are in close proximity, so they are more visible and easier to put in the shopping trolley. Following a similar logic, sweets and treats can be placed directly on the lower shelves because they are easier to see for children who will try to persuade parents to buy them. Finally, product positioning systems are being explored that encourage consumers to take a particular path and consequently spend more time in the supermarket.

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Chapter 3
Cognitive Factors

3.1 Food Literacy

It is said that the best way to get to know a person is to eat with them in a restaurant. This is probably also true when we go to the supermarket with that person. This way we learn, for example, how much she knows about food, whether she buys the first thing that comes to mind to save time, whether she looks closely at food labels to assess nutritional information, whether she checks the place of manufacture of the different options she has in mind, whether she buys the cheapest or the cheaper alternative, or whether she buys a ready-made meal because she is afraid to go to the cooker.

Many of the decisions we make in the supermarket depend on our **food literacy**, that is, the *knowledge we have about food and how we use this knowledge when choosing food*. Strictly speaking, food literacy can be understood as the ability to obtain, interpret, and understand basic information about food and nutrition, and the ability to use this information to make healthy dietary choices (Kolasa et al., 2001). In a broader sense, and more recently, food literacy is also described as an understanding of the impact of food choices not only on health, but also on the environment and the economy. Furthermore, food literacy nowadays refers not only to the knowledge useful for preparing and eating healthy food, but also to an awareness of its origin and the cultural context from which it comes (Truman et al., 2017).

One way to capture all these aspects of food literacy is to refer to three basic domains of food literacy (Slater, 2017).

The first area relates to **functional competence** and concerns self-confidence and responsibility for one's own diet. This functional competence consists of having basic knowledge of nutrition, food safety, and hygiene when preparing food, as well as knowing where food comes from and how to juggle food purchases to make healthy and economical choices. Functional competence also includes: (a) the skills needed to prepare food; (b) the ability to manage their economic resources to buy

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healthy food; (c) a positive relationship with healthy eating, an understanding of the relationship between body weight and health, and good self-esteem in relation to their own body image; (d) a critical mind when analyzing issues related to food, for example, an understanding of the economic interests of companies producing food, and an understanding of the messages about food and nutrition disseminated by social and mass media.

The second area relates to **relational competence**, which is linked to the enjoyment of food and its cultural significance. Relational competence means: (a) having a positive relationship with food, for example, making choices that promote well-being, enjoying eating and preparing food, having fun preparing new and different foods; (b) enjoying experimenting with traditional foods and different cultures; (c) being open to trying new foods; (d) recognizing the importance and enjoyment of preparing and eating food with others.

Finally, the third area relates to **social competence**, which concerns: (a) understanding the relationship between social justice and food systems; (b) the influence of food lobbies; (c) the relationship between food systems and sustainability.

It is important to have complete and reliable scales to measure food literacy. Among the different existing scales, we propose in Table 3.1 a short food literacy questionnaire that contains twelve items and covers the three different domains of food literacy that we have studied (Krause et al., 2018).

Table 3.1 Short food literacy questionnaire

1. When I have questions on healthy nutrition, I know where I can find information on this issue.
2. In general, how well do you understand the following types of nutritional information? (A) Nutrition information leaflets (B) Food label information (C) TV or radio program on nutrition. (D) Oral recommendations regarding nutrition from professionals (E) Nutrition advice from family members or friends
3. How familiar are you with the Food Pyramid?
4. I know the official recommendations about fruit and vegetable consumption.
5. I know the official recommendations about salt intake.
6. Think about a usual day: How easy or difficult is it for you to compose a balanced meal at home?
7. In the past, how often were you able to help your family members or a friend if they had questions concerning nutritional issues?
8. There is a lot of information available on healthy nutrition today. How well do you manage to choose the information relevant to you?
9. How easy is it for you to judge if media information on nutritional issues can be trusted?
10. Commercials often relate foods with health. How easy is it for you to judge if the presented associations are appropriate or not?
11. How easy is it for you to evaluate if a specific food is relevant for a healthy diet?
12. How easy is it for you to evaluate the long-term impact of your dietary habits on your health?

Adapted from Krause et al. (2018)

Another attempt to theoretically systematize food literacy was proposed by Vidgen and Gallegos (2014), who see literacy as a combination of knowledge, skills, and behaviors necessary for the different stages of the relationship that people have with food. From this perspective, the Authors, with the involvement of a panel of experts, identified a set of key competencies for food planning, selection, preparation, and eating. These competences are briefly described in Fig. 3.1.

Another attempt at a theoretical systematization of food literacy was proposed by Vidgen and Gallegos (2014), who see food literacy as a combination of knowledge, skills, and behaviors necessary for the different stages of people's relationship with food. From this perspective, the authors, with the involvement of a panel of experts, identified a set of key competencies for planning, selecting, preparing, and consuming food. These competences are briefly described in Fig. 3.1.

In terms of consequences, food literacy has been shown to have a positive impact on people's relationship with food, leading to choices that affect both physical and psychological well-being and the natural and social environment. People with high levels of food literacy have been shown to be less likely to be overweight or obese

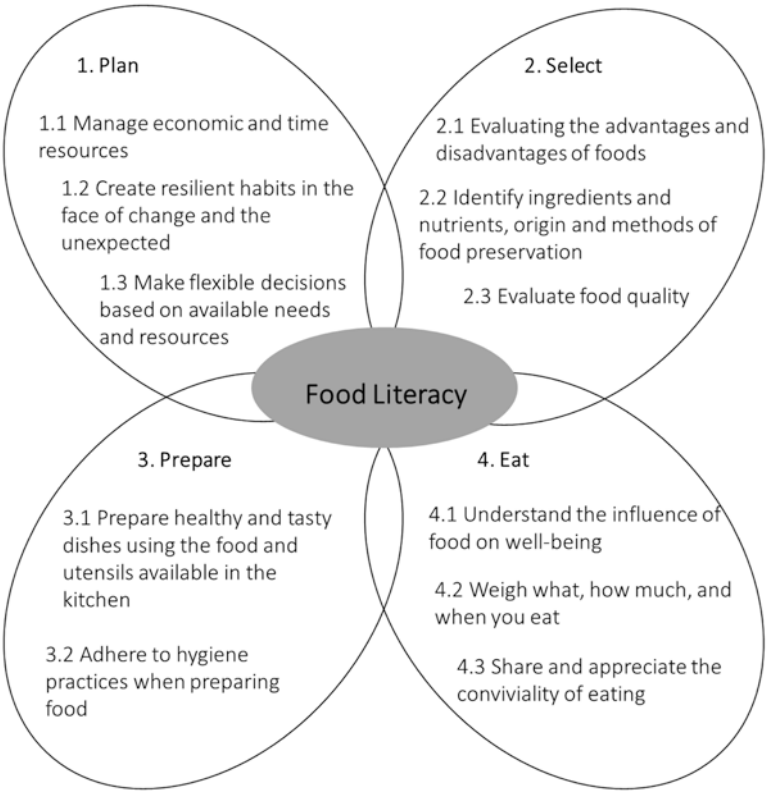

Fig. 3.1 The four domains of food literacy. (Adapted from Vidgen & Gallegos 2014)

and more likely to enjoy good health (Palumbo et al., 2019). In general, people who are better able to plan, select, prepare, and consume food properly are less likely to develop long-term diseases and be restricted in their daily activities.

3.2 Motives

Each of us chooses the food we buy according to certain motives, which may be more or less important depending on the time or context. Some, for example, attach great importance to value for money and take into account discounts, offers, and average prices on the market. Others are attracted by the external appearance of food. For example, they reject food that does not look perfect and tend to buy products that are packaged in aesthetically very accurate packaging. Still others carefully read the ingredients and nutritional information of the foods they buy to calculate the impact of their choice on body weight and fitness.

The reasons why we choose a particular food are referred to in the literature as dietary motives in the literature and are varied. In this paragraph we will focus on the most important ones. To understand food choices, it is first important to distinguish between "motive" and "motivation." Motive is the reason that leads to an action related to food, while motivation is the force that drives the person to perform such an action. In order for a motive to be translated into a real action, there must be an inner force, precisely a motivation, that allows us to pursue that action. For example, an overweight person may consider it important to eat healthier (health motive). However, she may continue to eat unhealthily because she lacks the motivation to change her habits. So the reason is the specific cause for a decision, the motivation is the psychological process that enables you to put that decision into action.

We can classify food choice motives in the same way as we classify people's general motives, that is, as primary or secondary motives. The **primary motives** are *innate and necessary for the human survival*. When choosing food, hunger, thirst, and avoiding danger are among the basic primary motives. We may choose food or drink because we are hungry or thirsty, and we may instead avoid food because we see it as harmful to our bodies. In some cases, even different primary motives, such as sleep, can influence the choice of certain foods over others. For example, sleep deprivation has been found to alter hormone levels involved in the homeostatic regulation of appetite (leptin and ghrelin) and the brain's reward systems, leading to a preference for highly palatable and rewarding foods (De Leon & Hanlon, 2020).

Secondary motives *are learned and vary according to the environment and culture in which the person lives*. Secondary motives include, for example, the desire to belong, sociability, and the expression of one's identity and values. However, there are different ways to define and consequently measure secondary motives. One of the most commonly used and validated scales for this purpose is the scale based on the responses of the **Food Choice Questionnaire** (FCQ; Steptoe et al., 1995). The scale is designed to assess nine dimensions: health, mood, convenience, sensory appeal, natural content, price, weight control, familiarity, and ethical

Table 3.2 Food choice motives questionnaire (Steptoe et al., 1995)

Dimension	Item
	It is important to me that the food I eat on a typical day:
Health	1. Contains a lot of vitamins and minerals.
	2. Keeps me healthy.
	3. Is nutritious.
	4. Is high in protein.
	5. Is good for my skin/teeth/hair/nails, etc.
	6. Is high in fiber and roughage.
Mood	1. Helps me cope with stress.
	2. Helps me to cope with life.
	3. Helps me relax.
	4. Keeps me awake/alert.
	5. Makes me feel good.
	6. Cheers me up.
Convenience	1. Is easy to prepare.
	2. Can be cooked very simply.
	3. Takes no time to prepare.
	4. Can be bought in shops close to where I live or work.
	5. Is easily available in shops and supermarkets.
Sensory Appeal	1. Smells nice.
	2. Looks nice.
	3. Has a pleasant texture.
	4. Tastes good.
Natural Content	1. Contains no additives.
	2. Contains natural ingredients.
	3. Contains no artificial ingredients.
Price	1. Is not expensive.
	2. Is cheap.
	3. Is good value for money.
Weight Control	1. Is low in calories.
	2. Helps me control my weight.
	3. Is low in fat.
Familiarity	1. Is what I usually eat.
	2. Is familiar.
	3. Is like the food I ate when I was a child.
Ethical Concern	1. Comes from countries I approve of politically.
	2. Has the country of origin clearly marked.
	3. Is packaged in an environmentally friendly way.

4-point response scale from 1 = "Not at all important" to 4 = "Very important"

concerns. The full scale consists of 36 items and is presented in Table 3.2 along with an indication of the variables measured by each item. Since its development, this scale has been used in different countries around the world, making it possible to compare the reasons that are most prevalent in each country (Cunha et al., 2018). By using this scale, it was also possible to examine the relationship between motives and the choice of different foods. For example, health seems to be the main motive that leads consumers to attach importance to choosing foods with low sugar content

(da Veiga et al., 2021). The health motive has also been shown to be predicted in turn by other dietary motives, namely: (a) weight control; (b) natural content; (c) ethical concerns; (d) mood. Consumers who rank the consumption of low-sugar foods as important are thus guided not only by the pursuit of health as such, but also by the idea that health is ensured by promoting foods that are useful for weight control, are made of natural ingredients, have a positive impact on well-being, and have been produced in a sustainable manner. As far as the choice of sustainable food is concerned, there are motives that favor it and those that hinder it. While concern for protecting the environment expectedly facilitates sustainable food choices, they are often hindered by the sensory appeal and price of the food. For example, plant-based meat is perceived as less tasty and/or more expensive than real meat. The need to better understand the motivations that favor sustainable eating behavior has led to the development of a scale called the **Sustainable Food Choice Questionnaire** (SUS-FCQ; Verain et al., 2021), which was tested in a survey in five different European countries: the Netherlands, Denmark, the Czech Republic, France, and Italy. The scale, shown in Table 3.3, measures four dimensions related to food sustainability, namely, the extent to which food is produced with respect for animal welfare, workers, and the environment, and the extent to which it is local and seasonal. After confirming the statistical validity of this scale, the researchers involved in this project investigated the extent to which the sustainable food choice questionnaire correlates with the dimensions of the food choice questionnaire. The highest correlations were found for the motives related to sustainability, natural content, and health.

Table 3.3 Sustainable food choice motives questionnaire (Verain et al., 2021)

Dimension	Item
	It is important that what I usually eat:
Animal welfare	1. Is produced without animals being in pain.
	2. Is produced in an animal-friendly way.
	3. Is produced with respect for animal rights.
	4. Is produced with sufficient space for the animals.
	5. Is a free-range product.
Ethical concern	1. Is produced without exploitation.
	2. Is produced without child labor.
	3. Is traded in a fair way.
Environmental welfare	1. Is prepared in an environmentally friendly way.
	2. Is produced in an environmentally friendly way.
	3. Is produced without disturbing the balance of nature.
	4. Is produced with minimal CO_2 emissions.
	5. Is packaged in an environmentally friendly way.
Local and seasonal	1. Is a local/regional product.
	2. Is a seasonal product.
	3. Comes from close by (little transport distance).

4-point response scale from 1 = "Not at all important" to 4 = "Very important"

Then, the extent to which the different dimensions of the sustainable food choice questionnaire predict the consumption of four different groups of sustainable products was also examined:

1. Organic and fair trade products (meat, vegetables, fruit, organic, or fair trade dairy products)
2. Seasonal and local products
3. Meat substitutes (veggie burgers and fish, eggs, cheese, pulses, tofu, or other plant-based products eaten instead of meat)
4. Products with a sustainability logo

The study showed that all dimensions measured by the questionnaire were positively associated with the consumption of all four product groups.

3.3 Attitudes

Both food literacy and food choice motives influence people's **attitudes** toward certain foods, that is, *their positive, negative, or even ambivalent evaluation of that food with the possible consequences of whether they choose it or not*. The study of attitudes has a long tradition in social psychology. Attitude is generally understood as the positive or negative evaluation of an object, behavior, or social event (Eagly & Chaiken, 2005). In addition, three main components of an attitude have been identified (Rosenberg, 1960).

1. The **cognitive component** includes information and beliefs related to the object of the attitude.
2. The **affective component** refers to the emotional response to the object of the attitude.
3. The **behavioral component** results from the actions we take to approach or distance ourselves from the object of attitude.

For example, our attitude toward dark chocolate might include the belief that chocolate is healthy (cognitive component), the perception that it triggers a positive emotion when eaten (affective component), and the tendency to eat it as an afternoon snack (behavioral component).

When attitude relates to a particular behavior, we can define it as an evaluative response that elicits a favorable or unfavorable predisposition to performing that behavior (see the theory of planned behavior that we covered in Sect. 2.2; Ajzen & Fishbein, 1977). According to this theory, your attitude toward performing a behavior is more favorable if you evaluate the performance of a behavior as being associated with predominantly positive consequences. The opposite is true if you evaluate the performance as being associated with predominantly negative consequences. In other words, attitude toward a behavior is the result of your beliefs about the positive or negative consequences of performing that behavior. Attitude does not predict behavior directly, but indirectly, by influencing behavioral intention, which in turn

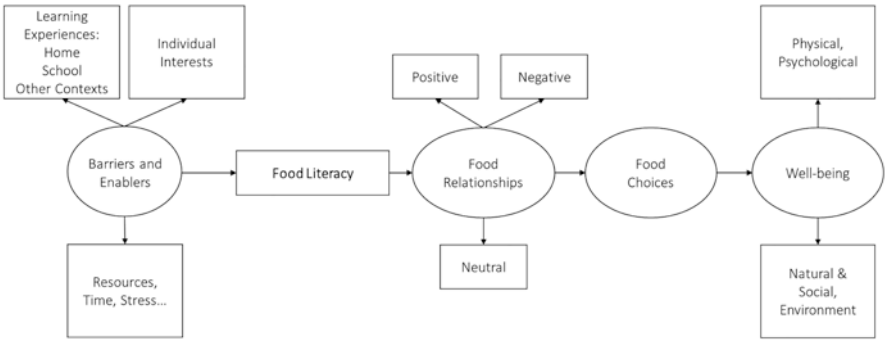

Fig. 3.2 Food literacy antecedents and consequences. (Adapted from Colatruglio & Slater, 2016)

is the strongest predictor of individual behavior (Fig. 3.2). A large body of experimental data has shown that attitudes influence people's intentions and consequently predict their future behavior (Armitage & Conner, 2001). To return to the area of food: Attitudes can refer to the extent to which one is inclined to choose a particular food or follow (or not) a particular diet. This inclination is determined by the beliefs one has about the consequences of this choice, that is, the advantages or disadvantages. For example, young adults' attitudes toward eating all-you-can-eat sushi may be based on the belief that this choice will be pleasant, cheap, and easily accessible.

Attitudes are more effective in predicting a behavioral intention the more specifically they are defined (Fishbein & Ajzen, 2011). For example, when it comes to predicting the intention to perform a specific action in a specific context, the measurement of attitude should refer to the same action in the same context (**principle of correspondence**; Presseau et al., 2019). For example, general positive attitudes toward healthy eating are unlikely to be able to predict specific behaviors, such as regularly eating fruit as a snack at work or reducing meat consumption when eating out at a pub. These behaviors could be influenced by numerous factors other than the fact that one values healthy eating positively. It is therefore important to examine the attitude toward the behavior in question. This attitude has a decisive influence on the intention to perform this behavior and subsequently on the actual performance of the behavior.

There are standardized methods for measuring attitudes toward food. The most commonly used are **Likert scales** and the semantic differential (e.g., Valois & Godin, 1991). Likert scales are used to measure the positive or negative evaluation of an eating behavior by indicating the degree of agreement or disagreement with a series of statements about the topic of the attitude. The scale usually includes 5 or 7 levels or response options (from "strongly disagree" to "strongly agree"). The responses to each statement (or item) are then added together to give an overall score that indicates how positively or negatively the respondent values the attitude item. For an example of a Likert scale for assessing attitudes toward chocolate, see Table 3.4.

Table 3.4 Example of attitude measurement with a Likert scale

	Completely disagree	Disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Agree	Completely agree
Dark chocolate is...							
…nutritious	1	2	3	4	5	6	7
…high in calories	1	2	3	4	5	6	7
…delicious	1	2	3	4	5	6	7

Table 3.5 Example of attitude measurement with the semantic differential technique

Eating dark chocolate is…								
Disadvantageous	1	2	3	4	5	6	7	Advantageous
Unpleasant	1	2	3	4	5	6	7	Pleasant
Unsatisfactory	1	2	3	4	5	6	7	Satisfactory
Not important	1	2	3	4	5	6	7	Important

The **semantic differential technique** (Osgood et al., 1957) consists of presenting a series of scales with bipolar adjectives (e.g., positive-negative, true-false) and asking the person to associate these adjectives with the stimulus presented. An example, also related to chocolate, is given in Table 3.5. The prompt implies two types of judgements that are related. One concerns *direction* (which of the two poles of the scale of opposing adjectives is most associated with the object of the setting) and the other concerns *intensity* (when the identified association approaches the extreme of the scale). Usually, the distance between the two opposing adjectives is quantified using a seven-point scale (−3 to +3 or, more commonly, 1 to 7). The middle point of the score (which corresponds to 0 or 4) corresponds to the equidistance or neutrality of the two bipolar adjectives with respect to the concept stimulus (Di Nuovo & Licciardello, 1997). Finally, the responses are summed and used to assign a total score, which also in this case indicates how much the respondent evaluates the attitude object positively or negatively. In the case of attitudes related to food choices, for example, the pairs of adjectives assessed may be: "pleasant – unpleasant," "smart – stupid," "useful – harmful," "useful – useless," "tasty – disgusting," "cheap – expensive," and also simply "good – bad" or "positive – negative."

Attitudes toward food are strongly influenced by the importance the person attaches to the different food motives. This is shown, for example, by the results of a study (Rankin et al., 2018) with a large sample of people from different European countries (Poland, Portugal, Ireland, Spain, the UK, Greece, Germany, Norway, and the Netherlands). The study examined dietary motives that may predict intention to adopt a personalized diet, based on dietary recommendations based on one's eating habits, lifestyle, and health status. Results showed that participants had more positive attitudes toward personalized diets when they were motivated by a desire to lose weight, by the impact of food choices on mood and health, and by the ethics of those

choices. Positive attitude, in turn, influenced intention to follow a personalized diet, and intention was also influenced by the sensory appeal of the suggested foods. Conversely, participants who placed more value on price and familiarity with the foods had less positive attitudes toward personalized diets and consequently lower intentions to adopt them.

This suggests that highlighting the healthy content of a personalized diet can help develop positive attitudes toward it. However, the key to developing intention to adopt a personalized diet is highlighting the sensory appeal of the recommended foods. Given the potentially negative impact of motives related to the price and familiarity of foods, it is also appropriate to provide reassurance that a personalized diet plan takes into account the individual's economic means and includes foods that are familiar to them, as well as their sensory preferences. More generally, the research findings on this topic clearly show the importance of taking into account the dietary motivations of beneficiaries when designing and implementing programs to promote healthy eating. The communication strategies used should therefore be as individual as possible and take advantage of the beneficiaries' pre-existing motives and attitudes (as we will see in more detail in Chap. 9).

In addition to **explicit attitudes**, that is, *conscious attitudes*, food choices can also be influenced by **implicit attitudes**, that is, *unconscious associations that people make between certain objects or actions and associated positive or negative evaluations* (Greenwald & Banaji, 1995). Attitudes are associations that exist in memory between certain objects and their evaluations. These associations can vary in strength and, consequently, can vary in memory (Fazio & Towles-Schwen, 1999). It follows that behavior is only determined by explicit attitudes and controlled processes if the person is sufficiently motivated to engage in conscious deliberation and has the necessary resources, such as time and cognitive abilities. If there is a lack of adequate motivation and/or sufficient resources, behavior is more likely to be determined by automatically activated attitudes. Implicit attitudes can be measured using computer categorization tasks (e.g., Implicit Association Test, IAT; Greenwald et al., 1998).

According to the **Reflective-Impulsive Model** (RIM; Strack & Deutsch, 2004), implicit attitudes are part of the *impulsive system* and predispose the body to approach or automatically avoid a stimulus. As such, they can conflict with explicit attitudes, that is, more conscious appraisals, personal norms, and goals that are instead located in the reflective system. It is interesting to observe how often implicit attitudes have a very strong and direct effect on behavior, as they are stored in memory along with representations of motor responses (i.e., behaviors). In the case of food choices, for example, it has been observed that explicit attitudes predict well the decision to eat fruit or a chocolate bar when people have sufficient cognitive resources to process their choice. However, when cognitive resources are scarce, the choice is more strongly determined by impulsive processes. In the latter case, the measurement of explicit attitudes loses its predictive power, while the predictive power of the measurement of implicit attitudes increases (Friese et al., 2008).

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Chapter 4
Emotional Factors

4.1 Emotional Eating

Think about how many movies you have seen where there are powerful or emotionally poignant scenes when the protagonist buys, prepares, or eats food. Food and emotions are closely linked and we have all experienced this to a greater or lesser extent, perhaps when we drank too much after an argument with our partner or when we felt guilty because we could not resist buying the cream puffs that were on display in the patisserie.

The emblem of the relationship between food and emotions is the so-called ***comfort food***, that is, a *food whose consumption gives comfort or a feeling of well-being*. So let us talk about foods that provide a kind of psychological comfort, particularly emotional comfort. They can vary from person to person and from culture to culture, but most often they are foods that are high in calories (rich in sugar, fats, and/or carbohydrates). They are also often associated with our childhood, with the idea of home cooking, prepared according to simple recipes or associated with traditions (Spence, 2017). For this reason, they have a nostalgic charm and remind us of our home, family, or friends (Locher et al., 2005). In short, comfort foods generally remind us of people, places, or times we like and help us feel better immediately. However, the flip side of the coin is that we often feel guilty and less healthy after eating these foods (and this is especially true for women; Adriaanse et al., 2016).

If we reflect on our daily experiences, we can easily understand how the act of eating can become a means of regulating our emotions. When the delicate balance between food and emotions is disturbed, the impulse to eat becomes a reaction to an emotional need that would require a different kind of food. In particular, eating foods high in carbohydrates and fats becomes a strategy to cope with negative emotions. **Emotional eating** *is an eating behavior that consists of consuming food because of an emotional outburst, even when the body does not need it*. Emotional eating is different from physical hunger, which is triggered when the body needs

P. Catellani, V. Carfora, *The Social Psychology of Eating*,
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nutrients, because it occurs in the presence of negative emotions (such as anger, boredom, stress, and loneliness). In these situations, eating becomes a means to relieve unpleasant feelings or to obtain an emotional satisfaction that we are denied in other areas of life. Emotional eating can become dangerous when it leads to eating behaviors that cause staggering weight gain, which in turn triggers additional negative emotions (such as shame or guilt). In extreme cases, emotional eating leads to **binge eating**, which is *the overconsumption of highly palatable foods that are usually high in fat and sugar* (Gearhardt et al., 2009).

Eating tasty foods makes people feel better in the face of stress or negative emotions due to a physiological mechanism (e.g., Leehr et al., 2015; Franja et al., 2021): Eating triggers increased dopamine release in the mesolimbic pathway, which signals pleasure and reward (Volkow et al., 2011). Furthermore, eating tasty food reduces brain activity in response to stress (Brownell & Gold, 2012). In addition to this physiological component, emotional eating is explained by a behavioral component, in the sense that it is the result of learning through experience. Following Skinner's (1963) learning theory, we can say that the relief of stress and negative emotions through eating acts like a reward or rather a "negative reinforcement" as it reduces the unpleasant experiences. This leads to the person being induced to repeat the same experience. This increases the likelihood that the person will increasingly tend to respond to unpleasant emotional states with eating behavior aimed at reducing them, which inevitably leads to weight gain.

The interrelationship between physiological and behavioral processes in the response to unpleasant emotional states and weight gain is illustrated in Fig. 4.1. Increased stress and negative emotions "trigger" (Trigger; Box A) sensitization of the reward system in the brain and lead to increased food intake (Box B) and weight gain (Box D). Increased food intake, in turn, leads to further activation of the reward

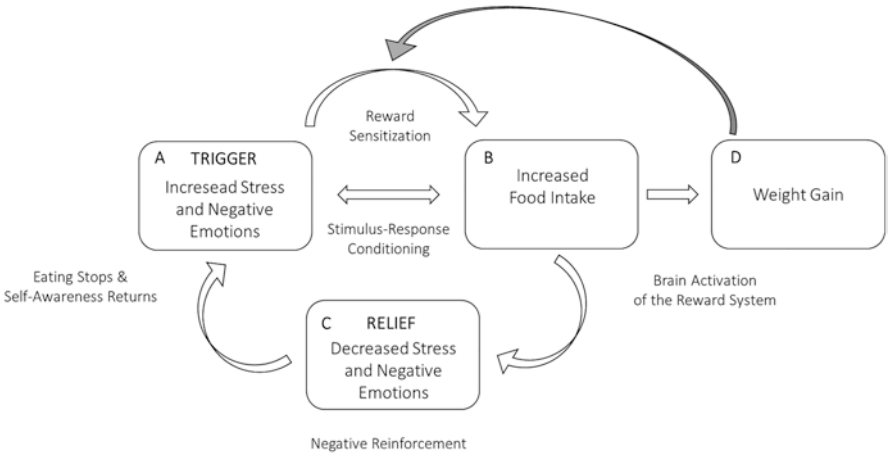

Fig. 4.1 Explanation of the physiological and behavioural component of emotional eating. (Adapted from Klatzkin et al., 2021)

system in the brain and thus to a decrease in stress and negative emotions, that is, relief (Box C). However, this short-term emotional relief is not permanent, because stress and negative emotions return when food intake ends. When stress and negative emotions increase, the likelihood of food intake being "triggered" again increases. This creates a kind of vicious circle that is difficult to break and which we can call as reward consciousness (grey return arrow from D in Fig. 4.1). The more negative emotions arise and the person suppresses them by eating, the more he or she will tend to seek quick relief in precisely this way, because the physiological pleasure of eating is increasingly associated with the release of negative emotions.

Emotional eating and binge eating are closely related to **emotion regulation**, which is *the ability to adaptively regulate one's emotional state by employing a range of strategies and behaviors aimed at changing one's emotional state*. Emotion regulation activates behaviors such as overthinking a challenging situation to reduce anger or anxiety, hiding visible signs of sadness or fear, or even focusing on the reasons why we feel happy or calm. Underlying emotion regulation is a set of processes responsible for monitoring, evaluating, and modifying emotional responses in terms of their intensity and temporal duration (Thompson, 1994).

The *process model of emotion regulation* (Gross & Thompson, 2007) has instead emphasized that such regulation can encompass both positive and negative emotions and can be both conscious and unconscious. Moreover, the factors involved in its activation are found at both individual and social levels. This means that the appropriateness of the forms of emotion regulation also depends on the contextual factors in which it takes place and consequently cannot be determined a priori.

Emotion regulation strategies can also be categorized according to whether they are used before the emotion is activated or when the emotion has already been activated (Gross, 1998). In the first case, we speak of antecedent-focused emotion regulation strategies, which are based on a kind of pre-emptive action. The person decides whether to engage with the stimulus and whether to focus on some of its specific aspects. In the second case, we speak of emotion regulation strategies that focus on the response. The person can intervene in the different components of the response to regulate it. For example, he or she may use a form of emotion regulation based on a cognitive reappraisal of the emotion, he or she may intervene in the physiological and behavioral response to prevent inappropriate behavior. Based on these premises, five main categories of emotion regulation have been identified (Gross, 1998).

- **Selection of the situation**: The individual seeks or avoids certain stimuli (people, places, objects, events) in order to increase positive emotions and decrease negative ones.
- **Modification of the situation**: The individual is activated to modify the situation in order to change its emotional impact.
- **Use of attention**: The individual tries to control her attention in order to regulate her emotions. She can achieve this through three main strategies. The first is *distraction*, which consists of focusing on non-emotional aspects of the situation or shifting attention away from the actual attention. The second strategy is

concentration, which consists of selecting certain aspects of the situation and reinforcing the emotional response. Finally, the third strategy is *rumination*, which involves focusing attention on internal states and their consequences.

- **Cognitive change**: The person changes the way he or she evaluates a situation in order to change its emotional meaning and thereby elicit different and more acceptable emotional responses.
- **Response modulation**: When the emotional responses have already been activated, the person attempts to directly influence the experiential, behavioral, or physiological components of the emotional response. An example of modulation is suppression, which consists of inhibiting an ongoing emotional state.

Using the functional MRI technique to detect emotional activation, it has been found that low levels of negative emotion regulation are often associated with a subsequent increase in high-sugar and high-fat foods (e.g., Morawetz et al., 2020). Furthermore, a deficit in emotion regulation can lead to eating disorders or true eating disorders. People with restrictive anorexia and bulimia often have deficits in emotion regulation. For example, a study of patients with anorexia has shown that in these patients, a marked negative emotional state on a given day is associated with a higher likelihood of food restriction the next day, confirming that these patients use food restriction to cope with negative emotions (Engel et al., 2013). In contrast, negative emotions usually precede binge eating in people with bulimia nervosa (Haedt-Matt & Keel, 2011).

People who are most receptive to the calming value of food, and those who use food as "self-medication" to provide short-term relief from stress and negative emotions, can be defined as **emotional eaters** (Van Strien, 2018). To measure whether a person can be defined as *an emotional eater*, several psychometric scales have been developed. Let us focus on one of them, the **Florence Emotional Eating Drive Questionnaire** (FEED; Cassioli et al., 2021). It is a scale in which twenty-three emotions are suggested (see Table 4.1) and two questions are asked for each of these emotions.

Table 4.1 Florence emotional eating drive questionnaire (Cassioli et al., 2021)

1) How often do you feel …?		
2) How strong is your desire to eat when you feel…?		
Resentful	Discouraged	Shaky
Upset	Worn out	Inadequate
Rebellious	Blue	Jittery
Sad	Uneasy	Irritated
Jealous	Worried	Frustrated
Lonely	Furious	On edge
Confused	Nervous	Angry
Guilty	Bored	

Note: 5-point answer scale. For the first question: from 0 = "never" to 4 = "always"
For the second question: from 0 = "no desire to eat" to 4 = "an overwhelming desire to eat"

People who are most receptive to the calming value of food, and those who use food as "self-medication" to relieve themselves of stress and negative emotions in the short term, can be defined as *emotional eaters* (Van Strien, 2018). To measure whether a person can be defined as an emotional eater, several psychometric scales have been developed. We will focus on one of them, the **Florence Emotional Eating Drive Questionnaire** (FEED; Cassioli et al., 2021). It is a scale in which twenty-three emotions are suggested (see Table 4.1) and for each of these emotions two questions are asked:

1. "How often do you feel... worried/frustrated/lonely etc.?" on a 5-point Likert scale ("Never," "A few times," "Sometimes," "Often," "Always"): This measures the frequency with which the person believes they feel the emotion in question.
2. "How strong is your desire to eat when you feel anxious/frustrated/lonely etc.?", with a 5-point Likert scale ("No desire to eat," "A slight desire to eat," "A moderate desire to eat," "A strong desire to eat," "An overwhelming desire to eat"): In this way, the urge to eat is measured according to the occurrence of different emotions.

To obtain the total score, the frequency of occurrence of each emotion and the corresponding urge to eat are combined into a single score using the calculation scheme shown in Table 4.2. As you can see from the table, this score is calculated on a 10-point scale (from 0 to 9), where 0 corresponds to the absence of the urge to eat in the presence of the respective emotion or in the absence of the emotion itself, while 9 corresponds to an overwhelming need to eat in conjunction with an emotion that is felt very frequently.

When examining the personality traits of emotional eaters, it was found that these individuals often exhibit high levels of neuroticism (Keller & Siegrist, 2015), trait anxiety (when they are also obese; Schneider et al., 2010), and negative perfectionism (a type of perfectionist behavior driven by the goal of avoiding failure; Wang & Li, 2017). Attentional impulsivity (i.e., the tendency to shift attention quickly and impatience in the face of complexity) and non-planning impulsivity (i.e., the tendency not to plan ahead and to ignore the long-term consequences of one's actions) are also common in young adults (Jasinska et al., 2012).

In summary, we can say that emotional eating is primarily triggered by unpleasant moods, a lack of emotional regulation, and certain personality traits. However, it has been shown that emotional eating can also be associated with positive

Table 4.2 Scoring table of the florence emotional eating drive questionnaire (Cassioli et al. 2021)

		Impulse to eat				
		0	**1**	**2**	**3**	**4**
Frequency of emotion	**0**	0	0	0	0	0
	1	0	1	2	3	4
	2	0	2	4	5	6
	3	0	3	5	7	8
	4	0	4	6	8	9

emotions in some cases (Evers et al., 2013; Turner et al., 2010). However, those who report a strong desire to eat in response to negative emotions generally do not report the same desire in response to positive emotions (van Strien et al., 2013). It is likely that eating in response to negative rather than positive emotions is due to different motivations (van Strien et al., 2016). In any case, the first behavior seems to be more strongly correlated than the second with higher body weight and the typical symptomatology of eating disorders (Meule et al., 2018).

4.2 Pleasure in Eating

Pleasure in eating has often been studied in a negative sense, equating it with the satisfaction of visceral impulses triggered by negative emotions or the environment (e.g., Loewenstein, 1996). In this case, pleasure is defined as the desire to resist by, for example, trying to divert attention from the bodily states that signal the desire to eat (hunger, arousal, salivation, etc.). The satisfaction of this pleasure is in turn presented as simple hedonistic gratification, resulting from the enjoyment of visceral impulses (Cornil & Chandon, 2013), and ultimately as antagonistic to healthy dietary choices. However, the enjoyment of food can also be seen in a more positive sense, focusing on the social, cultural, and aesthetic dimensions of eating (Johnston & Baumann, 2007; Cornil & Chandon, 2016). In this perspective, the enjoyment of food is seen as a positive pathway to well-being. Above all, the positive feeling that results from the perception of pleasant sensory and physical states when eating is valued.

A deeper analysis of food enjoyment has led to the distinction of three different types of food pleasures: visceral, Epicurean, and experiential (Batat et al., 2019). **Visceral eating pleasure** *is a short-term hedonic relief that results from the satisfaction of eating impulses that are often beyond volitional control*. For example, a subscale of the Dutch Eating Behavior Questionnaire (DEBQ, van Strien et al., 1986) has been used to measure visceral eating pleasure, referred to as external eating, which refers to reactivity to food stimuli that focus on sight and smell and are independent of the internal state of hunger or satiety (e.g., subjects are asked: "When you see or smell something delicious, do you feel like eating it?").

Epicurean eating pleasure *is a sustained pleasure resulting from aesthetic appreciation of the sensory and symbolic value of food*. It is voluntarily pursued, can be pursued as an end in itself rather than to satisfy a craving, and is inextricably linked to aesthetic, sensory, and symbolic food experiences. The items of a scale to measure the Epicurean eating tendency are listed in Table 4.3 (Cornil & Chandon, 2016). The term Epicurean refers to the theory of the Greek philosopher Epicurus, according to which pleasure is the goal of a happy life characterized by the absence of pain in the body and the absence of disturbance in the soul. Epicurean pleasure in food implies, for example, an appreciation of gastronomy and culinary cultures. This is the case, for example, with those who see "eating out" as a quest for tasty and refined foods that create multisensory experiences based on flavors, visual

Table 4.3 Scale of the Epicurean eating tendency (Cornil & Chandon, 2016)

1. If I try, I can clearly and easily imagine the taste of many dishes.
2. My friends say that I am a foodie.
3. Cooking is a major form of art, similar to music or painting.
4. I like to discuss the taste of food with my friends.
5. There is a lot of beauty in food.
6. I can easily find the words to describe the taste of many foods.
7. More than other people, I value the look, the smell, the taste, the texture in mouth of foods.

images, and actions. In this perspective, "eating out" becomes an activity characterized as an opportunity for pleasure, distraction, and gratification (Kalita & Sarma, 2017).

It has been shown that the tendency to experience Epicurean pleasure is different from the tendency to experience visceral pleasure (Cornil & Chandon, 2016). Moreover, Epicurean pleasure is more pronounced in women than in men, while it is independent of age, income, and education. Epicurean pleasure is also associated with a preference for small food portions and a general perception of high well-being, while it is not associated with a high body mass index. In contrast, visceral indulgence is associated with a preference for large portions of food, a relatively low general sense of well-being, and a high body mass index.

The experiential pleasure of food *consists of the satisfaction and pleasure derived from the multisensory experience of enjoying food, valuing taste, and also community and cultural meanings* (Batat et al., 2019). This pleasure encompasses both the immediate experience of eating and the memory or expectation of enjoying food. It is an integrated, holistic experience that encompasses three aspects that are not included in the definition of pleasure. First, the experience of pleasure as *a learning process* that is the result of life experiences in different social contexts. Secondly, it presupposes the importance of a *subjective perspective* that leads to the experience being integrated into a particular food culture and subculture (e.g., French or Asian culture). This means that food experiences are shaped by a particular culture and the history, social norms, values, and beliefs of that culture. Thirdly, experiential enjoyment is seen as a *journey or process that enables you to strive for well-being*. As Fig. 4.2 shows, this pleasure of food journey comprises three phases, and in each of these phases it is possible to apply one or more principles to increase the pleasure and satisfaction that result from that phase. Let us look at the phases and principles in detail.

1. The **contemplation phase** culminates in the anticipation of the positive sensations we will experience during the meal. The pleasure that results from this phase is further enhanced by the sensory principle. The stimulation of multisensory responses (sight, taste, smell, touch, and hearing) increases the liking, even the anticipation, of the meal.

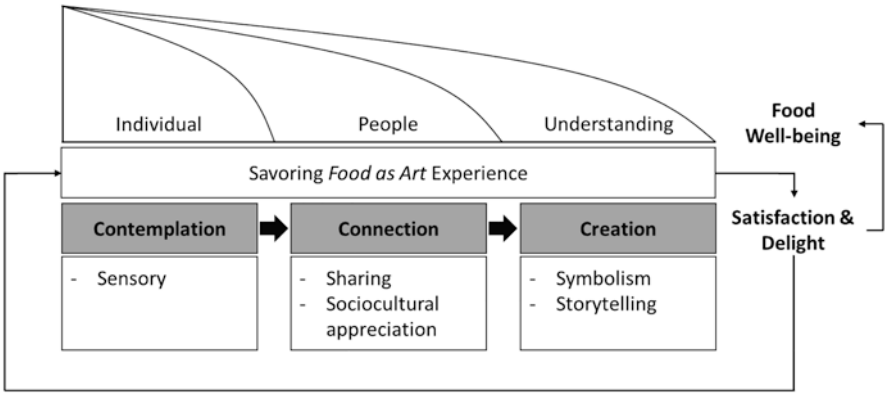

Fig. 4.2 The experiential pleasure of food journey. (Adapted from Batat et al., 2019)

2. The **connection phase** culminates in tasting. The associated enjoyment is enhanced by sharing and socio-cultural meanings. Sharing food often means sharing values and social norms and strengthening communal bonds, such as intimacy with others. On the other hand, eating food traditionally associated with a particular community means strengthening one's positive cultural identity and celebrating diversity.
3. The **creation phase** culminates in remembrance, and the enjoyment associated with it is further enhanced by the principles of symbolism and storytelling. Symbolism refers to the attribution of aesthetic, religious, or moral values and can encompass all food practices, such as the ceremonial preparation of a dish or the aesthetic presentation of food. It not only reinforces the pleasure of eating, but also strengthens shared cultural, social, and religious identities. Storytelling is a memory-rich experience that uses words, signs, or symbols to tell stories about food experiences. It strengthens social connections through the perpetuation of traditional rituals.

4.3 Anticipated Emotions

The relationship between emotions and food is not just about the moment you enjoy the food or what happens afterward, but also about the anticipation of that moment and what happens during the process of deciding whether to consume a particular food. In fact, not only the emotions experienced at the same time play an important role in the decision-making process, but also those that are anticipated as a future outcome of the decision (Lowenstein & Lerner, 2003). **Anticipated emotions** are *expectations about how you will feel once you experience the gains or losses associated with the decision you have made*. In general, the expectation of a positive emotion that might result from performing the behavior leads you to perform it, while the expectation of a negative emotion leads you to avoid it.

Numerous scientific studies have confirmed that anticipated emotions influence people's decisions, intentions, and behavior. Many of these studies have also shown that anticipated emotions are a useful additional variable compared to those predicted by the theory of planned behavior (Sect. 2.2). Anticipated emotions increase the ability to explain intentions (Perugini & Bagozzi, 2001). For example, in relation to eating behavior, **anticipated regret**, or *the expectation of regret in the future if a particular behavior is not performed*, has been shown to be an important predictor of the intention to eat at least five portions of fruit and vegetables per day (Caso et al., 2016). In another study, early regret was found to be a strong predictor of intention to drink at least two liters of water (Carfora et al., 2018). The same study also found that early regret moderated the relationship between intention and behavior. Thus, the more people anticipated regret, the more they converted their behavioral intention into actual behavior within the next month. From this we can conclude that anticipated emotions play an important role in predicting both intentions and eating behaviors, and this role remains evident even when considering the role of other predictors of behavior predicted by the theory of planned behavior.

Although previous research has mainly focused on anticipated emotions with negative value (besides regret, guilt, or shame), it is possible that anticipated emotions with positive value (such as satisfaction, happiness, or pride) may also play a relevant role in food choices. This is confirmed by a study that investigated the psychosocial factors underlying the intention to adhere to the Mediterranean diet (Carfora et al., 2022). In this study, a sample of approximately 2000 Italian adults participated in an online survey that measured the negative and positive anticipated emotions associated with the decision to adopt a Mediterranean diet, as well as the motives underlying this decision, in addition to the dimensions of the Theory of Planned Behavior (i.e., attitude, subjective norm, perceived behavioral control, and intention). The negative emotions measured were regret, dissatisfaction, and worry, while the positive emotions measured were pride, satisfaction, and security. Motives were distinguished between mood motives (i.e., choosing foods that make you feel good and relieve stress and tension) and health motives (i.e., choosing foods that are healthy, nutritious, and rich in minerals and vitamins).

Examples of the items used to measure each of the dimensions examined in this study can be found in Fig. 4.3. The same figure summarizes the results of the study, which confirm the plausibility of the model originally adopted. As you can see from the arrows connecting the different dimensions, their direction and the numerical value of the connection between the dimensions, both mood and health motives influence the intention to follow the Mediterranean diet. However, they do not do so directly, but indirectly, through the increase in anticipated positive and negative emotions. Furthermore, anticipated positive and negative emotions prove to be direct predictors of intention, along with subjective norm and perceived behavioral control. These data confirm that not only negative but also positive anticipated emotions can increase intention to engage in a particular eating behavior.

In some cases, the expected emotions associated with a decision, including eating, may be contradictory and inconsistent. This occurs in situations where there is

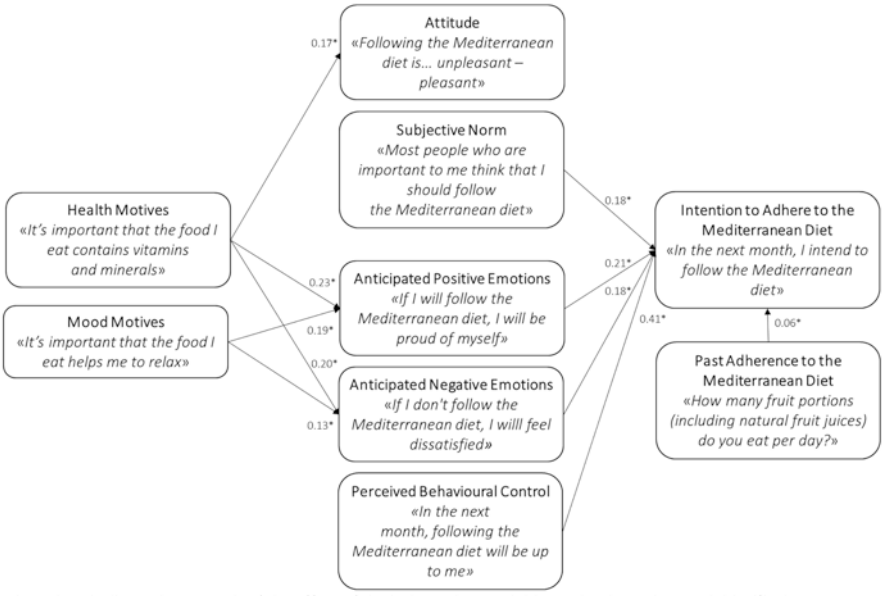

Fig. 4.3 Model of prediction of the intention to adhere to the Mediterranean diet. (Carfora et al., 2022)

a self-control dilemma, that is, when a desire felt by the person conflicts with their overriding goal (Hofmann et al., 2013). For example, a person who has set a goal to lose weight might be tempted to eat a piece of cake. The person is therefore faced with a dilemma and it is this dilemma that may lead him to imagine two likely future scenarios. In the first scenario he will imagine eating the cake, in the second scenario he will imagine not eating it. These probable future scenarios, which refer to giving in to or resisting a temptation, are generally associated with the anticipation of emotional reactions. For example, in the first scenario, the person might anticipate that eating the cake will trigger both positive emotions (due to enjoying a dessert) and negative emotions (associated with the experience of breaking the diet and violating the overarching goal the person had set for themselves). Also in the second scenario, the person may assume that giving up will trigger both positive emotions (satisfaction at not having succumbed to temptation) and negative emotions (sadness at not having satisfied the desire for the cake).

According to the ***Model of Anticipated Emotions in Self-Control*** (MAESC; Kotabe et al., 2019), mixed and conflicting anticipated emotions guide the evaluation of self-control because they activate the recognition of a conflict between an immediate desire and a higher-level goal. Recognition of this conflict leads to mental simulation of satisfying or avoiding the desire and anticipating the positive or negative emotions that result from the choice (Fig. 4.4). If a person mentally simulates the satisfaction of a desire and the resulting pleasure, they will choose to give

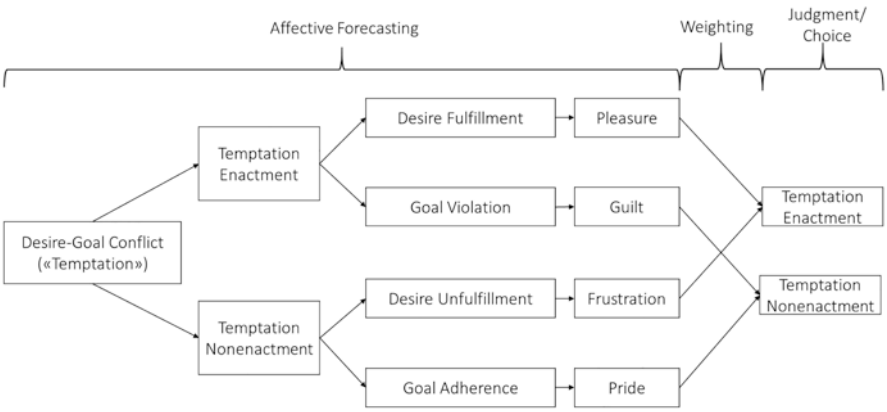

Fig. 4.4 Model of anticipated emotions in self-control. (Adapted from Kotabe et al., 2019)

in to the temptation. However, if she mentally associates this satisfaction with the violation of the goal, she anticipates the feeling of guilt and maintains self-control not to give in to the temptation. On the other hand, if a person mentally simulates the non-satisfaction of the craving, she anticipates that holding on to the goal will trigger a feeling of pride. Pride, in turn, promotes self-control and the removal of temptation. On the other hand, when she considers dissatisfaction with the craving but adherence to the goal, she anticipates the feeling of frustration, which is detrimental to self-control and increases the likelihood of giving in to temptation (Kotabe et al., 2019).

The authors confirmed the existence of this link between anticipated emotions and giving in or not giving in to a temptation by conducting an experiment in which participants read the following text:

> *Everyone struggles with a dilemma of self-control from time to time. Do I give in to temptation and not pursue my goal (e.g., eat a cheeseburger and not pursue my diet goal consistently)? Or do I resist temptation and pursue a goal instead (e.g., I resist the cheeseburger and act according to my diet goal)? Whether you give in to temptation or resist temptation and pursue a goal instead, the decision can trigger a range of emotions. We want to know what you think about the emotional consequences of self-control decisions. To this end, we now ask you to rate which emotions you would feel most strongly after acting out or avoiding a temptation. Since we are striving for accuracy, it would be best if you answered as honestly as possible. If you think you would feel emotions that are not included in our answer choices, we have given you the opportunity to write in an alternative answer.*

Participants were divided into two conditions:

- Participants in the "**temptation enactment**" condition read the following sentence: *"Below, we list a range of emotions that may occur after acting out a temptation and failing to pursue a self-control goal. Which positive and negative emotions do you think you would feel most strongly?"*
- Participants in the "**temptation nonenactment**" condition read the following sentence: "*Below, we list a range of emotions you might experience if you avoid*

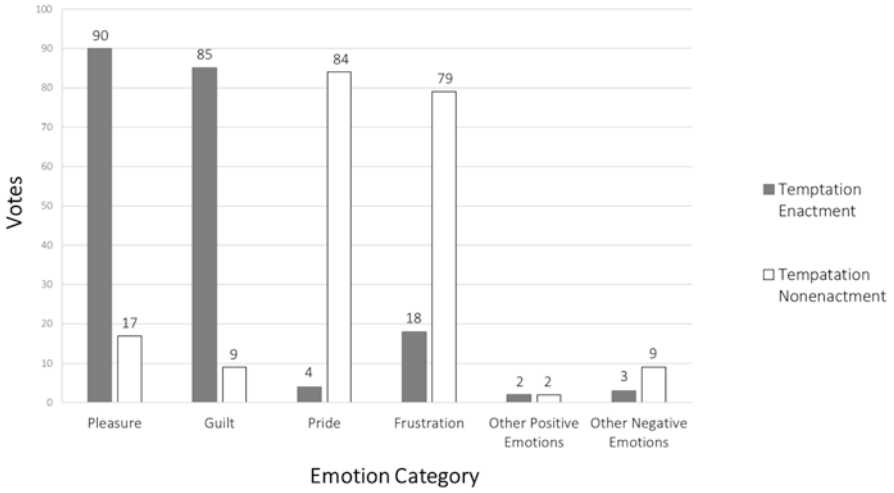

Fig. 4.5 Anticipated emotions after simulating two different future scenarios (giving in to a food temptation or not giving in). (Adapted from Kotabe et al., 2019)

temptation and instead pursue a self-control goal. Which positive and negative emotions are you likely to experience most strongly?"

All participants then selected the positive and negative emotions they thought they would feel most strongly. The results showed that participants in the Exercise Temptation condition selected more expected emotions such as joy and guilt, while participants in the Do Not Exercise Temptation condition selected more expected emotions such as pride and frustration (Fig. 4.5).

According to the MAESC model, the *time span* of an expected emotion must also be taken into account, as people anticipate not only the strength of the emotion (intensity), but also how long it will last (duration). Less complex basic hedonic emotions such as pleasure and frustration tend to be relatively short-lived, as they correspond to a faster and more impulsive way of responding to the world, and they are more concrete and associated with short-term goals (i.e., immediate desires). Complex and self-conscious anticipated emotions, such as guilt and pride, tend to be of longer duration as they are associated with self-consciousness. They therefore require a slower and more reflective type of response and are more abstract and associated with long-term goals. Finally, according to the MAESC model, anticipated emotions have a different *weight* when they occur in a decision-making process during a self-control dilemma. People rate anticipated guilt more strongly when assessing self-control because they tend to simulate the satisfaction of a temptation ("What if I did?") than its avoidance ("What if I did not?"). Moreover, desires are action-oriented, as many studies in social and cognitive neuroscience show. Accordingly, mental simulation is based on a neural network designed to represent actions rather than inactions (Grezes & Decety, 2001).

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Chapter 5
Norms, Identities, and Values

5.1 Relational Factors and Eating Decisions

Tonight you are having dinner for the first time in a restaurant with a person you met at a friends' party and immediately found very interesting. The waiter brings you the menu and the other person immediately decides on a salad and a dish with vegetables and pulses. Meanwhile, you read the long list of dishes on the menu and are particularly taken with the appetizing meat dishes. What will you choose in the end? And now imagine that you are in the same restaurant with your brother or sister. The waiter brings you the menu and the other person decides on a double cheeseburger with bacon and yoghurt sauce. What do you choose this time? You might choose the same thing in both cases, but more likely you will choose something different. In social situations where we eat together with others, we often tend to adapt our behavior more or less consciously to that of the other guests.

Before we look at the influence of others on our food choices, let us consider the difference between "commensality" and "sociability," two different terms that are often used interchangeably. **Commensality** is a term widely used in the literature and can be defined as *the act of sharing a meal with other people* (Sobal, 2000) or, in a more literal sense, eating at the same table (Fischler, 2011). The term encompasses any form of eating together, such as attending a formal dinner, a party, or a simple family meal. The act of eating together has an important psychosocial interest, as it helps to consolidate social groups and strengthen cultural identities. Although eating together usually evokes friendly and positive images, in its more formal manifestations it can also have other functions, such as the presence of a hierarchy between people or even a subordination that can also lead to separation or even social exclusion. The way we eat and with whom we do is often an indication of how society divides into classes, kinship, age, or professions and can be strongly influenced by inclusion or exclusion criteria (Kerner et al. 2015).

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For what has just been said, it is also appropriate to distinguish the concept of commensality from that of **conviviality**, which instead refers to *the pure pleasure of sharing a meal with others, a pleasure that often goes beyond the purely hedonistic and sensory and refers to the pleasure that comes from sociability* (Phull et al., 2015). Sociability as pleasure depends heavily on the people you share meals with. For a meal to be truly sociable, social interactions must be activated that guarantee the building of a pleasurable moment of sharing. The connections between people, families, and friends enable the experience of conviviality, and this in turn can strengthen these bonds. Conviviality enhances people's well-being while strengthening their sense of identity and connection to the group with whom the meal is shared (Batat, 2019). Thus, family meals are an important site for cultural and nutritional socialization, and children and adolescents are more likely to have healthier eating habits if they participate in shared family meals at least three times a week.

In a study that can be considered the first to examine how social factors influence this behavior, Nisbett and Storms (1974) asked participants to go into a psychology lab without having eaten anything in the previous 2 h. They then had the participants "taste" crackers and recorded how many crackers each participant had eaten. The situation in which the participants ate the crackers varied according to the experimental condition, namely: (a) eating the crackers with another person who had eaten a lot in consultation with the researchers; (b) eating the crackers with another person who had eaten little in consultation with the researchers; (c) eating alone. The results of this study showed that the behavior of others had a big influence on how many crackers were eaten. Those who were with a person who ate a lot of crackers had eaten more than those who were alone, who in turn had eaten more than those who were with a person who ate few crackers.

Since that first study, studies on the effects of psychosocial factors on diet have multiplied. The results of these studies can be differentiated according to the role played by the relationship factor under study, namely: social facilitation (the influence that the mere presence of other people has on our behavior), impression management (the way we control the impression we leave on others through our behavior), and modelling (the way we adapt our behavior to that of others).

5.2 Social Facilitation

The phenomenon of **social facilitation** refers to the fact that *people tend to eat more when they are in the presence of others than when they are alone* (Herman, 2015). Several researchers have studied people's eating behavior when they are in larger or smaller groups. This research has involved experimentally manipulating the size of groups in the laboratory and studying eating behavior in real life. In experimental research, participants know nothing about the true purpose of the experiment and can eat as much as they want. Usually, the relationships between the number of

people present at a meal and the amount of food consumed are measured. In other cases, information on the same topic is collected on the basis of observations or self-assessments (e.g., by asking participants to keep a food diary).

A meta-analysis examined 42 studies (both experimental and non-experimental; Ruddock et al., 2019). The studies that measured food intake using food diaries found that, on average, meals were between 29% and 48% larger when participants ate with others than when they ate alone. Consistently, studies based on the observational method have shown that people who eat in groups choose or consume foods that have 12% more calories than people who eat alone. Interestingly, however, this increased food intake when eating with others only seems to occur when the subjects are of normal weight. Overweight people show an opposite tendency to choose fewer foods when eating with others than when eating alone.

A number of factors have been identified that may moderate the effect of social facilitation, in the sense that they increase or decrease the extent to which this effect occurs (Ruddock et al., 2019). Let us consider these factors together.

- **Familiarity**. Having a familiar relationship with those around you at the table tends to increase the effect of relief and therefore the amount of food consumed. Conversely, eating with strangers or simple acquaintances often does not result in eating more than when you are alone.
- **Gender**. Women tend to eat the same amount as men in smaller groups (less than three people), while they eat less than men in larger groups. In addition, women tend to choose less calorific foods when the number of male guests increases, while they choose more calorific foods when the number of other female guests increases. In contrast, men choose more caloric foods when the number of guests present increases, regardless of gender. The reasons for these differences are attributed to the phenomenon of impression management, which we will discuss in the next paragraph.
- **Type of food**. Social facilitation has a greater effect when people are exposed to high-fat and/or high-protein foods such as meat and sweets.
- **Duration of meal**. When eating with others, one tends to eat larger quantities as the duration of the meal increases. When sitting at the table with others, the duration of the meal often increases (Clendenen et al., 1994).

We are usually aware that we eat more when we are with others, and it has been found that restaurant-goers tend to order more dishes when the number of people at the table increases (Cavazza et al., 2011). The increase in portions ordered when the meal is eaten in company suggests that social facilitation is supported by a type of food learning, an effect called early social facilitation (Ruddock et al., 2021): People have learned that eating in company is more varied than eating alone, and in this perspective they tend to order more food when they are with others. Eating is consistently perceived as more enjoyable when it is associated with an experience of sociability (see Box 4.1) than when this experience is not shared with others. Finally, meals eaten in company are perceived as less filling than meals eaten alone.

5.3 Impression Management and Stereotypes

People have a strong desire to be accepted by others and to feel that they belong to one or more social groups (Baumeister & Leary, 1995). Therefore, they place great importance on making a good impression on others. When choosing food, the way we behave at the table can affect how other people see us, and this in turn can affect how they relate to us. The image of the gourmet dish we share as a post on our social profile can determine our success in attracting potential contacts. The restaurant we choose for a business lunch can influence the success of a meeting between colleagues. How we behave when we dine with others for the first time influences their desire to go out to eat with us again in the future. Therefore, many of our eating habits influence the way other people perceive us. This also happens because eating behavior (in terms of type and quantity of food) is linked with **stereotypes** or *preconceived notions that are not based on direct experience and are difficult to change, creating expectations and behavioral consequences*.

Among the most common food-related stereotypes are those related to **gender**. The type and amount of food you eat are useful tools to signal gender identity and make a good impression in the eyes of the people you share a meal with (Cavazza et al., 2017). For example, when women eat vegetables, choose smaller quantities, and select healthy, low-calorie foods, they can give an impression of femininity. In contrast, eating meat, choosing large quantities, and choosing high-calorie and unhealthy foods can be a way for men to convey an impression of masculinity (Higgs & Ruddock, 2020).

Food size, portion size, and even food presentation are potential factors responsible for gender stereotypes about food, influencing men's and women's intention to eat certain foods to a greater or lesser extent. To test these effects, Cavazza et al. (2015) asked a sample of people to associate 26 different foods with men, women, both, or neither. The results showed, for example, that the hamburger was more associated with men, while the caprese salad (mozzarella and tomato) was more associated with women. Subsequently, participants in a second study were exposed to the vision of a plate of burgers or caprese salad (*food type*) presented as a large or small portion (*portion size*) and elegant or gross (*presentation*). It was found that the caprese salad, small portion, and elegantly presented dish were perceived as more "feminine" foods and women expressed a greater intention to eat them than men.

The impact of gender stereotypes in relation to food is also evident when food choices are shared on social networks. In an experimental study (Cavazza et al., 2020), different groups of participants viewed fictitious profiles on Instagram that differed in terms of gender and images of dishes posted ("male" dishes, "female" dishes, or neutral images). Thus, posting "male" dishes was shown to decrease the perception of femininity of those posting, regardless of the user's stated gender. Furthermore, posting images of dishes that match the gender of the Instagram profile increases the impression of femininity for the woman and masculinity for the man, as well as the desire to interact with him. Therefore, posting pictures of dishes that match the gender stereotype influences the formation of impressions in the people who post the pictures on social media.

The stereotypical view of food can easily be transformed into prejudice (i.e., a stereotype with a strong negative connotation). Often people have a negative attitude toward obese people, thinking of them as lazy, slovenly, lacking self-discipline, etc. More generally, many tend to judge negatively people with eating habits that contribute to the development of obesity. In particular, eating so-called "good" foods can lead to those who eat them being perceived as having a "good character." Yet, people who eat "good" foods are perceived as "better" people than those who eat "bad" foods: they are judged to be more attractive, healthier, more moral, and more intelligent than consumers of "bad" foods (Higgs & Ruddock, 2019). Finally, consumers of "good' food are rated as more serious, albeit less likeable overall, while consumers of "bad' food are perceived as fun-loving, happy, and sociable.

5.4 Modelling and Social Norms

People often adapt their eating behavior to the behavior of others (Cruwys et al., 2015). For example, men tend to drink more alcohol if their friends also drink heavily. Such a phenomenon can be described by the **modelling** process (modelling; Bandura & Walters, 1977), *that is, the learning that takes place by observing the behavior of others*. In the area of eating behavior, modelling manifests itself through the imitation of another person who takes on the role of the "eating model".

Imitating the behavior of others does not necessarily mean behaving in the same way. For example, people rarely eat exactly the same amount of food that others eat. They simply tend to eat more than they normally would if the guests eat a lot, or eat less if the guests eat little. As mentioned at the beginning of this chapter, Nisbett and Storms (1974) showed that boys eat more when the other person eats a lot of crackers and less when the other person eats only a few. Subsequently, many studies have been conducted to better understand why this happens (for a review see Cruwys et al., 2015).

One of the reasons why people imitate the eating behavior of others is that imitating another person's behavior facilitates social interaction. This interpretation is supported by the fact that personality traits related to the need for affiliation are more pronounced in those who tend to "model" their eating behavior on that of others. Consistently, this tendency was found to be particularly pronounced in social situations that require an effort to belong, for example, in a situation where the reference model is behaving antisocially. It is less pronounced when the reference model is already behaving amicably.

People also tend to model the eating behavior of others because they are generally motivated to behave "properly" and often look to others for information on how to behave "properly." We often see the behavior of others as a guide that we follow. In this case, this behavior becomes a **social norm**, *that is, a rule of behavior shared by the members of a community*. In the case of eating behavior, the social norm can be highlighted by the presence of another person during the meal, but also by signals from the environment, such as the size of the suggested portions, or by

information about the behavior of people who are not present at the time of the meal (e.g., through messages or texts describing the behavior of these people). In addition, the social norm of eating depends strongly on the context of the meal: for example, it may be the norm to eat fruit with cutlery in an elegant restaurant, but not in a beach bar.

Social norms are often formed and learned within the social groups we belong to and identify with. They determine what is considered acceptable behavior by members of the group and are an important source of influence on individual members of the group. Moreover, they can arise both from what the members of the group actually do (i.e., the practices) and from what the members of the group want or prefer (i.e., the expectations). In the first case we speak of descriptive social norms and in the second of injunctive social norms (Cialdini et al., 1990). **Descriptive social norms** concern *widespread behaviors within a social group*. They are based on the perception of what most members of the group do (e.g., "Many people eat meat" or "My family members eat pasta for lunch"). In this case, people adapt to the eating habits of others because they see the foods (and quantities) chosen by others as an indicator of how much they can or should eat. This type of social influence is called "informative social influence." **Injunctional or prescriptive social norms**, on the other hand, concern *behaviors that are considered appropriate within a social group*. In this case, people base their behavior on what others think is right or wrong (e.g., "Many people expect me to eat more fruit or vegetables" or "My family members want me to eat fruit every day"). This type of social influence is called "normative social influence."

Research has shown that descriptive social norms are generally more effective than injunctive norms in influencing people (e.g., Stok et al., 2014). Furthermore, food modelling appears to be driven by descriptive norms rather than a desire to belong, in the sense that it is driven by information about how many other people have behaved before, rather than by the behavior of a single person present at the time.

To study how people behave when exposed to normative social influence, researchers have often used what is known as the *remote confederate design*. In these studies, participants "casually" see reports of the amount of food consumed by participants before them. The amounts consumed by previous participants can also be mediated by environmental cues, such as empty food wrappers allegedly left behind by previous participants. In both cases, the data are always fictitious and are used to activate the social norm and examine its impact on participants' behavior. The influence of the norm is generally confirmed. For example, people are more likely to choose a healthy food over a harmful one if they see evidence that previous participants have chosen a healthy food. They are also more likely to choose a larger number of biscuits if they know that other participants have done so before them, or a smaller number of biscuits if others have also done so (Cruwys et al., 2015).

In the same way, a sample of people was invited to participate in a study on the effects of hot or cold temperatures on taste (Burger et al., 2010). Participants were welcomed into a room and asked to sit at a table. Depending on which experimental condition they had been assigned to, they found on the table the wrapper of a

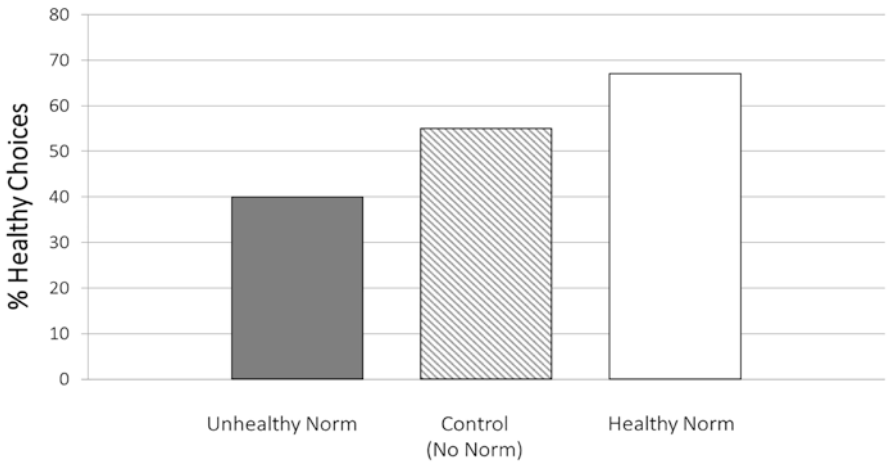

Fig. 5.1 Effect of exposure to different social norms on healthy food choices. (Adapted from Burger et al., 2010)

Snickers bar that the previous participant had eaten (*unhealthy cue*), the wrapper of a whole-grain bar (*healthy cue*), or nothing (*control condition*). In the first two cases, they were asked to throw the wrapper into the bin where other similar wrappers were already located to reinforce the activation of the norm. All participants were then asked to choose a bar from four possible options, only one of which was healthy, and to eat it with hot or cold water. The participants then answered a questionnaire about the taste of the bar in one case and in the other. However, the real purpose of the experiment was to check which bar the participant had chosen to eat. To confirm expectations, participants tended to choose a bar that was similar to the one they thought other participants had chosen before them (Fig. 5.1).

Therefore, descriptive norm information given seemingly at random seems to indicate the "right" way to do things and increase the likelihood that one's behavior will conform to the norm. We will discuss in a later chapter (Sect. 8.3) whether a similar effect can be observed when reference to descriptive norms is explicitly used to promote behavior change. In the meantime, we begin to understand in which people and under which conditions it is more likely that activating descriptive norms will lead to one's own eating behavior matching that of others.

5.5 Descriptive Norms and Eating Decisions

For **adults** and **adolescents**, most studies of how descriptive norms affect food choices have focused on the choice of tasty but high-calorie foods such as biscuits or sweets. These studies have consistently shown that people tend to eat more or less depending on how much the people they share the meal with eat. However, the few studies that have looked at healthy food choices have not come to the same

conclusions. This means that people tend to imitate eaters less when they choose healthy foods such as fruit or vegetables (Cruwys et al., 2015).

In **children**, studies have mainly focused on the possibility that imitating a dietary pattern may encourage the consumption of new or initially undesirable foods. These studies have mostly shown a significant effect of imitation in children, both when the role models are peers and when they are unfamiliar adults or teachers. However, they have also shown that repeated exposure to the model is necessary for the effect of imitation to last over time. However, when children are exposed to role models who consume unhealthy foods, imitation is not only easier, but the effect usually lasts for a few days even after a single exposure (Cruwys et al., 2015).

Few studies have yet examined the effects of imitation when the behavior studied is the selection of certain foods instead of others, for example, low-calorie foods instead of high-calorie foods, and the few results available are contradictory. Overall, however, it seems that people are influenced by the **amount of food** rather than the **type of food.** This could be because people are more confident in their food preferences than in the appropriate amount they should eat in different circumstances. Therefore, they tend to imitate others in terms of the quantity rather than the type of food they eat. However, further studies are needed to clarify these aspects.

5.6 Moderators of Descriptive Norms

Given what has been said so far about the impact of dietary models, we can say that descriptive norms have a significant impact on our food choices. However, there are some factors that can increase, decrease, or reverse the influence of social norms by acting as moderators. These factors include socio-demographic variables (gender and age), eating habits (personal preferences, eating styles, and meal times), and socio-relational aspects (identification with the group and social comparison) (Cruwys et al., 2015; Stok et al., 2016). Let us look at these aspects individually.

As far as **age** is concerned, younger children seem to be more inclined to imitate than older ones, but overall the tendency to imitate is found in all age groups. In terms of gender, females have been shown to generally match their food intake to that of other eaters, while few studies to date have examined the effects of imitation on males (or compared the effects on males and females). The lack of such studies may be due in part to men's low susceptibility to various types of eating disorders. In any case, the few studies conducted so far seem to indicate that men are affected by modelling to a lesser extent than women.

As far as eating habits are concerned, **pre-existing personal preferences** reduce the influence of social norms. This is especially the case when there are well-established habits and preferences about how much of a particular food is considered appropriate or desirable. In these cases, people are not very receptive to new or different social norms. The effect of modelling also varies according to the **time of day** at which meals are eaten. Breakfast, for example, is often based on preferences a person has learned over the years, and people are less likely to be influenced by

new regulatory conditioning. Conversely, snacks during the day are a less routine meal and therefore may be more influenced by social role models. **Eating style**, on the other hand, does not change the way people are influenced by the behavior of others. People with a restrictive eating style are more vulnerable to role models than those who do not, and the same is true with those who have a healthy eating style compared to those who do not (Cruwys et al., 2015).

As for **group identification**, which is the basis for the descriptive social norm, the higher the identification, the greater the influence of the norm. For example, young people's eating behavior is more likely to be influenced by that of a group perceived as very close (the circle of friends) than by that of a more distant group (students at the same university). Finally, modelling is influenced by **social comparison** with other eaters, for example, the similarity between one's own body weight and the body weight of the eaters. People of normal weight more easily adapt the amount of food they eat to that of a normal-weight eater, while they are more likely not to adapt to a very thin or obese model. Similarly, overweight people mainly imitate eaters who are also overweight (Cruwys et al., 2015).

5.7 Is Food Modelling Conscious or Automatic?

Are people aware that they are imitating the eating choices of others? Typically, they indicate that they are not susceptible to food imitation (Croker et al., 2009). This is consistent with a more general phenomenon commonly observed in a variety of settings, known as the "*third-person effect*": We tend to believe that our opinions and decisions are not influenced by external factors, while we believe that those of others are ("People can be influenced ..."; Davidson, 1983). However, it is unclear whether people are truly unaware of the influence of others or whether these claims are due to voluntary denial.

Some evidence suggests that food modelling occurs outside of consciousness and therefore automatically. This evidence includes the observation that people often activate an *unconscious imitation of others' behavior*, known as **mimicry**: people approach a food, grab a bite, or sip a drink more readily when they see someone else doing the same. In one study, for example, researchers observed pairs of women over dinner and paid attention to the synchronicity of their bites and sips (Hermans et al., 2012). Women were more likely to take a bite or take a sip immediately after their tablemate did so, suggesting unconscious imitation of eating behavior. Something similar was observed in a study aimed at investigating imitation in a family context (Bell et al., 2019). Using real-time video recordings, the researchers measured the frequency and timing of two family members' food bites during a shared meal. They found that one of the two family members was highly likely to take a bite within 5 seconds of the other family member doing so. In addition, about 30% of family pairs activated a mimic behavior and such behavior was even more likely (up to 40% of the time) when one of the members of the pair was a child instead. Food mimicry likely fulfils important social functions, such as

establishing and maintaining a relationship with other individuals, creating a sense of greater belonging, or expressing an emotional bond.

Further evidence that imitation may be at least partially automatic comes from studies that have examined cognitive load during meals. **Cognitive load theory** states that deliberate and demanding tasks require higher level cognitive resources, such as attention and self-control (Sweller et al., 2011). It states that a person engaged in a task that demands such cognitive resources will not be able to perform other conscious and demanding tasks. Among the tasks that require significant cognitive load is the processing of emotions. Processing emotions strains an individual's cognitive resources, forcing them to act automatically or without thinking when performing other tasks at the same time. For example, one study showed that children engaged in television viewing reinforced a peer's modelling, but only if the content of the program was highly emotional (Bevelander et al., 2013).

Although modelling behavior is predominantly automatic, this does not mean that it may not be amenable to conscious control in some cases. Individuals can focus on their own choices and change their eating behavior. Therefore, under certain circumstances, they can also intentionally increase or decrease the tendency to eat in response to an eating pattern. This is especially true when people are less impulsive (Hermans et al., 2013) or when they are better able to control themselves (Berger & Rand, 2008, see also Sect. 6.8).

5.8 Identity and Food Choices

The food we eat "speaks" about us and our lifestyle, and it is not surprising that it is one of the means by which we define our identity, our membership of a particular group, or differences from others. Italians, for example, are commonly associated with eating pasta, pizza, and espresso. So preferring certain foods or rejecting others often also means drawing a line between ourselves and others, making distinctions that are not only gastronomic but also (and sometimes especially) cultural or ideological. Scholars from various disciplines (not only psychologists, but also sociologists, writers, historians, philosophers, and semiologists) have studied how food choices are often a way of defining one's own identity and that of others. The proverb "Tell me what you eat and I will tell you who you are" (Brillat-Savarin, 1825, 2009, p. 15), attributed to the culinary essayist Jean Anthelme, can be suggested as emblematic of the importance of social identity in food choices.

Social identity has been defined as "*that part of an individual's self-concept which derives from his knowledge of his membership in a social group (or groups) together with the value or emotional significance attached to that membership*" (Tajfel, 1981, p. 225). Social identity theory (Tajfel et al., 1979) and the self-categorization theory that builds on it (Turner & Reynolds, 1987) are based on the assumption that a person's understanding of their thoughts, beliefs, and actions comes from knowing how that person defines themselves in relation to others. A person may define him/herself in terms of personal identity, that is, in terms of

individual characteristics and traits perceived as unique ("I" and "me"), or in terms of social identity, that is, in relation to his/her membership of one or more social groups ("we"). In other words, an individual's identity has two main dimensions: a) a personal dimension, characterized by the particular and distinctive features of the subject, understood as a unique individual; b) a social dimension, related to the characteristics resulting from the person belonging to the social context, from their action in a complex social reality organized according to several categories (Catellani, 2011).

Both the personal and the social dimensions of identity are characterized by several aspects that may be more or less pronounced at a given time. When personal identity is most prominent, the person focuses on how he or she is unique and different from others. When social identity is most prominent, the person focuses on their similarity to others and sense of belonging to a group (Turner, 1982). Through the sense of belonging to a social group, people internalize the norms of that social group, behave similarly to other members of the group, and seek their approval and support.

As for *the part of identity that results from our food choices* (**food identity**), it is particularly difficult to distinguish the personal dimension from the social, as many aspects of personal identity end up having strong social connotations. Food choices are hardly just about the private sphere of the individual. They take place in social contexts, influence others, and are influenced by them. For this reason, we will consider all identity aspects related to food choices as strongly influenced by a social dimension.

To define food identities, we can propose the following, based on people's prevailing eating habits.

- **Healthy eaters:** those who pay attention to a health-conscious diet.
- **Meat-eaters**: those for whom eating meat is a central aspect of their identity.
- **Vegetarians**: those who eat a plant-based diet (lacto-ovo-vegetarian, lacto-vegetarian, ovo-vegetarian, or vegan).
- **Flexitarians**: those who limit the consumption of meat without eliminating it.
- **Pescatarians**: those who consume neither red nor white meat, but eat fish, mollusks, crustaceans, and seafood.

The close link between personal and social identity in food choices becomes clear when we consider, for example, the adoption of a vegetarian dietary style. A vegetarian diet is often an important part of a person's identity, reflecting a food choice and lifestyle that clearly identifies the person in a social context. At the same time, this person shares some beliefs about the consumption of animal products with other vegetarians, leading to common practices and behaviors. Since eating is typically, or at least often, a social activity, adherence to the norm of not eating meat becomes a public activity and is often judged (not always favorably) by others.

Similarly, a particular dietary style is defined as flexitarian, that is, minimizing meat consumption without eliminating it. Those who make such a choice may feel part of a social category that includes those who behave in the same way, and in this way develop a flexitarian social identity. This identity is characterized by four

aspects: the centrality of reducing meat consumption in defining one's overall identity, the sense of pride that comes from reducing meat consumption, the perception of how others see those who reduce meat consumption, and the attitude toward those who eat a lot of meat (Rosenfeld et al., 2020). Flexitarians may publicly describe themselves as vegetarians or omnivores. When flexitarian identity is strong, people are more likely to publicly describe themselves as vegetarian because they perceive abstaining from meat as a salient aspect of their personal identity. If the decision to abstain from meat is made out of a moral motivation, such as the protection of animals, they will emphasize this aspect of their identity more publicly in order to project a positive self-image. Those who place great value on the judgement of the majority may avoid interacting with vegetarians, as this could promote a negative self-assessment through "stigmatization" based on widespread anti-vegetarian prejudice. Those who are less sensitive to the majority's judgement and proud of their decision to reduce meat consumption can increase their self-esteem by associating with vegetarians, which further strengthens their group identity and promotes a positive self-evaluation.

Even among meat eaters, meat consumption is closely linked to self-concept. That is, the meanings people ascribe to meat consumption are consistent with their self-concept. People with a high expression of this identity have been shown to have negative attitudes toward reducing meat consumption and low self-efficacy perceptions in terms of controlling the amount of meat they eat. Consequently, meat-eater identity not only positively predicts intention to eat meat, but also negatively predicts willingness to reduce meat consumption (e.g., Carfora et al., 2017).

In addition to food identity, other more general identities also influence food consumption, such as ethnic, religious, political, and gender identity. For example, ethnic identity is often associated with certain foods that are symbols of tradition and reasons for pride. For example, on the topic of meat, think of the consumption of hot dogs in America, meat pies in Australia, or Florentine steak in Tuscany. Carrus et al. (2009) studied how ethnic identity influences the intention of Indian immigrants in Italy to buy ethnic foods. A sample of Indian immigrant women residing in Italy completed a questionnaire that included the variables predicted by the Theory of Planned Behavior (attitudes, subjective norms, perceptions of behavioral control, behavioral intentions, and behavior; see Sect. 2.3) and three additional variables: identification with the Indian ethnic group ("I am proud of my origin," "My motherland is a part of me," "I feel connected to my motherland"), perceived norms of the Indian ethnic group ("Usually people from my motherland prefer to buy typical food from my motherland"), and past behavior ("In the last 15 days I have mainly bought food from my motherland").

This study has shown that past behavior, ethnic identification, and perceived ethnic group norms explain food choice intentions and behaviors even beyond attitude, subjective norms, and perceived behavioral control. The highest levels of ethnic food purchase were found among women with strong Indian identity and high perceptions of the importance of the group's dietary norms. Conversely, the lowest scores were found among women who have a weaker Indian identity and place less importance on the norms of the group to which they belong (Fig. 5.2).

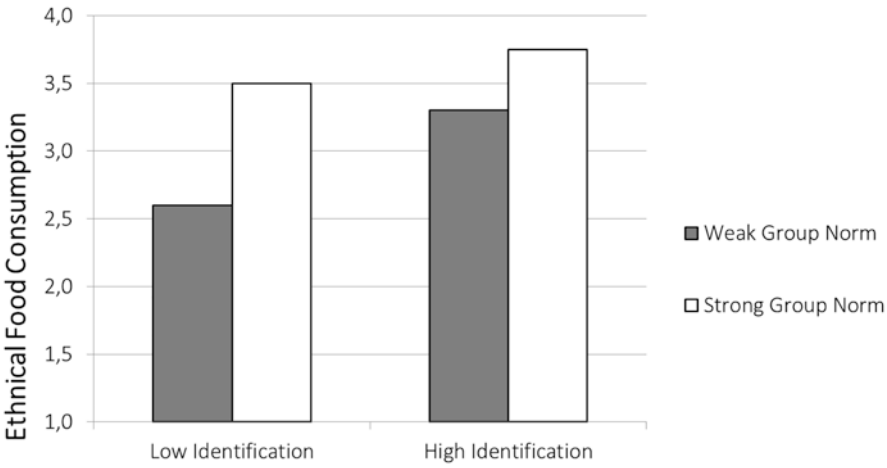

Fig. 5.2 Ethnical food consumptions a function of the level of ethnic identification and the strength of group norms. (Adapted from Carrus et al., 2009)

National identity also plays an important role in food choices. In a study of Australians, Americans, and Britons (Nguyen and Platow, 2021), participants indicated the extent to which they shared descriptive norms (e.g., "Most Australians/Americans/Britons eat meat regularly") and injunctive norms (e.g., "If an Australian(s)/American(s)/Briton(s) did not eat meat, he/she would probably be teased by other Australians/Americans/Britons") about meat consumption in their country. They also indicated their identification with a national identity and expressed their agreement with phrases such as: "I feel connected to other Australians/Americans/British people." So the first thing that emerged was that the greater the importance attached to national identity, the more positive the attitude toward meat and intention to eat it. An interesting interaction was also shown between adherence to descriptive and injunctive norms and national identity. When agreement with both norms is high, intention to eat meat is higher than when agreement with both norms is low. When a "normative skew" occurs in the sense that the injunction norm is high but the descriptive norm is low, the intention to eat meat is only high when national identity is also high. In other words, the descriptive and injunctive norms on meat consumption are independent of national identity when they match. When the norms do not match, people mainly refer to their national identity to guide their intention to eat meat.

5.9 Values and Food Choices

Food choices are not only determined by needs closely related to livelihood, security, and belonging (understood as closeness and support from others). They are also guided by our more abstract values. In exploring the relationship between values

and food choices, extensive reference has been made to the **theory of basic values** proposed by Schwartz (1992), according to which values are abstract and relatively stable beliefs about ideal and desirable ways of acting or being. Moreover, values are beliefs that transcend specific actions and situations, which is why they are called abstract. This characteristic distinguishes values from norms and attitudes that refer to specific actions, objects, or situations. Finally, values are hierarchically ordered according to the importance each person attaches to them. They therefore form an ordered system of priorities that characterizes them as personal values. The impact of values on everyday decisions is rarely conscious. As a rule, values only become conscious when one's own actions or judgements have contradictory effects on the values in question.

According to Schwartz's model, there are ten basic values derived from human needs recognized in all cultures. These ten values are briefly described in the following text.

- **Security** indicates the need for order and stability in interpersonal and social relationships.
- **Conformity** represents the need for conformity to social expectations and norms.
- **Tradition** reflects the importance attached to respect and acceptance of traditions.
- **Self-direction** is associated with the desire to be able to think and act independently.
- **Stimulation** reflects the search for excitement, novelty, and exciting challenges.
- **Hedonism** aims at the pursuit of personal pleasure and the satisfaction of the senses.
- **Achievement** focuses on the quest for personal success through the demonstration of one's competence.
- **Power** is about the pursuit of high social status and dominance over others.
- **Benevolence** is about maintaining and promoting the welfare of those with whom one has frequent personal contact.
- **Universalism** focuses on respecting and protecting all people and nature.

Values influence attitudes to objects and situations and the way people explain their behavior. They also serve to guide behavior and provide criteria for evaluating one's own actions and those of others. Therefore, people decide what is good or bad, justified or unjustified, what should be done or, conversely, avoided, on the basis of the possible consequences of adhering to or violating their values. For example, a person who prioritizes the value of power in their life is often focused on rising above others to gain authority, having a positive attitude toward situations that can bring economic gains, and positively judging who has wealth and social power in life. In contrast, a person who attaches greater importance to the value of universalism pays attention to respect for social equality, has a positive attitude toward situations that allow close contact with nature, and positively evaluates those who implement environmentally friendly behaviors. From these examples, it is clear that each value starts from a need, aims at a purpose, and can be identified by some indicators that we have listed in Table 5.1.

Table 5.1 Personal values according to Schwartz's model

Value	Need	Purpose	Items
Security	Protect yourself and your group	Stability and order in interpersonal and social relationships	*Living in a safe country* *Living in a safe environment*
Conformity	Suppress individual impulses that are harmful to others	Limit actions and impulses that are potentially harmful to others or inconsistent with social norms	*Always follow the rules* *Be well-mannered and polite*
Tradition	Develop a set of common symbols and practices	Accept and respect the customs and ideas of a culture and/or religion	*Have respect for tradition* *Be modest and humble*
Self-direction	Mastery	Independence in thought and action	*Be independent* *Have new ideas, be creative*
Stimulation	Activation	Living a stimulating, challenging life	*Have a life of innovation and change* *Have an exciting life*
Hedonism	Pleasure	Satisfaction of the senses	*Enjoying life* *Satisfying desires*
Achievement	Obtaining resources for survival	Achieving personal success by demonstrating competence	*Being successful in life* *Being ambitious*
Power	Dominance and control	Achieving a high socio-economic status and a dominant position over others	*Being in a leadership position* *Being rich and owning expensive things*
Universalism	Respect	Understanding, tolerance, and protection for all people and nature	*Giving everyone equal opportunities in life* *Being tolerant of other people and ideas*
Benevolence	Affiliation	Maintaining and improving the welfare of the people you are in direct contact with	*Helping those around us* *Responding to the needs of others*

Adapted from Schwartz (1992)

Schwartz has not only highlighted the ten values that are recognized as important by people of all cultures, but has also examined the dynamic relationships between these values that are compatible or incompatible with them. For example, behaviors aimed at gaining power are often incompatible with universalism, while they are very compatible with success: In other words, actions that aim to secure wealth and

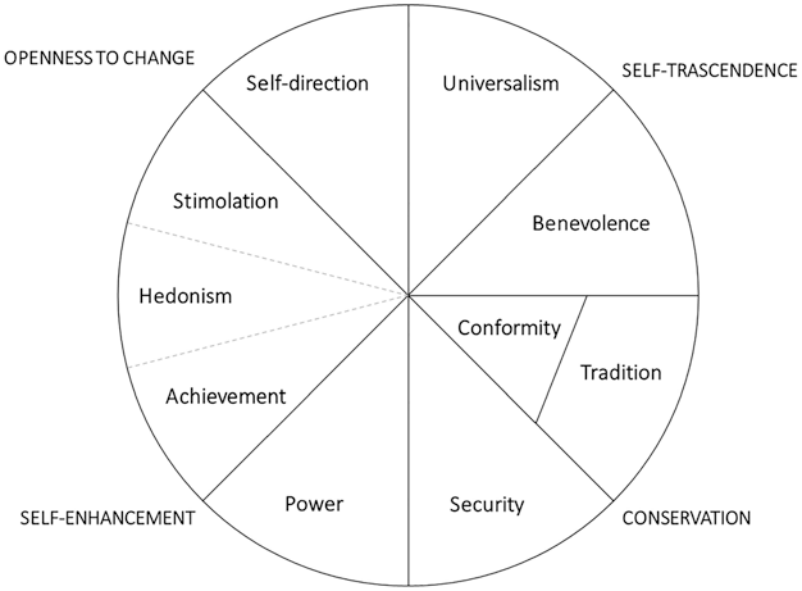

Fig. 5.3 The psychological structure of personal values according to Schwartz's model. (Adapted from Schwartz, 1992)

dominance over others tend to be different and opposite to those that are useful to ensure social equality and protection of the environment, while they are consistent with those that are necessary to achieve success. By examining the compatibility or incompatibility relationships between values, Schwartz has identified a psychological structure that represents the possible relationships between the ten values. This structure, shown in Fig. 5.3, approximates a near-circular model in the sense that the representation of the connections between the values creates a roughly circular diagram. The values are arranged so that those that are compatible with each other (e.g., power and success) are next to each other, while those that are incompatible with each other (e.g., power and universalism) are in opposite positions. Finally, two values that can be explained by similar motivational goals, tradition, and conformism are placed next to each other because they have consistent – and in some cases overlapping – motivational goals.

In total, the ten values can be represented in a space organized around **two bipolar dimensions**. These dimensions are:

1. **Conservation-Openness to change**: concerns the contrast between the desire for independence in thought and action (stimulation and self-determination) and the desire for submission to the dictates of tradition and social norms (tradition, conformity, and security).
2. **Self-enhancement-self-transcendence**: reflects the conflict between the goal of working for the good of others (benevolence and universalism) and the pursuit of personal success and dominance over others (power and achievement).

The value of hedonism has not been assigned a stable position: Some studies rank it closer to the values of self-determination and achievement, while others rank it closer to the values of power and achievement. For this reason, in Fig. 5.1, the value of hedonism is placed within the dashed grey lines.

Regarding the relationship between personal values and food choices, the importance attached to the values of self-transcendence (universalism, benevolence) and openness to change (self-direction, stimulation) was associated with attitudes toward consuming ethically and sustainably sourced products. Universalism and self-direction, but not benevolence, were thus found to be positively correlated with the purchase and consumption of ethical and sustainable products (van der Werff & Steg, 2013). Furthermore, a relationship between values and meat consumption has emerged. Self-affirmation and self-preservation, especially the value of power, are associated with increased meat consumption (Rozin et al., 2012). In contrast, self-transcendence and openness to change, especially universalism, are associated with lower meat consumption (Ruby et al., 2013). The same is true for the value of safety, but only if it is associated with health concerns (Brunsø et al., 2004).

If we shift our attention from meat consumption to the more general issue of choosing a vegetarian or vegan diet, we find that this choice can be attributed to two different sets of values (Fox & Ward, 2008): (a) more "selfish" values associated with the desire to prevent disease, awareness of the negative effects of meat consumption, and the search for greater well-being and quality of life; (b) more "altruistic" values associated with the protection of animals, environmental protection, and social equality. It is common that those who start a vegetarian diet for "selfish" reasons end up developing more "altruistic" reasons. In addition, "altruistic" vegetarians have been found to be characterized by a longer duration of vegetarianism, a greater belief in choice, and greater dietary restrictions (Hoffman et al., 2013).

It is also common to find intermediate positions, that is, people who are convinced of the need to protect animals by not eating them, yet continue to eat omnivorously. These people struggle with what is called in the literature "*the meat paradox,*" which occurs precisely when animals are loved and eaten at the same time (Loughnan et al., 2014). In this case, people experience cognitive dissonance, that is, the coexistence of opposing and contrasting cognitions or thoughts, to the point of emotional discomfort. To overcome this dissonance, people often adopt various justifications, such as denying or eliminating the suffering associated with raising animals for slaughter.

Another way to reduce the conflict between meat consumption and concern for animal suffering is to legitimize one's own behavior by denying that animals are endowed with mental capacities such as fear, pleasure, pain, anger, and self-control. In this context, it has been found that people tend to attribute lower mental capacities to animals that are considered edible (e.g., cows or fish; Bastian et al., 2012). It has also been shown that we are more inclined to attribute lower mental capacities to a certain category of animals (e.g., lambs) if, for some reason, the suffering associated with these animals becoming meat for human consumption is highlighted. To test this hypothesis, Bastian et al. (2012) assigned participants in an experimental study to two different conditions.

- **Food condition.** Participants saw a picture of a lamb with the description: "This lamb will be taken to a slaughterhouse, killed, butchered, and supplied to supermarkets as a meat product for humans."
- **Control condition.** Participants saw a picture of a lamb, including the description: "This lamb is taken to another paddock and spends most of its time eating grass with other lambs/cows."

After seeing the picture with the description, participants rated the extent to which each animal had 15 mental abilities, namely: pleasure, fear, rage, joy, happiness, desires, wishes, planning, goals, pride, pain, hunger, tasting, seeing, hearing. The evaluation was done on a 7-point scale from 1 "definitely does not possess" to 7 "definitely possesses". So it turns out that those who eat meat are more inclined to deny the animal's abilities. When they are reminded of the link between eating meat and animal suffering (nutritional status). It is thus confirmed that the tendency to deny animals mental abilities is motivated by the desire to reduce cognitive dissonance and justify one's own consumption behavior.

Overall, we can say that there is a close connection between values and food choices. Food consumption behavior depends on the personal values of each individual. However, as we have just seen, one's eating habits are sometimes at odds with one's values. In these cases, when the contrast becomes clear, people try to justify their actions to overcome the dissonance created by the contrast between the reference values and their behaviors.

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Chapter 6
Habits and Behavior Change

6.1 Past Behaviors and Habits

From a young age I was used to preparing great meals, at home where my mother prepared the excellent traditional dishes without changing them, but also outside with friends who were always ready to celebrate any event at the table, from the victory of our favorite team to the arrival of summer. Slowly, without realizing it, I started to put on weight and recently I realized that I did not like myself anymore. When I see photos of myself, I immediately move on, and my relationship with the mirror is also not very good anymore. What can I do? Where should I start? I would love to change some of my eating habits, but every time I try, there is something that makes me quickly go back to where I started.

A story like this shows us that our past habits and behaviors have a powerful influence on our future intentions and behaviors. This is so true that research to explain people's intentions based on the theory of planned behavior (Sect. 2.2) soon revealed the possibility of adding past behavior to the predictors of intention. When it comes to diet, past behavior is usually measured by the number of servings of a particular food consumed in a given period, for example, the number of servings of red meat consumed in the last 7 days. Good measurement of past behavior is important because this variable is often one of the strongest predictors of intention and future behavior, regardless of the role played by other psychosocial variables such as attitudes and norms. Past behavior may also act as a moderator of the influence of certain psychosocial variables on future intentions or behavior. In other words, the effect of variables such as attitudes or norms on the intention to perform a behavior in the future may also depend on how often people have performed that behavior in the past.

In a study we have already discussed (Carfora et al., 2022; Sect. 4.3) on Italians' intention to adhere to the Mediterranean diet, we found that past behavior not only influences this intention, but also moderates the effects of other psychosocial

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antecedents. Positive attitudes toward the Mediterranean diet, a high sense of control and social norms had a stronger influence on intention to adhere to the Mediterranean diet when individuals had adhered little to the Mediterranean diet in the month prior to the study. For those already adhering to the Mediterranean diet, intention to continue to do so was predicted by expected positive emotions. This is because those who have not adhered to the Mediterranean diet in the past are likely to have little experience of the positive emotions that may be associated with switching to it. As a result, they may not expect to experience these emotions in the future and therefore do not anticipate them (which could instead be an excellent incentive to make the switch). In contrast, those who have already followed the Mediterranean diet are likely to have already experienced corresponding positive emotions. Therefore, they can more easily anticipate them when deciding how to behave in the future.

Dietary motives also vary according to the number of previous experiences with the Mediterranean diet (Carfora et al., 2022). Those who have little experience with eating Mediterranean food mainly justify their intention to adhere to the Mediterranean diet with a health motive (i.e., Mediterranean diet as a synonym for a healthy diet). Those who have more experience with the Mediterranean diet do not base their choice on a health motive, but on a mood motive, which in turn is associated with expected positive emotions toward the Mediterranean diet. This difference in past behavior could be due to the fact that those who follow the Mediterranean diet regularly are more aware of its emotional benefits because they have experienced them before. However, it could also be because the effects of the Mediterranean diet on psychological well-being are less well known than those on physical health.

In summary, those who have a low adherence to the Mediterranean diet are primarily prompted to do so by *rational factors* (i.e., attitudes, social norms, perception of control, and health motive). In contrast, those who have been following this dietary style for a long time are mainly prompted to continue doing so by *emotional factors* (i.e., positive anticipated emotions and mood motives). In summary, at an early stage, the person seems to be pushed toward greater adherence to this dietary style if they expect health benefits (positive attitudes and health motives), that others approve of this choice (social norms), and that the change is possible (perception of behavioral control). In this case, the person then *consciously* decides whether to perform this behavior in order to achieve these consequences (Ouellette & Wood, 1998). At a later stage, when adherence is already high, rational factors are less relevant because the repetition of the behavior has led to the formation of a habitual response. As a result, the behavior is *performed automatically* and with little effort or awareness. In this case, the person consumes Mediterranean food without having to activate a rational evaluation of the reasons for doing so, and the behavior is driven by habit.

The concept of habit has long been equated with that of past behavior. However, a frequent behavior does not necessarily mean that a habit will develop. For example, drinking a whisky after dinner may be a frequent behavior during a holiday period, but this does not necessarily become a habit. When we return from holiday, we can (relatively) easily revert to the previous habit of not finishing the meal with a whisky. At the same time, we can decide to take some fruit to work every day as a

snack. This decision will also take some time to become a daily habit. We can define a **habit** as *a memory-based tendency to respond automatically to the signals that have led to the performance of a behavior in the past*.

When people perform a behavior repeatedly in a particular context, they develop an implicit association in memory between the context and the response and form a habit. One of the pieces of evidence that contextual cues automatically recall habitual responses comes from a series of studies. In these studies, participants were given the task of preparing a sushi dish using a computer game (Carden & Wood, 2018). Through extensive practice, participants learned to quickly recognize the next step in the sequence of steps to prepare sushi and thus developed automatic habitual responses. After learning the habitual responses, the participants became particularly fast at performing the task. At the same time, however, they had more difficulty giving different responses when it was necessary to change the recipe and add a new ingredient.

When contextual signals automatically attract attention, the more often a behavior is repeated in a stable context, and the less intentions and goals play a role, the more spontaneously it is activated. Rational evaluations lose importance, the behavior becomes deeply ingrained and automatic, and it becomes overly complex to change it. This leads to habitual resistance to change. This resistance can be a mechanism that helps people maintain a healthy eating behavior, once learned and repeated several times. At the same time, it is also one of the biggest obstacles to interventions aimed at changing wrong eating habits.

6.2 Stages of Change

How can we help people develop and consolidate healthy eating habits? First of all, we need to understand to what extent people are willing to change their behavior or not, or, we can also say, at what stage they are in their change process. The **transtheoretical model** we will now present describes behavior change as a progression toward increasingly habitual actions (Prochaska & DiClemente, 2005). According to this model, behavior change consists of **five stages** that differ according to how much the person is willing to engage in and maintain a healthy habit (Fig. 6.1). Let us examine these stages one by one.

- **Precontemplation**. In this stage, people show no desire to change their previous behavior or that of the next 6 months. They think there is no reason to change and may not be aware that their behavior is problematic. Any behavior that is changed during this phase is usually the result of external pressure. Once this pressure is removed, people revert to their old habits. When making food choices, a person in this stage has no intention of making healthy choices, such as eating fruits and vegetables regularly, avoiding unhealthy snacks, or reducing red meat consumption. In order to develop healthy habits, people in the precontemplation stage need to at least consider the possibility of changing their behavior.

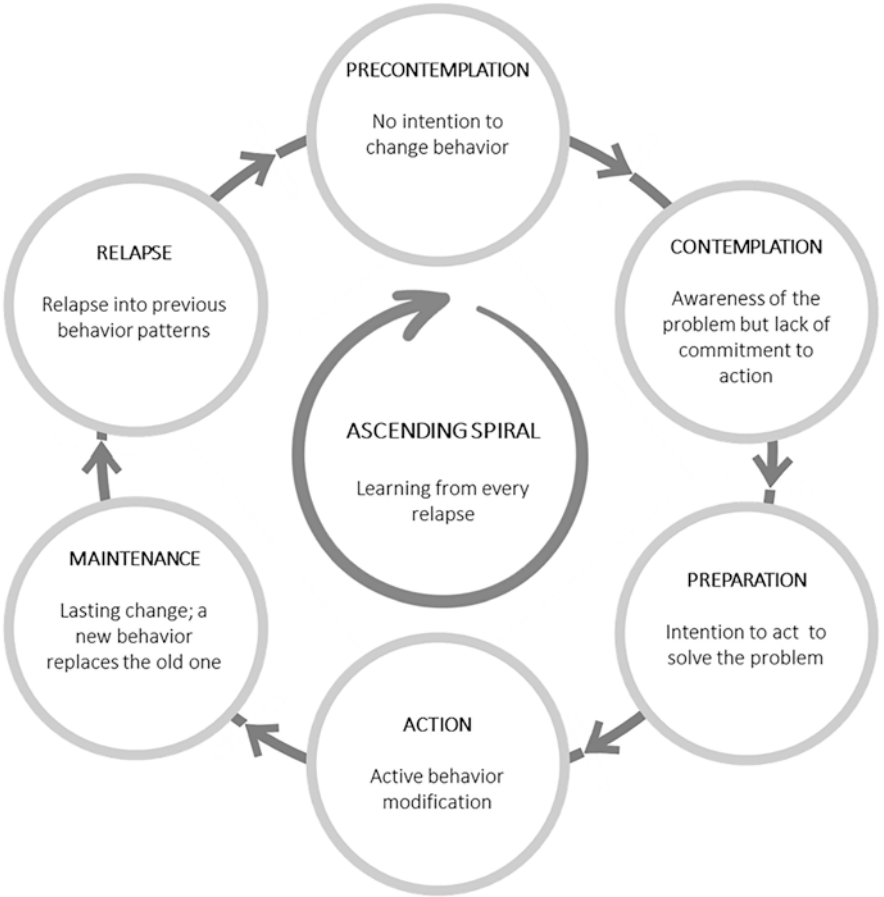

Fig. 6.1 Stages of change. (Adapted from Prochaska & DiClemente, 2005)

- **Contemplation**. In this stage, people consider the possibility of changing their behavior within the next 6 months. They feel the need to change their behavior but do not feel ready to start. In the case of food choices, people at this stage want to make healthy choices and are beginning to think about what changes they should make in this direction (e.g., reducing consumption of fatty foods) and how they might do so. To support those in the contemplation stage, work can be done to raise awareness of the benefits of change and to improve the ability to plan actions that will be useful in initiating change.
- **Preparation**. The person sets out to initiate change, usually with the aim of changing within a month. So this stage is where the first useful steps are taken to move on to the next phase. For example, the person who wants to eat healthier might make an appointment with a nutritionist and/or plan the actions needed to eat healthier (e.g., buy more fresh food).

- **Action**. The person puts the new behavior into action. However, before this becomes a habit, it takes some time. For example, they start by eating healthier and commit to the necessary behaviors to develop a stable habit later.
- **Maintenance**. Once the change has taken place and the behavior has been maintained for at least 6 months, the person has reached this final stage. This is not a static stage, as the person must actively work to avoid relapse. In the case of healthy eating behavior, this is a person who adheres to a healthy and balanced diet on a daily basis.

Another important aspect of behavior change that has been incorporated in the transtheoretical model is **relapse**. Relapse occurs when the learned healthy behavior is not maintained over a longer period of time. The inclusion of relapse moments as a rule rather than an exception gives the change the form of a spiral rather than a sequential pattern. For example, relapse is possible in the action stage, which brings the person back to the preparation stage, while relapse in the maintenance stage can bring the person back to the preparation phase or, in extreme cases, even to the pre-contemplation stage. The linear progression from pre-contemplation to maintenance is the ideal progression, but it is rare, while the spiral progression is what we observe most often in reality.

According to the transtheoretical model, another factor to consider when adopting a new behavior is **decision balance**. Decision balance is both a weighing of the pros and cons of a healthy behavior and a true technique of change. It is the comparative evaluation of the positive and negative aspects of a particular behavior, the subjective weighting of the obstacles and advantages associated with the change. Such a technique involves advantages and disadvantages. Advantages include practical benefits for oneself, practical benefits for others, personal approval, approval of others. Disadvantages include practical disadvantages for oneself, disadvantages for others, personal disapproval, and disapproval by others. There is a close connection between the stages of change and the advantages and disadvantages people associate with them. To move from the preliminary consideration stage to the action stage, the perceived benefits of change should be at least twice as high as the disadvantages.

6.3 Feeling Effective

One psychological factor that can help or hinder progress in developing healthy eating habits is self-efficacy. **Self-efficacy** is *the belief that one can successfully accomplish and complete a particular task* (Bandura, 2000).

The development of perceptions of self-efficacy is based on four main sources of information, which are listed in the following text.

- **Experiences of effective management**. Experiencing situations in which one has successfully demonstrated mastery of certain skills.

Table 6.1 Eating Self-Efficacy Questionnaire (Lassetter et al., 2018)

1. I will say no if my friends offer me junk food or unhealthy food
2. I will eat healthy even if my friends eat unhealthy food
3. I will eat healthy when I eat out with my family
4. I will eat at least four portions of vegetables every day
5. I will eat at least three portions of fruit every day
6. I will not drink lemonade more than once a week

Note. 3-point response scale: 1 = There is no way I can do this; 2 = I might find this difficult; 3 = I think I can do this

- **Comparisons with others**. Noticing that people like oneself have achieved good results in a particular task.
- **Positive feedback from others**. Receiving support and encouragement from others to master a situation and achieve a goal.
- **Physiological states and positive emotions**. Experiencing positive sensations and emotions when performing a task.

Although self-efficacy can be a general belief in one's ability to succeed, there are also more specific forms of self-efficacy, which include self-efficacy in eating. Table 6.1 shows an example of a scale measuring eating self-efficacy (Lassetter et al., 2018). High self-efficacy can contribute to the development of good self-esteem (i.e., a set of evaluations a person has of themselves). In turn, high self-esteem can improve feelings of self-efficacy. Although these two concepts are related, they are distinct from each other. Self-esteem is a general or overall perception of one's worth, while self-efficacy refers to perceptions of specific abilities. While self-esteem focuses more on "being" (e.g., feeling perfectly acceptable as you are), self-efficacy focuses more on "doing" (e.g., feeling up to a challenge).

Self-efficacy is also linked to the concept of self-control and the ability to modulate one's behavior to achieve one's goals. For this reason, it can be confused with self-regulation. Again, these are two related but distinct concepts. While self-regulation is a strategy for achieving one's goals, self-efficacy, as mentioned earlier, is the belief that one can succeed. Finally, self-efficacy is distinct from the perception of behavioral control (variable of the Theory of Planned Behavior; Sect. 2.2). The latter is a broader construct that includes not only the evaluation of internal resources/skills for performing the behavior, but also the evaluation of external resources that facilitate or hinder the performance of the behavior.

As we have already surmised, in addition to the sense of general self-efficacy, there is also a sense of self-efficacy that is specific to each area of life. In the case of eating, **eating self-efficacy** has been defined as a person's belief in their ability to successfully implement healthy eating behaviors (Ames et al., 2012). Eating self-efficacy can be divided into two sub-dimensions.

The first sub-dimension of eating self-efficacy is the **ability to adopt** certain behaviors, such as choosing healthy foods and avoiding foods that are harmful to health. In the case of following the Mediterranean diet, for example, self-efficacy refers to the ability to consume the healthy components that are considered part of this diet (such as olive oil, fruits, vegetables and legumes, fish, nuts, and seeds). It is

also about the ability to reduce the consumption of certain foods that are not part of the Mediterranean diet, such as red and processed meat and dairy products (Cuadrado et al., 2018).

The second sub-dimension of self-efficacy is the **ability to control** one's eating behavior in different contexts and in response to different emotions. It can be further differentiated into internal and external self-efficacy, depending on how we regulate our eating choices when exposed to certain social situations or certain internal emotional experiences (Lombardo et al., 2021). **Internal self-efficacy** *refers to a person's ability to control their eating decisions when faced with positive or negative emotional states* (e.g., "I can control what I eat when I feel either sad or depressed*"), or when faced with certain internal physiological states* (e.g., "I can control what I eat when I am very hungry"). **External self-efficacy** refers to the *ability to control one's eating behavior in different social contexts* (e.g., "I can control what I eat when I am out with friends") *or in situations with high food availability* (e.g., "I can control what I eat when I am at a party where there is a buffet with a large variety of food"). Eating self-efficacy, in all its dimensions, plays an important role at every stage of the process of self-regulation of eating behavior. It influences intentions, the level of effort made, perseverance despite failures, and the maintenance of changes achieved. Self-efficacy also plays a key role in translating knowledge into consistent behavior. To confirm this, a longitudinal study of healthy eating promotion conducted over 10 years with a sample of about two thousand Californians (Rimal et al., 2011) showed how self-efficacy mediates the relationship between nutrition knowledge and healthy eating in the sense that this relationship is stronger for individuals with high self-efficacy. In other words, people put into practice healthy dietary choices that are consistent with their knowledge primarily when they feel they can do so. Furthermore, people who receive new information about healthy eating can only apply it concretely and adopt new healthy behaviors if they have high self-efficacy about eating. For this reason, careful analysis of the level of diet-related self-efficacy of the people involved is essential in interventions to promote healthy eating.

6.4 Strengthening Knowledge and Positive Attitudes

Behavior change can be facilitated by increasing people's **knowledge** about the positive consequences of healthy eating behaviors (e.g., through phrases such as: "Eating fruits and vegetables regularly improves blood vessel health") or about the negative consequences of unhealthy behaviors (e.g., "Eating too much red meat can worsen your gut health"). In addition, behavior change can be promoted by people valuing the positive consequences of healthy foods and the negative consequences of unhealthy foods differently (e.g., thinking "Eating fruit and vegetables regularly is right, healthy, and fun"). In this case, the change occurs through a change in **attitude** toward what we eat (Sects. 3.3 and 8.2). However, a comprehensive knowledge of food consequences and a positive attitude toward healthy food does not always lead to a proper diet.

For example, the first US national campaign, 5-A-Day-For-Better-Health, which informed people about the health benefits of eating five servings of fruit and vegetables a day, was successful in increasing people's knowledge but did little to increase consumption (Stables et al., 2002). In these cases, where knowledge and attitudes that are firmly embedded in people are not translated into coherent behavior, the gap between knowledge and behavior (the so-called "*knowledge-behavior gap*") and the gap between attitude and behavior (the so-called "*attitude-behavior gap*") are significant barriers to behavior change. This is because habits are stored in procedural memory, a type of memory that is relatively separate from declarative memory, where information, goals, and intentions are stored. Moreover, habits are automatically triggered by contextual cues, even when people have different knowledge and intentions, and unlike such habitual responses (Sect. 6.1). For this reason, behavior change can be facilitated not only by changing knowledge and attitudes, but also by using behavioral techniques that may involve changes in the environment. Let us now look at these techniques in more detail.

6.5 Developing Implementation Intention

To facilitate the translation of a positive attitude toward healthy and/or sustainable eating behavior into a behavioral habit, the use of self-regulatory strategies, such as planning the execution of the desired behavior in specific contexts, is useful (Hagger & Luszczynska, 2014). We can proceed in this direction through interventions aimed at developing the so-called **implementation intentions**, that is, *intentions that use voluntary planning of how to achieve a goal by activating specific responses to predictable situational signals* (Gollwitzer, 1990). To this end, it is necessary to select an appropriate and applicable response to a particular situation that may occur in the future and to create a detailed plan of where, when, and how the intended behavior will be carried out. The development of implementation intentions can be encouraged, for example, by asking participants to formulate plans for:

- Reduce or avoid eating the unhealthy foods.
- Increase healthy food choices.
- Replace the unhealthy eating behavior with a healthy option.
- Decide how and what they want to eat.

The development of implementation intentions leads to consistent mental representations becoming more accessible through the **implementation of "if... then..."** plans, so that when certain signals ("if...") occur, automatic responses can more easily follow ("then..."). An example of a plan is: "If I am at university all day today, I will bring some fruit as a snack." In cases like this, the automatic response comes from an act of mental planning, as opposed to a habit of acting on specific signals, which only comes from a large number of repetitions in stable contexts. If the action described in an implementation plan is sufficiently specific, if it can be successfully applied in many situations, and if the specific signal occurs in a stable context, it is

possible that the signal-response link, originally based on an implementation intention, gradually becomes directly motivated by habit after prolonged repetition (Bieleke et al., 2021).

The effectiveness of interventions based on intention planning has been extensively tested to reduce the consumption of fatty foods and increase fruit and vegetable consumption. In general, this effect has been shown to be small when the intervention aims to reduce unhealthy behaviors (e.g., fat consumption), while it is larger when it aims to promote healthy eating habits (e.g., fruit consumption). This is because it is more difficult to break a habit than to adopt a new behavior.

Implementation intentions are more likely to facilitate a behavior if it is formed in support of *goals that the person has freely set for themselves* rather than goals that they perceive as a *duty*. Furthermore, the conversion of intentions into behaviors depends on the individual's level of perceived self-efficacy. Individuals with high self-efficacy are more likely to act in accordance with their implementation intentions. Based on these findings, Churchill and colleagues (2019) compared two strategies for formulating intentions to reduce the consumption of unhealthy snacks: one condition that focused on freedom of choice (*autonomy-framed implementation intention*) and one that focused on a sense of obligation (*control-framed implementation intention*).

Participants first stated how often they had eaten high-calorie snacks (e.g., chocolate bars, cakes, and biscuits) in the last 7 days. Then they read the following text:

> Snacks such as cakes, biscuits, chocolate, crisps, ice cream and pastries contain a lot of saturated fat and sugar. Evidence suggests that people who reduce their consumption of high-calorie snacks, compared to those who do not, have a lower risk of many serious life-threatening diseases and enjoy several potential health benefits. People who reduce their consumption of high-calorie snacks have a lower risk of heart disease and stroke, high blood pressure, high cholesterol, type 2 diabetes, and cancer (e.g., bowel cancer). You may also have health benefits from snacking less, such as healthy-looking skin and hair, healthy weight, more energy and vitality.

Participants were then assigned to two different experimental conditions. Participants assigned to the "autonomous implementation intention"condition read and repeated the statement three times: "If I think I am going to eat a high-calorie snack, I will ignore that temptation." Participants assigned to the "controlled implementation intention"condition read and repeated the statement three times: "If I think I will eat a high-calorie snack, I must ignore this temptation." Seven days later, participants reported the frequency with which they had eaten high-calorie snacks during the week. They then answered a food self-efficacy scale consisting of eight items (e.g., "I can resist eating when I am anxious or nervous").

The results of the study showed no significant main effects of the two experimental conditions. However, eating self-efficacy moderated the relationship between the type of implementation intention and snacks consumed. As shown in Fig. 6.2, participants with higher self-efficacy consumed fewer snacks when they were in the autonomy condition. Conversely, participants with lower self-efficacy consumed fewer snacks when they were in the control frame condition. For individuals with high self-efficacy, the freedom of choice condition also means that they feel they

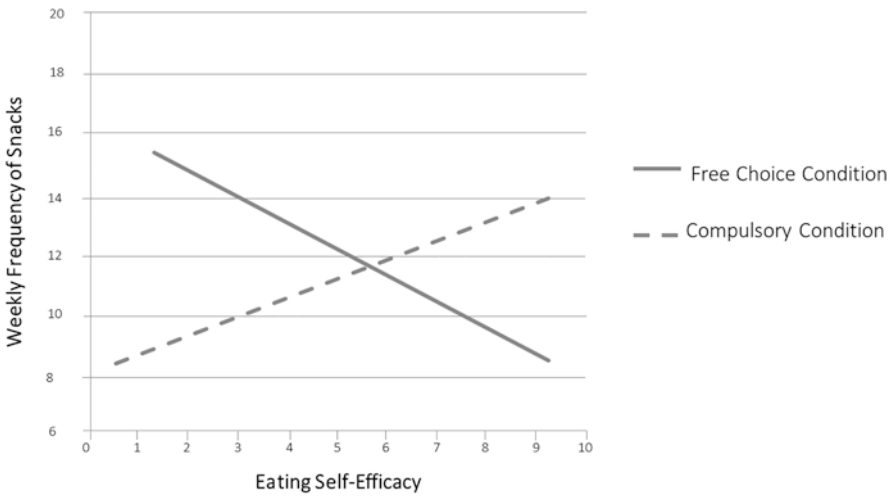

Fig. 6.2 Weekly frequency of snacks as a function of the level of eating self-efficacy and the experimental condition (Compulsory or Free Choice). (Adapted from Churchill et al., 2019)

have control over their food choices. For individuals with low self-efficacy, the freedom of choice condition means that they feel they do not have enough confidence in their ability to limit consumption. This in turn reduces motivation and/or control over their food choices. Furthermore, these participants may have perceived the statements on control as more concrete and strict than those on autonomy, that is, a prescription to follow regardless of their perception of self-efficacy.

In summary, making action plans along the lines of "if... then..." helps people to achieve their healthy eating goals. However, the success of these plans depends on them being formulated according to the level of self-efficacy in eating.

6.6 Extrinsic and Intrinsic Rewards

One strategy for training new behaviors that has been extensively researched in behavioral psychology is the use of rewards, which can encourage repetition of an action in a context with specific signals. To understand how rewards can promote the emergence of new behaviors, we can refer to the distinction between extrinsic motivation and intrinsic motivation (Deci & Ryan, 1985).

An **extrinsically motivated behavior** is one that is driven by the desire for rewards such as money or recognition by other people. Extrinsic rewards can be particularly effective in incentivizing the adoption of healthy behaviors. However, behaviors acquired through extrinsic rewards tend to decline when they are no longer present (Mantzari et al., 2015). For example, if a parent gives their child a reward every time they eat fruit, the child will be motivated to eat fruit to get the reward. If the parent stops rewarding the child, the child may stop eating fruit.

Rather, an **intrinsically motivated behavior** is one that is directed toward oneself, in the sense of rewarding the self (Kruglanski et al., 2018). The rewarding power of intrinsically motivated behaviors stems from the fact that they are consistent with the person's values or that they are easy to follow as a habit. The more a behavior aligns with one's core values, the more likely it is to be repeated and become a habit in the long term. So, if the child from the previous example has internalized the importance of taking care of their health through nutrition, they will develop the habit of eating fruit because they see this behavior as consistent with their values and do not need an external reward. Intrinsically motivated habits are not only based on core values, but can also arise because they are intrinsically rewarding, for example, because they simplify life by eliminating the need for new learning or new choices. Even the simple process of repeating an action can be intrinsically rewarding because it enables the person to implement a previously acquired behavior with ease, fluency, and less mental effort. If the child mentioned earlier repeats the choice of a fruit over time, he or she will find it easier to make that choice instead of considering whether to make another (perhaps not healthy) choice.

In summary, intrinsic motivations are more encouraging in the long run. However, if the person does not already have intrinsic motivation, extrinsic rewards can meaningfully encourage them to engage in a new behavior.

The distinction between intrinsic and extrinsic motivation to promote healthy eating behavior has been extensively researched and applied to different contexts. In addition, thanks to the development of digital technologies, apps are increasingly being developed to support healthy eating by using intrinsic and extrinsic reward systems to encourage users to adhere to a balanced diet. For example, one such app (Luhanga et al., 2016) used the following intrinsic rewards: public recognition by winning a prize in a competition, fun by participating in online games, progress and achievement by completing challenges and passing levels, contribution to something meaningful such as scientific research. Extrinsic rewards were virtual rewards, that is, earning points, and real cash prizes. For example, participants received one hundred points for uploading the picture of their meal, and if the meal was on the recommended food list, they also received 10% of the value of the meal (based on the university canteen price) as a cash bonus. At the beginning of the study, participants showed greater interest in the cash bonuses. By the end of the study, the strongest motivations were all intrinsic. The most effective intrinsic motivations included the opportunity to contribute to something meaningful (e.g., working on scientific research) and having fun.

6.7 Setting Achievable Goals

In addition to the use of rewards, another important cognitive strategy for promoting healthy eating is what is known as **goal setting**, *that is, setting goals to be achieved*. We all need to set goals to help us achieve what we want. When we clearly define our goals, they become more tangible and we can better evaluate and measure the

progress we are making toward them. The lack of clear goals puts us in a state where we move forward from day to day, week to week, month to month, and even year to year without any real concrete direction for our lives. Because without fixed goals, it is not even clear in which direction we should go and how we can achieve them. This applies to all areas of life, including food. For example, setting clear goals for our diet supports our motivation and our ability to focus on our desire to eat healthily. Specific nutrition goals are actually more likely to be achieved.

Goal setting theory is based on the idea that setting specific, measurable goals is more effective than setting vague goals. Edwin Locke developed this theory in 1968 and showed that workers are more motivated when they have clearly defined goals and constructive feedback, and that they are more likely to achieve these goals when they are specific and measurable. Locke not only emphasized the possibility of setting clear goals, but also showed that even challenging goals can lead to better work. Engaging with these goals forces employees to work hard and develop their skills. This increases the likelihood that they will receive positive feedback and develop a sense of accomplishment. This in turn can improve employee engagement, productivity, and satisfaction in the workplace.

In the food industry, as in other industries, we can use the criteria of the so-called SMART model (Morrison, 2010) and its extension, the SMARTER model, an acronym that indicates the salient aspects of a well-defined goal, to define the goals.

As summarized in Fig. 6.3, a goal is **SMARTER** if it is:

- **Specific**: Well defined, clear, and unambiguous. In the case of healthy eating, a goal is specific if it defines exactly which eating habits are to be adopted, maintained, changed, replaced, and eliminated. For example, the general goal "I want to eat healthy" needs to be translated into specific goals such as "I want to eat three servings of vegetables a day." To set a specific goal, you need to answer the question: "What exactly do I want to achieve?"

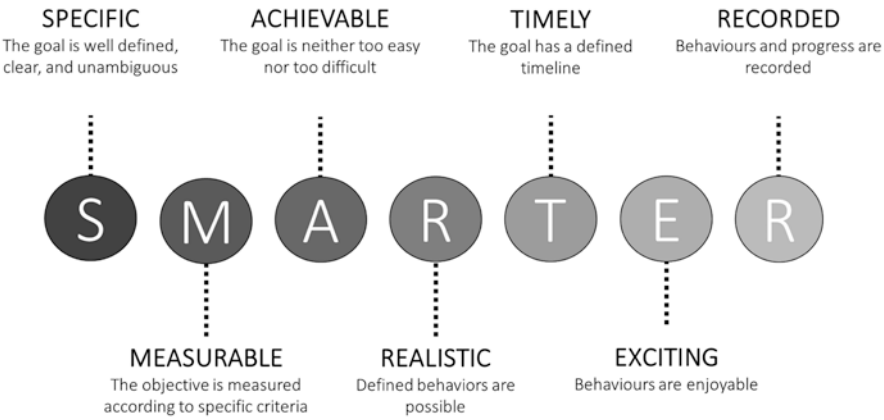

Fig. 6.3 SMARTER model. (Adapted from Morrison, 2010)

- **Measurable**: Defined by specific criteria that measure progress toward the goal. For example, a nutrition goal is measurable when we define how many servings of a certain food we need to eat per week. The question you should ask yourself to check if a goal is measurable is: "How will I know if I have reached the goal?"
- **Achievable**: Not impossible to achieve. The goal must not be too easy to achieve. Otherwise, the person will not find the goal challenging and motivating enough. But it does not have to be too difficult either. Otherwise, the person would feel discouraged and be more inclined to give up too quickly. As mentioned earlier (Sect. 6.3), to be achievable, a dietary goal needs to take into account self-efficacy and the person's ability to achieve it. A goal is achievable if the answer to the question "Can I achieve it with reasonable effort?" is positive.
- **Realistic**: The behaviors required to achieve the goal must be possible, taking into account the internal and external resources available to us. For example, a realistic eating goal requires that the person is able to make the planned food choices in the context in which they live and with the economic resources available to them. In this case, the question to ask is: "Can I achieve this goal with the resources available to me?"
- **Timely**: There must be a clearly defined time frame, including a start and end date (if necessary). For example, we can define how many times a week we eat vegetables, which days of the week we shop, etc. The questions to ask yourself in this case are: "When will I act to achieve this goal?", "By when do I need to have achieved it?", etc.
- **Exciting**: The behaviors involved in achieving the goal must be as fun and enjoyable as possible. In addition, achieving the goal must be perceived as rewarding. For example, a rewarding eating goal is one where food choices are not perceived as an unpleasant and sad abandonment and/or where developing a healthy eating habit is perceived as something that is very important to the self. In this case, the question to be answered is: "Are the desired behaviors and the achievement of the goal worthwhile?"
- **Recorded**: Behaviors and progress toward the goal need to be recorded, for example, by taking notes in a diary or on a designated app. To record eating behavior, for example, you can use many free apps that allow you to enter the amount of food eaten each day. A goal is recordable if you can answer positively to the question: "Can I record my progress?"

The criteria suggested by the model SMARTER enable a person to set healthy and achievable eating goals, measure their progress from time to time, and feel increasingly satisfied with each step toward success.

6.8 Self-Monitoring

As the model SMARTER shows, one of the basic activities in achieving an eating goal is to measure one's progress. In other words, monitoring one's own performance against the standard set. This allows us to adjust the next behavioral response

accordingly, strengthening motivation, and increasing the likelihood that the goal will be achieved. Several studies have found that tracking progress promotes goal achievement: Asking people to monitor their eating behavior helps them make healthy food choices, such as reducing red and processed meat consumption (e.g., Carfora et al., 2017, 2019).

Specifically, **self-monitoring** consists of *systematically observing and recording one's own behavior* (Boutelle et al., 1999). The type of information that can be observed and/or recorded varies. It may be objective information, such as the frequency or intensity of a particular eating behavior, or subjective information, such as a thought, a difficulty that causes the goal, a problem or a situation that hinders the goal set. Specifically, self-observation involves regularly assessing the performance of the behavior in question (e.g., how much you ate) and/or the achievement of the expected outcome (e.g., how much weight you lost) and then comparing these perceptions to the desired standard (e.g., losing 2 kilos).

Self-monitoring of one's progress promotes goal achievement because it facilitates the recognition of discrepancies between the current state and the desired state. Therefore, it allows to recognize when and how much extra effort or greater self-control is needed (Fishbach et al., 2012; Myrseth & Fishbach, 2009).

Self-monitoring is considered the most important first step on the path to self-control and is useful at different stages of an intervention, for example, in the initial assessment of the frequency of a behavior, in the choice of the goal to be achieved, in the ongoing monitoring of change, and in the evaluation of the effectiveness of the intervention itself. In this context, self-observation is a technique used as a means of developing an initial assessment of the behavior under study as well as the main tool for promoting behavior change (Korotitsch and Nelson-Grey, 1999). The technique of self-observation can be developed in different ways and varies according to the six basic dimensions presented in the following text and summarized in Fig. 6.3 (Harkin et al., 2016).

1. **Focus.** It is possible to distinguish between behavioral monitoring and outcome monitoring (Michie et al., 2013). For example, people who want to lose weight might monitor their snack consumption or weight (which is likely a consequence of frequent and abundant snack consumption). Monitoring a particular behavior (e.g., snacking less) encourages the performance of that behavior, but not necessarily the achievement of the expected outcome (e.g., weight loss). Conversely, focusing on the outcome has a greater impact on achieving the expected outcome than on performing a particular behavior. This is because behavioral discrepancies provide information about the need to regulate a particular behavior, but say little about outcomes, which are usually determined by multiple behaviors. Discrepancies in outcomes may indicate that you need to put more effort into multiple behaviors to achieve the desired outcome. However, they say little about a particular behavior (e.g., what substitute behaviors might help achieve the goal).
2. **Public/Private**. You can ask to monitor your progress publicly or privately. An example of the first type is participants in a weight loss support group who weigh themselves regularly in the presence of other group members and receive

approval or not depending on the goal achieved. An example of the second type is the person who reports the results achieved via an app that monitors the progress made. Both modalities can generate greater commitment and a stronger sense of ownership of the goal. They therefore promote goal achievement, although the impact of one or the other method varies according to the individual characteristics of those who experience it.

3. **Registration**. We may ask the person to record the information gained through self-observation (e.g., by writing the information in a diary or app). Self-recording, even if done privately, provides an opportunity to review and reflect on one's progress toward the goal over time and potentially identify interventions that promote or hinder that progress. In general, interventions that prompt the recording of self-monitoring information facilitate goal achievement more than those that do not (Harkin et al., 2016).
4. **Reference values**. The reference values used to monitor achievement of the set goal can vary. They may simply take the form of a desired goal to be achieved, they may be based on a comparison with a previous reference value (e.g., previous cholesterol levels), or they may result from a comparison with goals achieved by others (Harkin et al., 2016).
5. **Distance**. You can monitor the distance to the goal you want to achieve or, conversely, the progress you have already made. For example, a reduced calorie diet that should lead to losing several pounds may still be a long way off, but if the person notes that they have lost two kilos in the last week, they are likely to be satisfied with the progress they have made. This satisfaction is likely to increase commitment to achieving the goal, regardless of whether we are a long way from reaching the desired end goal (Harkin et al., 2016).
6. **Passive/active monitoring**. Active monitoring is about finding information about the progress of a goal (e.g., weighing ourselves). In contrast, passive monitoring is about collecting progress information without making any effort to find and check this information. An example of passive monitoring is noticing that your clothes are wider than they used to be (Chambers & Swanson, 2012) or that friends notice the weight loss you have achieved.

In summary, the more self-monitoring is guided by a clear definition of the six dimensions in the preceding text, the more likely it is that the person will be able to implement them and thus achieve the goal set.

6.9 Nudging

We conclude the exam of strategies to support behavior change by looking at cases where people are implicitly nudged to change their diet by changing the context in which they make their decision, and independently of their values. In these cases, we can use nudging, which is a gentle and non-explicit encouragement to choose a particular option. Nudging makes use of optimizing the architecture of choice

(Thaler, 2018). It is based on changing the decision context by altering salient signals that influence cognitive responses to a situation and the resulting behavior. An example of this is adjusting elements in a choice environment, such as the way food is placed on the shelves of a supermarket.

The definition of nudging includes three key elements. **Nudging** is any deliberate attempt to *(a) influence context, (b) increase/decrease the likelihood of certain behaviors occurring (c) without suppressing or punishing alternative behaviors or offering significant economic rewards* (Cesareo et al., 2022). Through nudging, then, we seek to change people's behavior, not necessarily by changing the meaning of their values or beliefs, but simply by activating immediate behaviors. Since food choices are often determined by quick, automatic, and spontaneous responses to environmental stimuli, nudging interventions can stimulate action without having to worry about the discrepancies between values and actions. Therefore, they can be a simple and cost-effective option to elicit a large number of specific behaviors.

To further illustrate the concept, it may be useful to give an example. In order to educate people to eat a balanced diet, the US government has long used the image of the "food pyramid," in which the various amounts of nutrients necessary for a proper diet are presented in descending order. Although this representation is scientifically correct, it is not very intuitive. More recently, the pyramid has been replaced by a new image, namely, a plate showing the recommended daily amounts of the different foods. In this way, the same information from the food pyramid was presented more clearly and could be more easily recalled when choosing or eating meals. Using this new image to effect a change toward a healthier diet is an example of nudging (Cesareo et al., 2022).

Several studies have shown the effectiveness of nudging to encourage people to make healthy and sustainable food choices, for example, by increasing the visibility of plant-based meat products (Vandenbroele et al., 2021). Other examples include product placement, suggesting a default option, and using sensory cues (Vecchio & Cavallo, 2019). Let us take a closer look at what they consist of.

- **Product placement**. Consumers are largely influenced by what immediately grabs their attention. Therefore, food companies pay expensive fees to place their products in the areas of shops that are most frequented by shoppers. The effectiveness of product placement is mainly based on the idea of making certain information more prominent than others at the time of decision. Several experiments have shown how slight changes in highlighting can have a lasting impact on food choices, for example, using contextual cues such as labels to make healthier options more visible (Ensaff et al., 2015). One study examined the consumption of fresh fruits and vegetables by middle school students and showed that the consumption of lettuce increased 4.82 times when it was placed in the same area where all other dishes were offered (Adams, et al., 2016). The results of other studies have shown that greater availability and accessibility of healthy foods compared to less healthy foods promotes healthy choices. For example, you can increase healthy food choices by placing them in a place that is easier to

reach. Or you can encourage vegetarian choices by increasing their accessibility and availability at a buffet (Kaljonen et al., 2020).

- **Default option.** It consists of defaulting to a particular choice that simplifies the decision-making process and exploits the general tendency to inertia and procrastination and the aversion to losing the status quo, that is, the tendency to avoid short-term losses in order to achieve long-term gains (Sunstein, 2017). For example, studies that have tested this choice architecture intervention have compared how much parents' choice of a lunch menu for their children is influenced by the fact that there is a predefined suggestion alongside other options, that is, whether parents tend to choose the default menu without considering the other options (Loeb et al., 2017). Another example is a study on the effectiveness of suggesting a default healthy option in a choice situation. Participants were offered a sandwich with an unhealthy side (fried potato croquettes) or vice versa with a healthy side (salad). The results of the experiment showed that most participants chose the healthy option when the healthy side dish was the default choice (van Kleef et al., 2018).
- **Sensory cues**. Colors and lighting levels in a shop or restaurant can encourage consumers to buy healthy foods such as vegetables. For example, purple and green light is more effective than red or yellow light in triggering positive emotions when looking at fruits and vegetables (Berčik et al., 2016). Similarly, people are more likely to select apples and red peppers when they are presented under white or yellow light than when they are under blue light (Yang et al., 2016). Sensory cues involving scents or sounds also implicitly influence the purchase of certain foods. For example, the diffusion of melon scent in a Dutch supermarket increased sales by 14% (Leenders et al., 2019), and the diffusion of ocean sounds at the supermarket fish counter has been shown to increase sales (Spence, 2011). Building a multisensory environment can also make consumers behave in a certain way when making a purchase. For example, virtual simulation of a multisensory environment associated with the farm positively influenced judgements of the perceived freshness of wild arugula and tomatoes (Sinesio et al., 2018). In summary, nudging appears to be effective when consumers need to make quick decisions or are unwilling to carefully evaluate the consequences of their choices. In this case of low cognitive involvement, nudging has an implicit effect on behavior by activating superficial information processing by the consumer, using sensory and environmental cues that facilitate fast and automatic choice. However, as mentioned earlier, nudging does not enable explicit and lasting change in the cognitive and affective components of choice. Therefore, we need to understand how to help individuals make better choices, both for themselves and for society as a whole, with awareness, freedom, and responsibility. To this end, we can make use of various communication strategies, which we will discuss in detail in the next chapters.

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Chapter 7
Communicating About Healthy Eating

7.1 Communication for Change

How would you launch a public campaign about the advisability of reducing consumption of high-calorie foods and drinks to avoid weight gain and thus protect health? Many of these campaigns do not achieve the desired goal because they do not seem to find the right key to wake people up and make them rethink. And what do you think of the umpteenth American actress who has developed a new diet together with her nutritionist and is now passionately promoting it on social media, showing off her beautiful body and good mood? To what extent will her fans believe her? How will she influence them? In the end, she may convince more people to publicly advocate for healthy eating, and it is important to understand why.

First, to effectively promote healthy and sustainable diets, a thorough understanding of the psychosocial processes underlying food choices is essential (see previous chapters in this volume). Communication can use different aspects such as cognitive, emotional, relational, or behavioral factors. Cognitive and emotional factors can be used, for example, through messages and recommendations that aim to inform and emotionally appeal to the recipient. Or you can use relational factors that play an important role in the decision to maintain a certain behavior or, conversely, to change it. We already know (Chap. 5) that a person who is involved in a social environment that exerts pressure toward certain dietary choices is easily inclined to perceive this pressure and to conform to the behavior of others. The communication processes aimed at changing behavior must therefore also take into account the influence of pre-existing social influences. The more communication can make use of the social environment (physical and affective) close to the recipient, the stronger and more sustainable the impact it is able to achieve.

To be effective, healthy eating communication must above all be able to trigger a change in behavior in the recipient or promote a transition from a simple positive attitude toward healthy eating to a behavior that is consistent with that attitude. To

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this end, it may be important not only to provide information about healthy eating, but also to provide advice and strategies that facilitate the adoption of a healthy and balanced diet in the long term. A message that merely suggests a set of information and recommendations that recipients do not know how to translate into actual behavior could have the unintended effect of decreasing their sense of self-efficacy (Sect. 6.3), while providing advice and strategies could conversely increase it.

7.2 Superficial or Deep Processing

One of the most recognized models for explaining the dynamics of persuasive communication is the **Elaboration Likelihood Model** (ELM – Petty & Cacioppo, 1984). According to this model, *persuasiveness depends on the probability that the receiver will process the message to which he is exposed*. Depending on the level of processing of the message, two types of pathways leading to persuasion are distinguished, a central and a peripheral one (Petty & Briñol, 2012).

The **central route** is the result of careful and thoughtful reflection by the receiver on the content of the message. It therefore requires a certain cognitive engagement. The central path is possible when the elaboration of the message is relatively deep. The person becomes convinced after reflecting on the content of the message by examining the information and arguments it contains and referring to other relevant arguments, for example, other information already present in the memory or other arguments developed by the receiver. In short, persuasion via the central route is achieved through a careful examination of all relevant considerations related to the main theme of the message.

The **peripheral route** of persuasion implies a superficial processing of the content of the message. Persuasion occurs because the receiver applies a simple decision rule to evaluate the position advocated. It can be based on "peripheral" signals, for example, when the perceived competence of the communicator is inferred from appearance, tone of voice, clothing, etc. The more superficially the message is elaborated, the more peripheral signals become decisive factors for the persuasive impact of the message.

Individual factors that determine the likelihood of performing the first or second router include **motivation**, that is *the extent to which the receiver is motivated to understand the message*, and **cognitive ability**, that is, *the extent to which the receiver is able to think carefully about the content of the message*. Variations in the extent to which the persuasive message is processed lead to differences in the persuasive results achieved. Attitudes formed under conditions of deeper elaboration are more consistent over time than those formed under conditions of superficial elaboration. They are also more indicative of intentions and subsequent behavior and more resistant to counterarguments.

The ELM model has produced many convincing research results. However, it has also been criticized for underestimating the role of emotions (see Chap. 4) in the elaboration and evaluation of messages. The application of this model focused

mainly on the cognitive processes of the persuasion process and neglected the possibility that emotions such as fear or anger can influence message elaboration (Kitchen et al., 2014). Regarding fear, messages that trigger this emotion are generally more effective than those that do not (Tannenbaum et al., 2015). In some cases, however, eliciting fear can be counterproductive. On the one hand, fear can draw the recipient's attention to the message. This increases the likelihood that the receiver will process the information contained in the message (Loewenstein et al., 2001). In this case, messages that elicit fear lead to systematic processing, which in turn promotes problem-relevant thoughts and a positive evaluation of the message (e.g., Meyers-Levy & Maheswaran, 2004). On the other hand, the anxiety elicited by the message may cause the receiver to activate defensive strategies to reduce the potential emotional distress associated with the message itself. For example, the receiver may divert his attention from the message, ignore its content, or reinterpret it by reducing its emotional potential (Ruiter et al., 2001).

Even the anger that a message evokes can influence the likelihood that it will or will not be processed in depth by the receiver. For example, messages that are phrased in a very assertive tone and show an obvious intention to control the recipient's opinion or evoke guilt may elicit an angry response, which in turn influences the processing of the message (Walter et al., 2019). Angry people are more inclined to resort to peripheral elaboration of the message (Moons & Mackie, 2007). And precisely because they are aware of the persuasive intent of the message, they may feel that this threatens their freedom of expression and action. This perception triggers a negative reaction to the persuasive message, known as **reactance** (Shen & Coles, 2015). The consequences include anger, but also the elaboration of counterarguments as well as attitudes and behaviors that go against the original intention of the message (Rains, 2013).

In relation to diet, it has been shown that the anger triggered by the message can, for example, influence the way messages focused on reducing the consumption of red or processed meat are processed (Carfora et al., 2021). Messages that elicited only moderate anxiety but no anger in recipients were evaluated positively and led to more positive attitudes and a subsequent intention to reduce meat consumption. In contrast, messages that elicited an angry response were rated less positively and did not lead to a change in attitude or intention. These results are consistent with the hypothesis that an angry reaction leads to a negative evaluation of the message and its peripheral elaboration, rendering it useless or even counterproductive.

7.3 Source of the Message

Persuasion research agrees that three essential dimensions of a persuasive message must be considered. The first is the **source** of the message, that is, the characteristics of those who send the message and how they are perceived by those who are confronted with the message. The second is the **content** of the message, which includes the actual content in terms of the information conveyed, as well as other aspects

related to the wording and communicative intent that are evident in the message. These include, for example, the tone of voice or the positive or negative valence of what is being communicated. The third aspect is the recipient of the message, often referred to as the target. The **target** of the message refers to the characteristics of the part of the population for which the message is intended (Hovland et al., 1953; Petty & Cacioppo, 1986).

In this paragraph, we will focus on the characteristics of the source and its influence on the persuasion process by referring to the available research in the field of food communication. Instead, we will devote the entire next chapter (Chap. 8) to message content and formulation. The next chapter (Chap. 9) will then focus on the characteristics of the receiver, in particular the possibility of calibrating nutrition messages according to these characteristics.

The source of the message can be a person, a social group, or even an institution. In all cases, the characteristics of the source have a significant impact on whether people engage analytically and in depth with the arguments proposed in the message. For example, if the source speaks too quickly, the receiver processes the message less (Brinol & Petty, 2009). If a person is not very motivated to engage with the topic of the message, they can be made to discuss the proposed arguments in more depth by presenting them with multiple sources (Harkins & Petty, 1981). As we have already seen, activating a deeper elaboration of the message means that there is an increased likelihood that the person will be influenced by the message and change their attitudes and behaviors accordingly.

The characteristic of the source that is most likely to increase the persuasiveness of the proposed message is **credibility**, *signaled by the recipient's tendency to believe that the messages coming from that source are credible and truthful*. For example, the World Health Organization or a renowned research center are more likely to be seen as credible than less recognized and well-known sources. The message coming from the former sources is more likely to trigger careful reflection in the recipient and thus a change in attitude and behavior. The credibility of a source is composed of two dimensions, competence and reliability, which we will now examine separately.

The source's **competence** *is assessed on the basis of their knowledge and experience of the content of the message* (Chen & Hirschheim, 2004). Usually, the source's competence is measured by asking the receiver to rate the extent to which the source is "knowledgeable – not knowledgeable," "informed – not informed," "competent – not competent," "qualified – not qualified," "intelligent – not intelligent" using bipolar scales. Research has shown that assessments of competence can be based on factors such as the source's area of origin, the source's academic curriculum, or the source's membership of prestigious institutions. Based on these assessments, a perception of the source's authority develops. An authoritative source is able to make accurate statements about a particular subject area. For example, the recipient might think this when an internationally recognized nutritionist makes a dietary recommendation. With the increasing prevalence of online communication and via social networks, there is a growing tendency to also rate the competence of the source based on their experience with the topic of the message (Alajmi & Farhan, 2016). In

this case, the evaluation of competence is strongly influenced by what the source conveys in terms of passion, personal interest, and accumulated experience with the topic. For example, a person may decide to buy a food product recommended by a member of a consumer organization or a food influencer because they consider that person credible based on their direct experience with the product in question.

The **reliability** *of the source stems from the fact that it was perceived as trustworthy, sincere, and honest*. The reliability dimension is usually assessed using scales that measure the degree to which the recipient perceives the source as "honest – dishonest," "reliable – unreliable," "open-minded – narrow-minded," "fair – unfair," "selfless – selfish" (O'Keefe, 2015). As a rule, recipients of a message are only convinced if the source appears objective, unbiased, and without the intention of manipulation or deception. Conversely, a **boomerang effect** can occur when recipients believe that the source wants to influence them, that is, *the tendency to adopt a position that is opposite to the one proposed by the source*. The dimensions of the source's assessment of credibility in terms of competence and reliability may vary according to the personal, social, and cultural characteristics of the recipients. Therefore, sources perceived as credible in one socio-cultural context may not be evaluated in the same way in another context.

The positive evaluation of the source of a message may depend not only on its competence and reliability, but also on its physical **attractiveness**. In general, attractive sources have a more persuasive effect than less attractive sources. This effect is strongest when a person has little motivation to process the message topic (e.g., distraction, low engagement, low perception of responsibility) or does not know it well. In these cases, attractiveness plays a simple and effective signaling role that increases the tendency to accept the message. Various dimensions help to determine the attractiveness of the source, besides beauty, physical abilities, well-groomed appearance, and likeability. In addition, a similar effect is created by the fact that the source is perceived as known, familiar, or similar to the recipient. The perception of similarity between source and receiver can be based on various aspects, such as age, gender, occupation, or opinions (O'keefe, 2015).

In line with what was said in Chap. 5 about the influence of others on our food choices, a message presented by a source who belongs to a group to which the receiver also belongs tends to be presented in more detail. This is more likely if the topic of the message focuses on an issue that is important to the group (e.g., a type of food traditionally consumed by members of that group) or if the message is presented by a highly representative member of the group (Brinol & Petty, 2009). However, the similarity between the source and the receiver is based on the fact that both belong to the same group. What counts is often the *perceived similarity* and not the actual one. In some cases, this similarity is not even perceived, but simply desired. These are the cases where the recipients feel clearly distant from the source (e.g., a very famous person) but still want to identify with him or her. In these cases, we speak of *desirable identification*.

What has just been said introduces us to the subject of the widespread use of celebrities as marketing communication tools. The use of celebrity is a person who, thanks to his public recognition and popularity, can facilitate the promotion of the

consumption, use, or sale of a product, service, or brand (the so-called *celebrity endorsement*, Bergkvist & Zhou, 2016). The more he is perceived as reliable, the more a celebrity increases the inclination to buy a certain product and the willingness to pay for it. Reliability, in turn, determines the perception of credibility of the recommendation received. This effect is more pronounced when there is a match between the celebrity and the sponsored food product. The **match-up theory** (Koernig & Boyd, 2009) assumes that the greater the perceived match between celebrity and product, the greater the persuasiveness. For example, a famous chef advertising a pasta brand is perceived as very coherent and is therefore persuasive. But even if celebrity endorsements that match the product positively influence consumer behavior, the extent of this influence varies by product category. Celebrities appear to have greater persuasive power when advertising consumer products that are purchased in routine decision-making processes that consumers make quickly, that is, without informing themselves or thoroughly comparing alternative products (Calvo-Porral et al., 2021).

Many campaigns rely on the contribution of celebrities to promote food consumption, and many studies have confirmed that celebrity sponsorship increases the effectiveness of food advertising (e.g., Nie & Liu, 2022). In social media, the presence of a celebrity has been shown to have a greater impact on consumer responses than the presence of other testimonials (Chung & Cho, 2017). In social media, the attractiveness of the source can be continuously increased by indicators of online behavior, such as the number of followers or the frequency of posts or comments. This is another reason why companies are increasingly turning to influencers, known as "micro-celebrities," alongside "traditional" celebrities such as actors, supermodels, or athletes. Unlike traditional celebrities, who have usually gained public recognition because of their professional talent, influencers often gain fame by calling themselves experts on social media platforms. By enthusiastically sharing content on topics such as beauty, fitness, food, or fashion, these users (often women) gain a large follower base and turn their online presence into a real profession. This is also the case with many food influencers.

When examining the persuasive power of both "traditional" celebrities and food influencers on social media, both have been shown to positively influence attitudes toward the advertised product and purchase intentions, more so by conveying perceptions of reliability and credibility than competence (Schouten et al., 2020). In terms of comparison between the two types of sources, food influencers are generally perceived as more credible testimonials than celebrities. As a result, consumers are more likely to intend to buy food when it is sponsored by influencers than by celebrities. There are probably three main reasons for this. First, influencers are known for sharing product reviews, tips, and personal experiences on their social channels. Although an increasing amount of this content is sponsored and primarily intended to persuade, most content created by food influencers is perceived by the public as honest opinions and without promotional goals. Conversely, consumers are usually aware that celebrities may not be experts on sponsored products and are rewarded for sponsorship on a large scale. Second, food influencers usually promote products in (at least seemingly) authentic and real-life contexts, which can increase

perceptions of reliability compared to celebrities. Third, because food influencers present themselves as people with extensive experience in the field and regularly share information about food with their followers, they are likely to be perceived as more consistent with the food product they promote. And this perceived consistency, as mentioned earlier, increases the perception of reliability of the source.

In line with what we have already said about the importance of similarity to the source, it was also found in the case of food and behaviors that the more consumers feel that they share interests, values, or characteristics with a celebrity or food influencer, the more likely they are to adopt their beliefs, attitudes, and behaviors. In the case of celebrities, the desire to identify with them predominates. There is also a strong similarity with food influencers. This is because, unlike celebrities, food influencers tend to address their followers directly in their posts, which signals closeness and leads followers to consider food influencers almost as friends. To sum up, unlike celebrities, influencers present themselves as "normal," approachable, and authentic people, which makes people feel very much connected to them.

In summary, we can say that people who are confronted with messages recommending a certain dietary behavior process the information they receive with strong consideration of the source it comes from. A credible source that is perceived as competent, reliable, or attractive encourages careful evaluation of the information content and behavior that is consistent with the recommended advice.

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Chapter 8
Types of Messages

8.1 Information About Health, Well-Being, and the Environment

There is a young man working in the Ministry of Health, an expert in psychology and communication, who is in charge of a campaign about the benefits of eating fruits and vegetables for health and well-being. In the campaign, our expert presents characteristics and nutritional values of food, but not only. He experiments and uses new content, new languages, and new communication channels. For example, he broadens the perspective by talking about the positive effects of certain vegetables on mood and longevity. He also refers to the positive consequences for the environment when the consumption of other foods, such as red meat, is reduced in favor of increased vegetable consumption. But also graphically, fruits and vegetables are presented in a new way, with a triumph of colors and shapes (which, not surprisingly, has inspired several painters in the past) that satisfies not only the eye but also the taste. Finally, our expert prepares banquets with vibrant and colorful fruit salads in the parks of different towns. He proposes a series of related events that are also promoted online and include a whole range of games and challenges for those who are aware of the nutritional and sustainable qualities of the different products.

The likelihood that people will pay attention to and engage with the nutritional recommendations depends not only on the credibility of the source (as we saw in Chap. 7), but also on the way in which the recommendations are presented, that is, the content, but also the style, method, and communication channel through which they are delivered. The most effective recommendations will be those that best succeed in harnessing the psychosocial factors that, as we have seen in previous chapters, influence people's dietary choices.

Let us first focus on the content message, distinguishing between content that relates to health, well-being, or the environment. Health-related messages are most often used in public nutrition campaigns. They emphasize the causal link between

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following the right dietary habits and improving health or maintaining its optimal state. Since people are very attentive to this topic, one can expect the highest effectiveness of these messages. Psychosocial research has confirmed their effectiveness, but has also shown under which conditions this effectiveness is higher. First of all, information about the health consequences of food choices can be given at different times. For example, health information can be offered before food purchases through persuasive messages in mass media, social media, and on smartphones. But it can also be offered during purchase, by placing information and labels on food packaging. Regardless of when the messages are presented, they usually include key pieces of information:

- The *ingredient* that activates the protective health function (e.g., beta-glucans in the case of oats).
- The *function* activated by this component (e.g., lowering blood cholesterol levels).
- The *benefit* derived from the activated function (e.g., reducing the development of heart disease).

When all three pieces of information are present, consumers know how to obtain the benefit highlighted in the message. Conversely, if a short message contains only one of these pieces of information, consumers must integrate the missing knowledge from their prior knowledge. However, consumers differ in the amount of information they prefer to receive. For example, research in several countries (Denmark, Finland, Iceland, Norway, and Sweden) has shown that some consumers prefer long and detailed information, while others prefer shorter information that focuses only on the benefits of eating a particular food (Grunert et al., 2009).

The main goal of health messages is to get people to be more positive about eating healthy foods, that is, to develop increasingly positive attitudes toward these foods. This is consistent with the fact that attitude is often the strongest predictor of intention to engage in healthy behavior (McEachan et al., 2011).

In addition to health, nutritional messages can also focus on **well-being**, such as the emotional well-being that comes from relaxation or being in a good mood. For example, in a study on promoting appropriate fruit and vegetable consumption through instant messaging on mobile phones (Carfora et al., 2016), the more traditional health messages (e.g., "*The fiber found in fruits and vegetables is essential for the proper functioning of the intestines*") were compared with messages about well-being (e.g., "*The production of the so-called feel-good hormone serotonin is stimulated by eating simple sugars, such as those found in fruit*"). The messages about well-being were more effective than those about health in increasing intention to eat fruits and vegetables regularly.

To sum up, messages that provide adequate information about the components of foods that affect health and well-being are often effective in changing attitudes toward healthy eating and thereby increasing or tracking subsequent suggested food choices.

Food choice recommendations can also be based on more altruistic motives, for example, when the proposed messages provide information about the **environmental**

impact of food production. As mentioned earlier, this environmental information can be provided not only at the time of purchase, but also at different times and through different media, including chatbots, that is, software that simulates and processes human conversations (see Sect. 10.2 for a more detailed discussion of chatbots). One example is a study (Carfora et al., 2019a, b) with a group of Italian university students that tested the effectiveness of a chatbot-mediated intervention aimed at reducing red and processed meat consumption through the use of different types of messages. In this study, participants were first asked to complete a questionnaire to determine their attitudes toward reduced consumption of red and processed meat (*Time 1*). They were then assigned to one of the different experimental conditions. Depending on the assigned condition, participants received messages on their mobile phones every day for 14 days on the following topics:

- **Environmental benefits** of eating little meat (e.g., "*If you eat little red and processed meat, you will protect the environment from climate change*").
- **Health benefits** of eating little meat (e.g., "*If you eat little red and processed meat, you will protect your health from heart disease*").
- **Environmental + Health benefits of eating little meat** (e.g., "*If you eat little red and processed meat, you will protect both your health from heart disease and the environment from climate change*").

Participants who took part in a fourth experimental condition received no message. During the 2 weeks that the messages were sent (*messaging intervention*), all participants were asked to complete a food diary at the end of each day. At the end of the messaging intervention (*Time 2*) and after another month (*Time 3*), all participants were asked to complete the same questionnaire they had completed at Time 1.

The results show that both messages focusing on health benefits and those focusing on environmental benefits reinforce positive attitudes toward reducing consumption of red and processed meat. This in turn leads to a decrease in meat consumption that lasts 1 month after the intervention ends. In contrast, attitudes do not change when messages focus on both benefits. This lack of effect of the combined messages is likely due to the cognitive overload of the participants: As the amount of information increases, attention to the message and retention of the message content in memory likely decrease.

Information about the environmental impact of food production can also be offered at the time of purchase. In most cases, we find it on food packaging in the form of short texts or certifications. Some studies have tested the effectiveness of different eco-labels in communicating the environmental benefits of food for sale (e.g., "Fair Trade," "Rainforest Alliance," "Carbon Footprint," or "Animal Welfare"; Yokessa & Marette, 2019). When eco-labels use logos that inform about the lower environmental impact of a food's production, they attract consumers' visual attention more than when this information is conveyed through text (Rihn et al., 2019). In general, familiar and reliable eco-labels generate positive perceptions, and their addition to the packaging of new and sustainable food products increases their purchase (Banovic et al., 2019). More specifically, consumers ascribe credibility to the eco-labels they trust, especially those certified by third parties such as governments

or environmental NGOs (Thøgersen & Nielsen, 2016). Finally, eco-labels are more convincing to consumers if they are easy to interpret and informative. For example, if they use simple representations, such as a traffic light with the colors green-yellow-red, to indicate the level of environmental impact from the production of the food (Thøgersen & Nielsen, 2016).

To sum up, the environmentally friendly attributes of a food or product can be communicated either before purchase, for example, via chatbots or social media in general, or at the time of purchase via labels with clear images and references to credible certifications. In all cases, messages are effective if they promote a positive attitude or intention toward the behavior suggested in the message.

8.2 Activation of Sensory Pleasure

The messages that use the emotional rather than the cognitive dimension can refer to sensory perceptions, that is, they focus on the enjoyment of the five senses that results from eating a particular dish or food. In addition, they may be more or less explicitly aimed at stimulating an emotional response in the present or an anticipation of the emotion that might be triggered by the choice of that food. When the messages have a sensory content, they rely on the hedonistic motivations of the recipients, that is, the search for pleasure, which in this case is associated with the consumption of food. These motivations can sometimes even be stronger than the health ones or contradict them. For example, it has been shown that consumers often classify foods that are considered healthier as less tasty. For this reason, they are less likely to eat them (Turnwald et al., 2017a). Similarly, eating a meal described as healthy is often perceived as less filling than eating the same meal labelled hedonic (Crum et al., 2011).

Thus, if there is a risk that a food presented as healthy will be perceived as less palatable, it may be useful to also focus communication on the sensory pleasure of eating that product. In other words, one can try to create the impression that healthy food is also tasty. For example, it has proven useful to describe vegetables with hedonic attributes that refer to their good taste and the pleasure that can result from eating them (Turnwald et al., 2017b). Every day for a month in a large university café, half of the suggested vegetable dishes were labelled in one of four different ways: basic description (just the product name), healthy restrictive description (information about low calorie intake), healthy positive description (information about healthy nutrients such as vitamins), or hedonic description (information about sensory aspects such as texture or taste). Some examples of the descriptions used can be found in Table 8.1. The results showed that the hedonic description of vegetables increased the number of people choosing vegetables by 25% compared to the simple description, by 41% compared to the healthy restrictive description, and by 35% compared to the healthy positive description.

Table 8.1 Examples of different types of labelling for dishes with vegetables

Standard	Healthy restrictive	Healthy positive	Hedonic
Corn	Reduced-sodium corn	Vitamin-rich corn	Rich buttery roasted sweet corn
Green beans	Light "n" low-carb green beans and shallots	Healthy energy-boosting green beans and shallots	Sweet sizzlin' green beans and crispy shallots
Sweet potatoes	Cholesterol-free sweet potatoes	Wholesome sweet potato superfood	Zesty ginger-turmeric sweet potatoes
Zucchini	Lighter-choice zucchini	Nutritious green zucchini	Slow-roasted caramelized zucchini bites

Adapted from Turnwald et al. (2017a, b)

One of the reasons why using the hedonic properties of food seems to be a promising strategy is that these properties are closely associated with pleasure and promise instant gratification. When they are highlighted, consumers are therefore more likely to activate heuristic thinking based on the affective consequences of choice than deep and rational thinking. Activating such heuristic thinking increases the desire to eat the product immediately (Choi et al., 2022) and makes people "short-sighted" when making purchase decisions based on rational considerations. For example, when a snack's *hedonistic attributes* (e.g., "crunchy" or "delicious") are highlighted on a product's packaging, consumers are more likely to want to eat the product immediately. In contrast, this is less likely if the *utilitarian attributes* of the same product are highlighted (e.g., "healthy" and "low calorie").

Is it possible to exploit the "myopia" induced by the relevance of hedonic benefits to promote sustainable eating behavior, such as the decision to buy a particular food product even when its expiry date is approaching? The expiry date of non-perishable foods (e.g., canned, frozen, and processed foods, snacks, and drinks) only indicates whether they are still qualitatively sound. However, consumers often tend to misinterpret the meaning of the expiry date. Therefore, they avoid buying food that is close to its expiry date, which in turn contributes to wasting a large amount of food that is still good to eat. As mentioned earlier, the glorification of hedonic attributes leads to a kind of "short-sightedness" among consumers, which leads them to consume the foods with these attributes as soon as possible. Therefore, it is likely that by activating myopia, there is less concern about the expiry date. Choi et al. (2022) have shown that when the hedonic benefits of foods close to their expiry date are highlighted (e.g., by describing snacks as "delicious," "fragrant," or "crunchy"), customers are more likely to buy these foods in order to eat them as soon as possible. Therefore, they are less negatively influenced by information about the proximity of the appointment (Fig. 8.1). This is not the case when the health benefits of the same food are highlighted (e.g., by describing snacks as "organic," "healthy," or "sugar-free").

To sum up, highlighting the hedonic qualities of a food increases the desire to consume it and reduces the impact of rational considerations that might limit consumption.

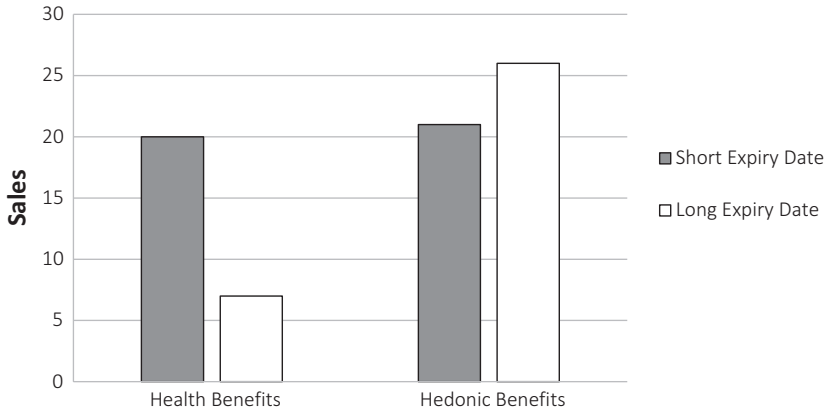

Fig. 8.1 Sale of products with a short or long expiry date according to the health or hedonic description. (Adapted from Choi et al., 2022)

8.3 Triggering Negative or Positive Emotions

Messages aimed at arousing basic (e.g., fear or disgust) or secondary (e.g., guilt or regret) emotions are another strategy that can be used to alter judgement about a food and intention to eat it. For example, some researchers have studied the persuasive power of messages that evoke *disgust* to reduce unhealthy or persistent eating behavior. By combining images of meat with images of pathogens that evoke disgust, Tybur et al. (2016) showed that activating this primary emotion made participants less likely to want to eat the meat depicted in the images. However, when it comes to reducing potentially harmful eating behaviors, evoking disgust does not always seem to be effective. For example, a study on the promotion of food safety in food preparation showed that the use of disgust did not increase the effectiveness of an informative intervention about the hygiene rules to be followed when preparing meals (Koch et al., 2022). Thus, disgust only promotes a change in food choices under certain circumstances and for certain foods. Future research will be able to look more closely at when this emotion can be used to change people's eating habits.

Another negative emotion that could theoretically be triggered to promote healthy and sustainable eating behavior is the feeling of *guilt* that people may feel when they have chosen, for example, unhealthy foods or foods whose production harms the environment. However, the more such a message triggers a feeling of guilt in the recipient, the more the recipient's feeling of anger also increases. Anger, in turn, often leads to little (or no) change in attitude toward the message (Pinto & Worobetz, 1992). Ultimately, emotional messages that elicit moderate feelings of guilt are more effective than those that elicit feelings of guilt of high intensity or, conversely, of low intensity (Walter et al., 2019).

In addition, messages aimed at promoting sustainable eating behaviors may usefully refer to anticipated emotions, that is, the mental anticipation of emotions that may occur in the future (Sect. 4.3). Some researchers have focused on the

anticipated regret one may feel after making an unhealthy food choice. For example, some of them analyzed the effects of a two-week intervention aimed at reducing meat consumption through messages that triggered anticipated regret (e.g., "If you eat excessive amounts of red and processed meat, you may regret not protecting your health"). Their results confirmed that triggering regret was sufficient to increase intention to reduce meat consumption and achieve effective reductions in meat consumption (Carfora et al., 2017).

Finally, regarding messages that trigger positive emotions, the results of studies that investigated how activating *empathy* toward animals can promote a reduction in meat consumption are also interesting (Palomo-Vélez et al., 2018).

8.4 Giving Information or Arousing Emotions?

At this point we can ask whether the most effective messages for changing eating habits and behaviors are those that provide useful information or those that focus explicitly on emotions. For example, in a study to promote the reduction of red meat consumption, the effects of messages focusing on the health harms of excessive consumption were compared with messages focusing on the emotions triggered by concern for health (Berndsen & Van Der Pligt, 2005). In the first case (*cognitive experimental condition*), participants read the following text.

It is well known that meat (especially hamburgers and pork) can increase cholesterol levels, which in turn increases the incidence of cardiovascular diseases such as strokes and heart attacks. In the Netherlands, there is limited control over the quality of meat and experts know little about possible risks associated with meat consumption. As a result, there have been several meat crises: BSE, foot-and-mouth disease, illegal hormones in beef, to name a few examples. Eating meat contaminated with BSE can cause neurological damage that can even lead to death. It is also likely that eating meat containing hormones is harmful to health. So all in all, it can be risky to continue consuming meat.

In the second case (*experimental emotional condition*), participants read a text that was partially similar to that of the participants in the cognitive condition, but differed in that it explicitly referred to fears related to "worrying about cardiovascular disease, eating contaminated meat or meat containing hormones." Then a group of participants in a controlled condition read no text. The results showed that emotional messages reduced positive attitudes toward meat consumption and the perception that eating meat is acceptable more than informative messages. In addition, they triggered a stronger perception of health risks, which led to a lower intention to eat meat in the future.

Similar results were obtained in a study comparing a text that focused on the health and environmental consequences of overconsumption of red and processed meat with a text that focused on eliciting disgust (Palomo-Vélez et al., 2018). This second text said things like, ".... Most meat sold in grocery shops and restaurants comes from cows that spend most of their time standing in deep piles of their own

feces." Reading this very emotional text reduced positive attitudes toward eating red meat more than the informational text.

Similarly, in another study, informative messages about the negative health and environmental effects of excessive red meat consumption were compared with the effects of messages that included content designed to arouse *anticipated regret* (see also Sect. 4.3) about not having protected health and the environment (e.g., "If you eat too much red and processed meat, you may regret not having protected your health from the likelihood of getting cancer and the environment from the release of methane produced during its production"; Carfora et al., 2019b). The result was that participants exposed to messages that triggered early regret reduced their consumption of red meat during the period in which they received such messages. Furthermore, participants maintained this change after 2 months. This was not the case for participants who had received informational messages.

Overall, the data we report show that emotional messages are more effective than informational messages, both when they trigger emotions in the present (e.g., disgust) and when they trigger expected emotions (e.g., expected regret).

8.5 Enabling Descriptive, Injunctive, or Dynamic Norms

As we have already discussed (Sect. 5.4), social norms related to eating behavior have a strong influence on the type and amount of food consumed, as they show people how they "should" eat and can foster a sense of moral obligation and a desire to conform to social expectations. Reference to specific social norms in various ways (e.g., labels on product packaging, posters, texts, or messages on social networks), as well as feedback about consumers' behavior compared to that of other people they consider relevant, strongly influence eating behavior.

Information about social norms can contain both descriptive and injunctive components. To test whether messages based on one or the other component are more persuasive, a sample of university students were assigned different experimental conditions (Mollen et al., 2013):

(a) Messages referring to an injunctive norm regarding the consumption of healthy food (*"Eat a mixed salad for lunch!"*)
(b) Messages referring to a descriptive norm regarding the consumption of healthy food (*"Every day more than 150 students at the university eat mixed salad for lunch*").
(c) Messages referring to a descriptive norm regarding the consumption of less healthy foods (*"Every day more than 150 students at the university eat a hamburger for lunch"*).
(d) Control condition without reading the messages.

The students' food choices were then recorded using a questionnaire given out after lunch. It was found that students exposed to the descriptive norm about healthy food were more likely to choose a salad than other students. It seems that messages based

on injunctive norms are more effective when people process these messages thoroughly. The decision to conform to the expectations of others in order to gain their social approval can require a great deal of cognitive effort, especially when there is a conflict between interpersonal and intrapersonal goals, that is, when what is considered "socially desirable" is different from what is considered "personally desirable" (Jacobson et al., 2011). Descriptive norms, which inform how to behave in a given situation and in a given social group, instead activate non-in-depth message processing based on decision heuristics. By stating what is common in a given situation, they cause people to automatically imitate the normative behavior without engaging them at a higher cognitive level. Therefore, when decisions about food are made quickly and with little cognitive effort, such as when choosing a quick lunch in a university canteen, reference to descriptive norms seems to be more effective.

The idea that a descriptive message can have a direct effect on behavior without affecting the deeper cognitive aspects that determine, for example, the development of a particular intention seems to be supported by the results of a study showing that a descriptive message (e.g., "*Most high school students try to eat a sufficient amount of fruit"*) increases the actual amount of fruit more than an injunctive message (e.g., *"Most high school students think that students their age should eat enough fruit"*; Stok et al., 2014), but without affecting the stated intention to eat. Injunctive norms are not only less effective than descriptive norms, they can sometimes even be counterproductive, that is, they promote counter-normative behavior (Stok et al., 2014; Fig. 8.2). The response to injunctive messages seems to be particularly pronounced among young people, probably because they are more reluctant to conform to the expectations of others. Therefore, interventions on eating behavior based on encouraging messages might even trigger a "boomerang effect", that is, make the recipients eat less healthy instead of healthier.

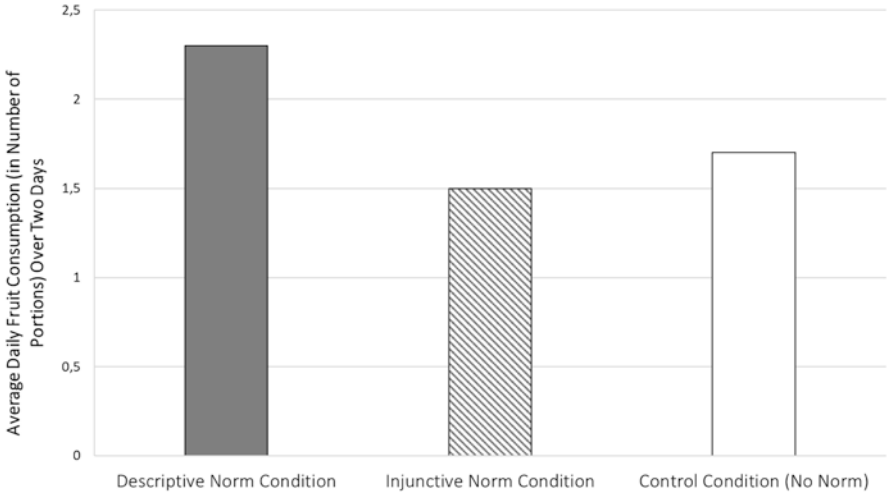

Fig. 8.2 Fruit consumption after the exposure to messages about the descriptive norm, the injunctive norm, or the control condition. (Adapted from Stok et al., 2014)

Some field research confirms that people who receive descriptive messages in a restaurant or canteen are more likely to choose healthy food. For example, it was found that a descriptive norm message ("Most people here eat vegetables with their lunch") shown for a fortnight in three restaurants led to a significant increase in vegetable consumption. This effect persisted in the 2 weeks after the message was removed (Thomas et al., 2017). Similarly, in two university canteens, displaying a descriptive norm message ("Did you know that most students here eat vegetables with their meal?") led to an increase in the percentage purchasing meals with vegetables (Collins et al., 2019).

Some field research confirms that people who are presented with descriptive messages in a restaurant or canteen are more likely to choose healthy foods. For example, it was found that a descriptive norm message *("Most people here eat vegetables with their lunch"*) shown in three restaurants for a fortnight led to a significant increase in vegetable consumption. This effect persisted in the 2 weeks after the message was removed (Thomas et al., 2017). Similarly, in two university cafeterias, displaying a descriptive norm message (*"Did you know that most students here eat vegetables with their meal?")* led to an increase in the percentage of meal purchases that included vegetables (Collins et al., 2019).

What happens if the behavior you want to promote is not yet widespread? In this case, activating the descriptive norm would simply mean that only a minority of people have already activated this behavior. For example, reducing the consumption of red meat to protect the environment is not yet widespread. Therefore, it is not perceived as a norm: Most people consume meat, and if they are thinking about reducing consumption, they are not yet doing it for environmental reasons (Earle & Hodson, 2017). One way to get around this problem could be to include in the message a reference to a **dynamic norm***, that is, a norm whereby more and more people engage in the proposed behavior* (Sparkman & Walton, 2019). Such a message can raise awareness that collective change is taking place and could create a desire in the person to participate in it. Unlike a descriptive or "static" norm (i.e., a norm associated with the current behavior of the majority), a dynamic norm prompts the individual to anticipate a changing world. It also suggests that the recommended behavior is perceived as increasingly important and meaningful, and all of this can motivate adherence to the norm. Evidence of dynamic norms increased interest in reducing red meat consumption as well as the frequency of choosing a plant-based lunch (Sparkman & Walton, 2017). Similarly, the inclusion of references to dynamic norms in restaurant menus and online shops increased the tendency to order vegetarian meals (Sparkman et al., 2020).

In summary, we can say that messages based on descriptive norms are useful in promoting common, socially accepted eating habits that are often implicitly linked to health. Messages based on dynamic norms, on the other hand, can be effective in promoting behaviors that are not yet widespread and socially accepted or linked to environmental protection. Messages based on rules of omission should ultimately be avoided, as they are not very persuasive and sometimes even counterproductive in the area of food choices. However, further studies need to investigate to what extent descriptive or dynamic norms can be more or less effective in combination or in comparison to other types of message content (e.g., emotional content).

8.6 Activating Goal Setting and Self-Monitoring

In addition to promoting healthy and sustainable eating styles through cognitive, affective, and social components, it is possible to support people in changing their eating habits through communicative interventions that focus attention on actual behavior. In this case, the interventions promote the definition and achievement of a clear goal and its self-control, and provide feedback that reinforces and encourages positive behavior.

As explained in Chap. 5, defining a goal and self-monitoring progress toward the set goal facilitate behavior change by signaling the discrepancy between the current state and the desired state. This makes it possible to identify the efforts that need to be made to achieve the desired goal, even when other important goals are present. This is facilitated by receiving feedback, that is, signals that the person is engaging in behavior that is consistent with their self-monitored goal. The theoretical basis for the use of feedback relates to behavioral psychology, according to which the receipt of positive reinforcement after the performance of a behavior promotes its subsequent repetition (Skinner, 1971). This is truer the more positive reinforcement immediately follows the performance of the desired behavior.

On a theoretical level, goal, self-monitoring, and feedback are concepts that can be clearly distinguished from each other. In practice, however, they are often combined when defining interventions to promote healthy eating. Achieving a set goal is often supported by asking the person to monitor their progress and providing feedback that reinforces motivation to engage. An example of a combined intervention of this type is a study to promote regular consumption of fruits and vegetables involving adolescents from numerous Danish high schools (Pedersen et al., 2016). First, the students were asked to set a target for the portions of fruits and vegetables they wanted to consume in a week. Then, each evening, students received a self-monitoring text message asking them to indicate the portions of fruits and vegetables they had eaten. Each time the students responded, they immediately received feedback about the difference between the weekly goal and what they had actually eaten (e.g., "You have now eaten 6 fruits and 8 vegetables. To reach your weekly target, you still need 14 fruits and 15 vegetables by Sunday evening"). This intervention increased fruit and vegetable consumption, but only among students who were sufficiently engaged and regularly reported the number of fruit and vegetable servings consumed each day. It remains to be investigated why not all students felt involved and therefore did not comply with the request to report daily fruit and vegetable consumption. Among the various possible reasons, one could be that the simple way of sending messages (SMS) was not perceived as engaging enough by all.

One way to overcome the problem of low engagement of participants can be to use apps that send notifications with personalized content based on the characteristics of the recipients (see Chap. 9). The reason for this is that personalized content is perceived as more relevant and encourages careful processing of the information received. Typically, self-monitoring apps allow personalization of messages and feedback based on socio-demographic characteristics (e.g., gender) as well as data

recorded by users (e.g., amount and type of food consumed). To give an idea of how this can be done, we briefly review the studies conducted by Burke et al. (2020, 2022).

In the first phase, data were collected on each participant's socio-demographic characteristics, perceived need, and self-interest in improving lifestyle habits, lifestyle, health and health status, eating habits, body mass index (BMI), blood pressure, and waist circumference. Subsequently, all participants were offered two physical activity and dietary goals as part of a 12-month intervention. In terms of physical activity, they were asked to gradually increase it, mainly by walking, with the aim of achieving 150 min of physical activity per week within 12 weeks. Participants who achieved this goal were then asked to increase their physical activity by 10 min each week, eventually reaching 300 min of physical activity per week. For diet, a daily calorie target was set based on the participants' body weight.

All participants were also asked to self-monitor by using a wireless scale and a fitness tracker with apps to record physical activity and food consumed. In addition, half of the participants were asked to read three daily feedbacks via an app. The feedbacks were automatically generated by an algorithm from the self-monitoring data and each related to a target behavior: physical activity or food intake. Again, participants received feedback on their weight every 6–8 days. If they did not use the scale for more than 14 days, they received a reminder asking them to record the new data. Table 8.2 gives some text examples of the different feedbacks.

Table 8.2 Examples of daily feedback based on self-monitoring data

Feedback		
Physical activity	Diet	Weight
Sent based on the number of steps taken and the number of minutes dedicated to physical activity in the previous week	*Sent according to the nutritional properties of the foods registered on the app by the participants*	*Sent based on weight loss data and frequency of use of the scale*
"If you are more active, you can feel more energetic and sleep better. A double win!"	"Have you had breakfast today? Do not forget to write it down!"	"Losing weight takes time, keep it up and you will see results!"
"Start by increasing your physical activity with activities you can do. For example, cycling, dancing, or walking."	"Your calorie consumption seems low for this time of day. Do you keep a record of all the food you eat?"	"You have continued to exert yourself, and the result shows on the scales."
"It can be a challenge to increase and maintain your physical activity. This week you have been physically active for less than 30 minutes. How can you increase those minutes next week?"	"You have started your day with some high-fat meals. Control your fat intake for the rest of the day by choosing fat-free or low-fat foods. You can do it!"	"Plateaus may occur. Take a look at your food diary and see if you can change anything."
"Your app reports more than 150 minutes of physical activity! Very good that you have increased your active minutes!"	"Way to monitor! You are keeping to the calorie guidelines and still have room for fat at your next meal. Enjoy!"	"When the number on the scale goes down, as it has this week, think about what you did to get this far and how you will continue those behaviors."

Adapted from Burke et al. (2020, 2022)

At the end of the intervention, the researchers observed a significant percentage weight reduction 6 months after the start of the intervention, both in participants who took part in self-monitoring only and in those who had also received personalized feedback.

Communication based on the use of behavioral techniques such as self-observation, goal setting, and feedback can also be combined with other types of content, such as content that promotes change in cognitive and emotional factors related to food choices. One such intervention was implemented to promote regular water intake throughout the day (Carfora et al., 2018). Participants were first asked to complete a questionnaire designed to measure attitudes, expected emotions, and intentions to drink water in appropriate amounts (i.e., approximately 2 liters per day) (*Time 1*). Over the next 2 weeks (*messaging intervention*), participants were assigned to one of four different experimental conditions.

- **Emotional messaging related to the set goal**. Participants received daily messages (via *WhatsApp*) that referred to expected negative emotions if they did not achieve the goal (e.g., *"If you do not drink at least one and a half liters of water per day, you will regret not thinking about your physical health"*).
- **Self-monitoring**. Participants downloaded an app to monitor their daily water consumption. The app allowed them to enter the required information by selecting the amount of water they drank in liters or choosing between pictures representing the amount (e.g., a small bottle, a cup, an average glass). Participants were also reminded daily to monitor the amount of water they drank (e.g., *"Remember to monitor your daily consumption by indicating how many glasses or bottles of water you drank today on the app"*).
- **Emotional messaging related to the set goal + self-monitoring.** Participants downloaded the water consumption monitoring app and received daily messages that combined emotional messages with self-monitoring reminders (e.g., *"If you do not drink at least a liter and a half of water a day, you may regret not thinking about your physical health. Remember to monitor your daily consumption by telling the app how many glasses or bottles of water you drank today*").
- **Control.** During the 2 weeks, participants received no emotional or self-monitoring messages.

After 2 weeks (*Time 2*) and two more weeks after the end of the intervention (*Time 3*), participants again completed the questionnaire they had completed at Time 1. The participants who had received reminders about self-control in combination with emotional messages drank more water at *Time 2* (while the effect of the intervention did not last 1 month after the end, that is, at *Time 3*). So, emotional messages alone are not enough to change very habitual and unconscious behaviors. People pay little attention to their daily water consumption and tend to drink the same amount over and over again. On the other hand, messages focusing on self-monitoring seem to be relevant only when combined with messages about negative emotional reactions that would occur if the desired behavior was not implemented. When people are no longer encouraged to self-monitor, they can easily fall back into old habits.

8.7 Valence of the Message

How can we use communication to get people to think about the consequences of their eating behavior and potentially move them toward healthier and more sustainable choices? To achieve this, it is not enough to develop messages of appropriate content quality. It is also necessary to think about how the message is framed, that is, so-called framing (Goffman, 1974). When framing a particular content, it is possible to emphasize certain aspects more than others. For example, if we advertise a low-fat yoghurt, we can use the label "20% fat" or "80% fat-free," basically saying the same thing in two different ways. By framing, that is, defining the content in a certain way, that message framing can influence recipients' conclusions and consequently people's decisions (Meyerowitz & Chaiken, 1987; Rothman & Salovey, 1997).

The type of message framing whose effects on recipients have been most studied so far is **valence**, *that is, the fact that the message emphasizes the positive consequences of a behavior or, conversely, the negative consequences of the absence of that behavior*. Several researchers have shown that recipients of a message may react differently to messages with different valence, even if they are objectively equivalent (Kuehberger, 1998). However, as research in this area has not produced clear-cut results, it has been necessary to introduce further distinctions in classifying messages according to their valence, beyond simple positivity/negativity. Following the **self-regulatory framework for message framing** (Cesario et al., 2013), we can distinguish four different levels of message framing, formulated in the form of recommendations (Table 8.3).

The first level is that of **hedonic consequences** and refers to the pleasure or pain caused by the behavior recommended in the message. Therefore, a distinction can be made between messages that focus on the pleasure of compliance ("*If you follow the recommendation, you will have pleasant consequences*") and messages that focus on the pain of non-compliance ("*If you do not follow the recommendation, you will have painful consequences*").

The second level is that of **outcome sensitivity**. In this case, the positively or negatively worded messages are further subdivided according to the presence or absence of pleasure or pain as follows. For messages with positive valence, we can distinguish between **gain messages,** which focus on the presence of positive outcomes (e.g., "*If you eat healthy, you will improve your health*") and **non-loss messages** that focus on the absence of negative outcomes (e.g., "*If you eat healthy, you will avoid harming your health*"). Similarly, for messages with negative valence, we can distinguish between **loss messages** that emphasize the presence of negative outcomes (e.g., "*If you eat unhealthy, you will harm your health*") and **non-gain messages** that inform the absence of positive outcomes (e.g., "*If you do not eat healthy, you will miss the opportunity to improve your health*").

For an example of differentiating messages according to outcome sensitivity, see Table 8.4 (Carfora et al., 2022). In this case, the messages related to the environmental consequences of buying local food and were sent to participants daily for a

Table 8.3 Framing levels according to the self-regulatory theory of message framing (Cesario et al. 2013)

Level	Question	Framing in terms of…	Example of manipulation
1. Hedonic consequences	What are the consequences of the behavior in terms of pleasure/pain?	Pleasures of adherence	"If you eat healthy, you will improve your health"
		Pains of non-adherence	"If you do not eat healthy, you will harm your health"
2. Outcomes sensitivity	What is meant by pleasure and pain?	Pleasure: presence of positive consequences (gain)	"If you eat healthy, you will improve your health"
		Pleasure: absence of negative consequences (non-loss)	"If you eat healthy, you will avoid harming your health"
		Pain: absence of positive consequences (non-gain)	"If you do not eat healthy, you will not improve your health"
		Pain: presence of negative consequences (loss)	"If you do not eat healthy, you will harm your health"
3. Regulatory concern	What are the consequences I am interested in?	Fulfilling growth and nurturance needs	"If you follow a healthy diet, you will meet your nurturance needs"
		Meeting safety and security needs	"If you follow a healthy diet, you will meet your security needs"
4. Goal-pursuit strategies	What kind of strategy do I use to achieve the goal?	Eager approach means	"Make sure that everything goes well to achieve your nutritional goal"
		Vigilant avoidance means	"Prevent something from going wrong in achieving your nutritional goal"

fortnight via the PsyMe app (a mobile app from the Catholic University of the Sacred Heart of Milan developed to support research in social psychology and artificial intelligence). Different groups of participants received messages with similar content, but differed in terms of the sensitivity of the results, namely:

- **Gain**: positive impact of buying local food on the environment (e.g., "Buying food produced near us promotes the survival of local agricultural varieties. When you buy local food, you contribute to the protection of biodiversity.")
- **Non-loss**: avoiding negative environmental impacts by buying local food (e.g., "Buying food produced near us promotes the survival of local agricultural varieties. When you buy local food, you do not contribute to the loss of biodiversity.")

Table 8.4 Examples of gain, non-loss, non-gain, and loss messages for the promotion of local food consumption (Carfora et al. 2022)

Gain	Non-loss	Non-gain	Loss
If you buy local food…		*If you do not buy local food…*	
…you contribute to the protection of biodiversity	…you avoid contributing to the loss of biodiversity	…you miss the opportunity to contribute to the protection of biodiversity	…you contribute to the loss of biodiversity
…you contribute to ecosystem protection	…you avoid contributing to ecosystem degradation	…you miss the opportunity to contribute to ecosystem protection	…you contribute to ecosystem degradation
…you help maintain air purity	…you avoid contributing to air pollution	…you lose the opportunity to contribute to air purity	…you contribute to air pollution
…you contribute to increasing green spaces	…you avoid contributing to decreasing green spaces	…you lose the opportunity to contribute to increasing green spaces	…you contribute to decreasing green spaces
…you contribute to energy saving	…you avoid contributing to energy waste	…you lose the opportunity to contribute to energy saving	…you contribute to energy waste
…you promote food waste reduction	…you avoid promoting an increase in food waste	…you lose the opportunity to promote food waste reduction	…you promote an increase in food waste
…you contribute to the preservation of glaciers	…you avoid contributing to the melting of glaciers	…you lose the opportunity to contribute to the preservation of glaciers	…you contribute to the melting of glaciers
…you contribute to reducing water pollution	…you avoid contributing to increasing water pollution	…you lose the opportunity to contribute to reducing water pollution	…you contribute to increasing water pollution
…you contribute to soil conservation	…you avoid contributing to soil degradation	…you lose the opportunity to contribute to soil conservation	…you contribute to soil degradation
…you contribute to saving water	…you avoid contributing to the waste of water	…you lose the opportunity to contribute to water conservation	…you contribute to water wastage
…you contribute to reducing the waste that pollutes the planet	…you avoid contributing to the increase of waste that pollutes the planet	…you miss the opportunity to contribute to reducing the waste that pollutes the planet	…you contribute to the increase of the waste that pollutes the planet

- **Non-gain**: loss of positive environmental impacts by not buying local food (e.g., "Buying food produced in distant places hinders the survival of local agricultural varieties. If you do not buy local food, you miss the opportunity to contribute to the protection of biodiversity.")
- **Loss**: negative environmental impacts that result if you do not buy local food (e.g., "Buying food produced in faraway places hinders the survival of local

agricultural varieties. If you do not buy local food, you contribute to the loss of biodiversity.")

In the next chapter we will present the results of this study (Sect. 9.4), because it has been shown that the effectiveness of the four different types of messages varies according to the characteristics of the recipients. In Chap. 9 we will look at exactly how important it is to adapt the framing of the message to the characteristics of the recipients and to personalize the communication as much as possible.

The third level of framing envisaged by Cesario et al.' (2013) model is **regulatory concern.** It is related to framing the consequences of the recommended behavior in terms of satisfying **safety needs** (*"If you follow the recommendation, you will satisfy your safety needs"*) or, conversely, **care needs** (*"If you follow the recommendation, you will satisfy your care needs"*). The need for safety can refer to different areas, such as maintaining satisfactory living conditions, maintaining work, and complying with social tasks and obligations. The need for care can refer to various areas, such as self-improvement, enjoyment of life, career advancement, or the fulfilment of one's hopes and aspirations. An example of framing manipulation in regulation is a study in which messages about the negative consequences of overconsumption of red and processed meat were framed in terms of possible harm to health or, conversely, in terms of possible harm to well-being (Bertolotti et al., 2016). In the first case, people read messages such as: "*If you eat a lot of red meat, your health will deteriorate.*" This reference to possible health risks was perceived by readers as a response to their need for safety. In the second case, on the other hand, people read messages like: "*If you eat a lot of red meat, your psychophysical well-being will decrease.*" This reference to well-being was perceived by readers as a response to their need for security. As we will see in the next chapter (Sect. 9.3), the greater effectiveness of one type of message or another also varied in this case depending on the characteristics of the recipient. In general, however, we can say that people who find messages with a health/safety framing or a care/well-being framing appealing also tend to change their attitudes toward the consumption of red and processed meat. Furthermore, when asked to choose a hypothetical meal based on a fictional menu, they are less inclined to choose dishes with red meat or sausage and more inclined to choose vegetable dishes.

The fourth level of framing in Cesario et al.' (2013) model refers to the **goal-pursuit strategy**, which can be framed in terms of an **eager approach** (*"Make sure everything goes well to achieve your goal"*) or a **vigilant avoidance** (*"Avoid anything that could go wrong in achieving your goal"*).

In summary, in the field of food communication, it has been found that people respond differently to messages depending on how they are worded. However, the research conducted has mainly shown that the persuasiveness of different formulations depends on the characteristics of the recipient. Therefore, we will return to the topic of the effects of the different levels of framing in the next chapter (Chap. 9). There we will refer to some of the studies mentioned earlier and other research showing that the impact varies according to the characteristics of the recipients.

8.8 Factual or Prefactual Formulation

Recommendations on eating behavior can be formulated in many different ways, even beyond the levels of framing just described. We can call a message formulation that offers promising results in terms of increasing the effectiveness of the messages prefactual. A **prefactual message** *represents a possible future outcome as a consequence of a hypothetical current behavior* (Petrocelli et al., 2012). An example of prefactual messages in the area of food is: *"If you eat an unbalanced diet, your risk of suffering from cardiovascular disease increases."* Research on prefactual thinking shows that the mental formulation of conditional thoughts such as "If... then" causes people to make a connection between an action (represented in the antecedent of the conditional sentence) and the outcome of that action (the consequence of the conditional sentence). In other words, the mere thought "If you perform action X, you will get outcome Y" leads people to believe that performing that action will lead to the expected outcome (and vice versa; Epstude et al., 2016). For example, a person who has bad eating habits might think, "If I change my diet, my health will improve." Formulating such prefactual message means supporting the belief that one's action is causally effective in achieving the desired outcome.

Activating prefactual thinking is an implicit component of several cognitive behavioral interventions that are successful in bringing about behavioral change in people (Stadler et al., 2009). In using the **mental contrasting technique**, for example, the person is first asked to name the goal they would like to achieve by changing a particular behavior. Then they are asked to imagine the most positive outcome they could achieve and the biggest obstacle they might encounter (Oettingen et al., 2001). Similarly, in the **implementation intentions** technique (see also Sect. 6.5), the person is asked to anticipate the steps that will lead to the desired outcome and formulate them in the prefactual form "if, then..." (Gollwitzer & Sheeran, 2006). For example, Bagozzi et al. (2004) observed that attitudes toward different prefactual scenarios related to a diet predicted intention to use it. Negative attitudes toward a prefactual scenario of failure (e.g., "Imagine going on a diet and failing to lose weight") are associated with a strong intention to control one's body weight.

When the prefactual statement is used in communication, its hypothetical formulation means that from the illocutionary point of view there is no obligation that the action must be performed, but only that a certain consequence would occur if the action were performed (Sanna, 1996). Prefactual statements thus capture the idea of something that is not yet a fact but could occur in the future. Thus they help people to believe that they have some ability to influence events. People who read such messages are in turn able to simulate in their minds hypothetical scenarios in the future that serve as precursors for the formation of intentions to act. The formation of an expectation about how an antecedent can determine a consequence also leads us to believe that the consequence can be changed by changing the expected conditions of the antecedent. This means that, for example, the statement "If you eat a balanced diet, your risk of developing metabolic disorders will decrease" can lead to the mental simulation of a scenario in which the person who currently eats an

unbalanced diet acts on this prefactual and in this way achieves the desired outcome. Prefactuals can thus help people to identify cause–effect relationships from which they can formulate strategies to achieve their goals. In this way, stimulating a prefactual thought can become part of the pre-decision phase and support both the identification of a goal to be pursued and the path toward it.

In summary, prefactuals are a future-oriented linguistic form that involves causal inference and incorporates both present personal action and possible future outcomes. The results of scientific research suggest that prefactual thinking (spontaneous or induced) is effective in highlighting the link between one's behavior and its future consequences, especially when associated with a dimension of caring and well-being (Bertolotti et al., 2016). This improves engagement with the message and increases positive attitudes toward the recommended behavior, leading to increased intention to carry out the suggested behavior.

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Chapter 9
Characteristics of Recipients

9.1 Targeted Communication

Try explaining to the old lady who has always prepared fish and crisps her mother's way that it is possible to make a light version of the same recipe where the potatoes are not fried and the dish is more digestible. Or try to educate students who drink cocktails and eat crisps in the pub several nights a week about the long-term health damage to their arteries. Most likely, neither recommendation will have the desired effect. If your nutrition communication does not match people's motives, resources, and emotions, what you say will not get through or, worse, will only upset people.

People respond differently to nutrition recommendations directed at them (Teeny et al., 2021). Socio-demographic and psychological characteristics, values, and lifestyles determine the differences in the way people process the recommendations they receive, and consequently the likelihood that they will adhere to the suggested behavior. Recommendations are more likely to be followed if they meet the specific needs of the target group. In order to meet these needs, it is first necessary to understand how they differ across different population groups. The importance of **profiling** (**or segmentation**), that is, *dividing the population into groups that are as defined and homogeneous as possible*, was first recognized primarily in the field of commercial communication. Today it also plays an increasingly important role in the field of public communication. It makes it possible to design advertising campaigns that are tailored to the needs of a precisely defined audience and can consequently be more effective.

In order to take into account the differences in the effectiveness of public communication depending on the characteristics of the recipients, it seems appropriate to distinguish between three different types of intervention in public communication about food.

- **Mass communication**. This is communication in which identical messages are sent to a relatively large and undifferentiated audience. An example of this is a

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brochure on the risks of excessive salt consumption distributed to doctors nationwide and displayed in the waiting rooms of their surgeries.

- **Targeted communication**. This is a communication based on profiling the target population. Each profile receives messages that may differ in content, language style, value, source, graphic, channel, etc. An example would be a campaign to promote fruit and vegetable consumption among children, programmed accordingly, and using, for example, simple language combined with eye-catching images and videos.
- **Personalized communication**. This is communication that uses different messages depending on the needs, preferences, and past behavior of the particular recipient (see also Chap. 10). An example of this communication is sending personalized feedback based on data collected from recipients using an online food diary.

These three types of communication activities should not be considered completely separate from each other, but can be arranged along a continuum. For example, a regional institution could launch a mass campaign to promote the consumption of local food. This campaign could include a main slogan that is disseminated through different media. However, it could also provide for a more targeted campaign in which the messages vary according to the socio-demographic and/or psychological characteristics of the recipients (mothers or fathers, people concerned about health or the environment, etc.). If the characteristics of the recipients taken into account at the same time are numerous and if it is then a very circumscribed and defined profile of recipients (e.g., elderly and educated people who have difficulty recognizing local products when they buy), targeted communication comes very close to personalized communication.

The ideal personalized communication is, of course, to formulate messages that are tailored to the characteristics of each recipient in order to effectively guide them toward a goal they consider important. However, this ideal is difficult to achieve. It is possible to take into account and measure many individual factors that explain a good percentage of the variance in behavior change following participation in communication campaigns. However, full personalization requires the identification and thus measurement of a sometimes very large number of factors that may play a role in turning toward or away from the expected behavior. An investigation of this kind can be facilitated by the fact that we have very effective predictive models at our disposal and, as we shall see in Chap. 10, significant progress can be made in this area through collaboration between social psychology and artificial intelligence.

9.2 Criteria for Profiling Recipients

As mentioned earlier, profiling the recipients of a communication campaign is about dividing the population identified as the target of the campaign into subgroups with similar characteristics. In this way, the targeted messages can be sent to each

Table 9.1 Basics of profiling

Profiling criteria	Description	Category	Example	Method
Demographic	Physical and factual data	Age, gender, educational attainment, region of origin...	University students away from home	A priori
Geographic	Place of residence	Home, work, or study address, destinations (e.g., travel, leisure, countries, regions, cities, states, regions...)	People living in Italy	A priori
Psychographic	Psychological characteristics, shared values, motives, or interests	Attitudes, opinions, beliefs, personalities, values, interests, motivations, emotions, character traits, cultural beliefs...	Vegetarians with a specific political-religious orientation	Hybrid
Behavioral	Behavioral factors	Lifestyle, purchase decisions, activities, hobbies, habits, use of products or services, use of social media, experiences...	Consumers who have searched online or previously purchased similar foods	Hybrid
Psycho-behavioral	Combination of psychographic and behavioral variables	Beliefs about how to eat healthy, restaurants and supermarkets visited, attitudes toward sustainability	Consumers who eat packaged snacks based on a particular attitude toward healthy eating	Hybrid

Adapted from Jenkins et al. (2021)

subgroup and increase the success of the campaign. Table 9.1 summarizes the different types of profiling with their description and examples (Jenkins et al., 2021).

Socio-demographic profiling is based on characteristics such as age, gender, or education. Geographic profiling refers to the person's area of origin or residence. Both profiles are often used to identify the target group of a public campaign. They are undoubtedly crucial factors in the planning and initial design of interventions (e.g., they are useful in deciding where to allocate resources or which communication channel to use). However, they are often not sufficient to understand what motivates people to behave in a certain way (Carins et al., 2014). Psychographic and behavioral profiling are needed to remedy this and consistently support behavior change (Kitunen et al., 2019).

Psychographic profiling examines people's personality traits, beliefs, values, interests, and lifestyles to understand the reasons for their behavior. Interest thus shifts from the "who" and "where" that demographic and geographic profiling provides, to the "why" that underlies behavior in this type of profiling. Behavioral profiling, in turn, shifts the focus to people's actual behaviors. This includes, for example, behaviors such as the frequency and quantity of purchases, the use and consumption of certain foods, and so on.

Psychographic and behavioral variables can be used together to provide both an explanatory and a predictive approach to behavior. In this case, we speak of **psycho-behavioral profiling**. When planning and designing a communication campaign, it is important to explore the motivations for behavior and to describe the behavior itself. When the psychological behavioral variables are added to the socio-demographic and geographic variables, it is possible to create an extremely accurate profile of the target audience of a public communication campaign.

Profiling of communication recipients can be carried out using different methods: a priori, a posteriori, or mixed. In **a priori profiling**, the number and type of people to be profiled are determined before data collection. This profiling can be qualitative or quantitative and often includes demographic and geographic variables such as age, nationality, etc. In the case of psychological behavioral variables, **post-hoc profiling** is usually conducted instead. It is often based on experiments and is divided into a series of successive phases, which we have illustrated in Fig. 9.1 and described in the following text.

- Participants complete a questionnaire to measure some psychosocial characteristics relevant to the eating behavior under study (e.g., concerns about health or the environmental impact of a particular food) (*Time 1*).
- Participants are assigned to one of several possible experimental conditions, in each of which they receive different messages. For example, in one experimental condition participants receive messages about the health benefits of a particular food. Participants in another experimental condition receive messages about the

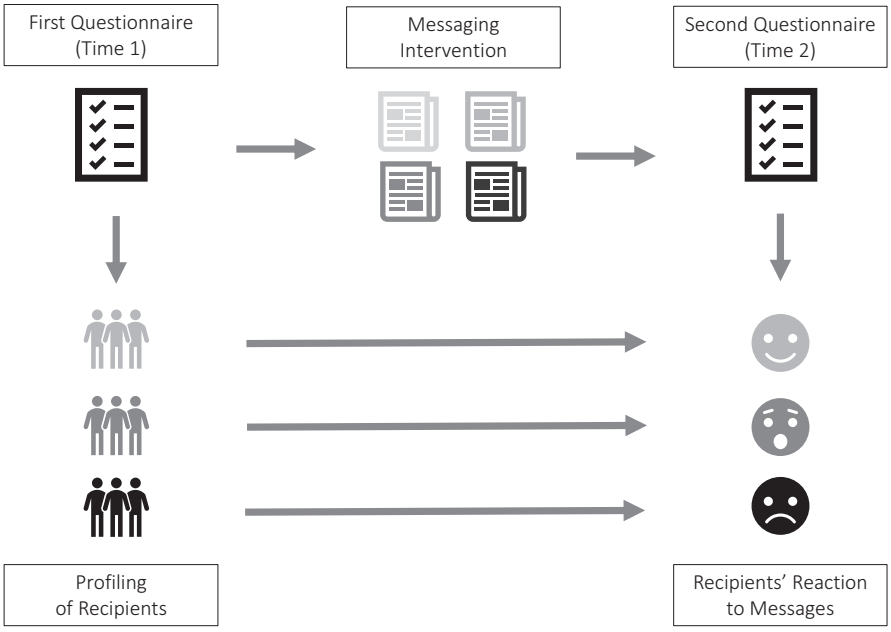

Fig. 9.1 Stages of the a posteriori profiling of recipients

environmental benefits of eating that food. Finally, in a third experimental condition participants read a message that merely describes that food, or they read no message at all (*Messaging Intervention*).

- Participants fill out a second questionnaire in which they give their evaluation of the message they received. In addition, the second questionnaire measures other dimensions that are considered outcomes of the messages read, such as cognitive, affective, social, or behavioral dimensions (e.g., attitudes, intentions, involvement in consumption related to the food that was the subject of the messages) (*Time 2*).
- The data collected at Time 1 is analyzed to create a profile of the participants based on the variables measured. For example, we can profile participants according to their level of health concern and identify three different profiles: "not very concerned," "quite concerned," and "very concerned."
- The responses at Time 2 are analyzed to see if the participants assigned to the different profiles responded differently to the messages they received. We might find, for example, that health-related messages are more persuasive to the "very concerned" group. Instead, we might find that environment-related messages were more persuasive to those who were not very concerned about health.

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Finally, in **hybrid profiling**, the method is divided into two phases: First, a priori profile is created and then a posteriori profiling is used to further test the usefulness of the different profiles identified in a priori profiling. For example, researchers may first profile individuals based on demographic data and then test whether this profile is enriched by a psycho-behavioral profile. Taking demographic data into account can be particularly important for creating contact opportunities with the target persons of a communication campaign. For example, if you know how old they are and where they live, you can more easily identify contact points that trigger behavior change (Jenkins et al., 2021).

Profiling the recipients of a communication campaign to promote healthy and sustainable eating habits as well as possible, and consequently selecting the delivery of the messages, means creating the best cognitive conditions for recipients to thoroughly process and positively absorb the messages they receive. Since people have limited cognitive resources to process information, they tend to use these resources especially when they are highly motivated and perceive the personal relevance of the information (Petty & Cacioppo, 1986; see also Sect. 7.2). Personalized messages are usually read and remembered more often than non-personalized ones and stimulate deeper information processing (Campbell et al., 1994). Thus, the more the communication is targeted to specific recipients, the more it encourages them to engage with it in depth and focus on it, while also allowing them to identify discrepancies between their actual and intended behavior.

For example, in a study of the effects of a communication intervention to promote weight loss, those who received targeted messages were able to make more "positive personal connections" to the messages than those who received non-targeted messages. The former developed more thoughts and ideas that related the weight loss information to their situation or experience than the latter (Kreuter et al., 1999). Deep processing of messages leads to deeper and more lasting beliefs than peripheral processing (see also Sect. 7.2). But even if a personalized message appeals to the recipients rather superficially, it can still be effective. Namely, it can help the person feel understood. This in turn increases the perception of the credibility of the source and induces people to follow the recommendations contained in the messages, even without undertaking a critical analysis of the proposed arguments. Finally, targeted communication can also serve to trigger an emotional response, such as fear, hope, or anxiety and thus automatically arouse the desire for a change in behavior in the person (see also Chap. 4).

Let us now analyze in more detail some psychological characteristics that researchers have found to be relevant to the appropriate adaptation of messages to recipients.

9.3 Regulatory Focus

The effect of a food recommendation may depend in part on a characteristic of the recipient called **regulatory focus** (Higgins, 1997). This refers to *the tendency to self-regulate the pursuit of one's goals and to selectively focus one's attention on achieving gains rather than avoiding losses*. Individuals who have a predominant **promotion focus** *are motivated by the search for gains that guarantee the attainment of a desirable ideal state*. These people focus on the rewards they receive when they are successful: attention, success, information, and goods. In terms of diet, people with a high promotion focus seem to be oriented toward eating healthy in order to achieve benefits for their health and well-being (Joiremanet al., 2012). Individuals who have a predominant **prevention focus** *are motivated to avoid risks, perform tasks and duties, and maintain the status quo*. They are therefore very alert to the negative consequences that could arise if they are not careful enough. In terms of nutrition, these people are concerned about eating healthily in order to avoid the risks, especially health risks, that result from poor nutrition (De Boer et al., 2007; Spiegel et al., 2004).

Communication on nutrition issues can increase its effectiveness if it is based on recommendations that are consistent with the prevailing regulatory focus of the recipients. When this is the case, recipients perceive that the challenging task required – namely to change their eating habits – is in line with their goals and consistent with their regulatory focus. It is therefore likely that they will be more engaged with this type of recommendation and consequently more willing to adopt the recommended behaviors. Thus, individuals with a predominant focus on promotion will be more persuaded by messages describing the benefits of a good diet,

while individuals with a predominant focus on prevention will be more persuaded by messages describing the avoidance of the risks of a poor diet. When recipients receive a message that is consistent with their regulatory focus, perceptions of regulatory fit are likely to be activated. **Regulatory fit** can be described as the *subjective experience of harmony with the received message, perceived as being consistent with their motivations and their preferred way of coping with a problem, task, or decision* (Cesario et al., 2008).

The experience of regulatory fit is not limited to an intuitive understanding and greater appreciation of the message received, but also causes recipients to be more interested, engaged, and motivated to engage with the content of the message itself. This in turn increases the possibility of a change in their attitudes and behaviors, as envisaged by classical models of persuasion (see also Sect. 7.2). For example, when examining the interaction between the value of proposed messages (see Sect. 8.7) and the predominant regulatory focus of recipients, it was found that win messages, that is, messages that emphasize the positive consequences of adopting a certain behavior, are more persuasive to recipients with a predominant promotional focus. Conversely, loss messages, that is, messages that emphasize the negative consequences of not adopting a certain behavior, are more persuasive for recipients with a predominant prevention focus (e.g., Dijkstra et al., 2011). In the case of junk food, for example, message highlighting the benefits of reduced consumption of these foods are most effective when recipients have a promotion focus. In contrast, messages highlighting the risks of excessive consumption are most effective when recipients have a prevention focus (Shimul et al., 2021).

Regulatory fit can also be activated by emphasizing in the message the consequences of the proposed behavior in terms of growth and improvement rather than safety and protection, that is, by varying the regulatory attention of the message (Bertolotti & Catellani, 2014; Cesario et al., 2013). For example, negative effects on well-being (e.g., psychological problems) resulting from excessive consumption of red meat are associated by people with the idea of growth. Conversely, negative health effects (e.g., cardiovascular disease and cancer) resulting from red meat consumption are associated with safety concerns (Bertolotti et al., 2016). This is because well-being is seen as a goal that is always progressing, as people are willing to keep improving the state of well-being they have achieved. In contrast, health is conceptualized as a minimum goal that must be achieved to prevent disruptions from upsetting a desirable equilibrium (Berthold et al., 2012). Once this equilibrium is achieved, people are generally motivated to maintain it as it is (i.e., to avoid disease) rather than to improve it further. So we can assume that a message focusing on the negative health consequences of excessive meat consumption is more persuasive to people with a prevention focus, while a message focusing on the negative consequences for well-being is be more persuasive to people with a promotion focus. In this context, several researchers have shown that a strong need for safety is associated with an increased sensitivity to potential losses and a preference for risk avoidance strategies (Freitas & Higgins, 2002). In contrast, a predominant need for growth is associated with an increased sensitivity to potential gains and a preference for eager approach strategies.

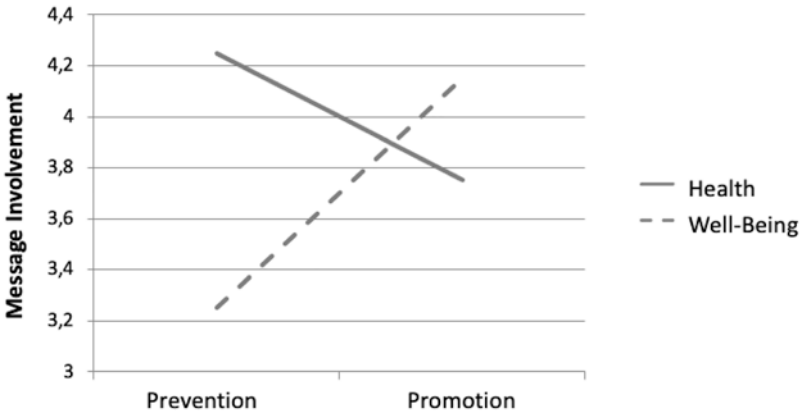

Fig. 9.2 Message involvement as a function of recipients' regulatory focus (promotion vs. prevention) and regulatory concern of the messages (well-being vs. health). (Adapted from Bertolotti et al., 2020)

This expectation was partially confirmed by a study by Bertolotti et al. (2020). As shown in Fig. 9.2, participants who focused on prevention were more engaged, influenced, and motivated by messages about the negative health consequences of eating red meat than by messages about the negative consequences for well-being. In turn, participants who focused on advertising were influenced by messages about well-being as well as health-related messages. Consistent with this, other research conducted in different fields (e.g., messages about the consequences of implementing alternative energy development strategies; Bertolotti & Catellani, 2014) has found that people with a prevention focus are particularly persuaded by messages that focus on safety rather than well-being, while people with a promotion focus are persuaded by both types of messages.

9.4 Motives

As discussed in Sect. 3.2, people differ in the reasons that guide their food choices. Since motives are an important determinant of how a message is processed and cognitively perceived, nutrition campaigns can increase their effectiveness by proposing messages that are precisely tailored to the motives of the recipients.

For example, we have already talked at length about health-related nutrition motives, but now we can distinguish between different expressions of the health motive. In a communication-focused study on increasing fruit and vegetable consumption, five profiles of individuals were identified based on the different psychological meanings attributed to health and thus the different sources of motives for health behavior (Geeroms et al., 2008). We list the five types in the following text, starting with a key word that identifies them.

1. **Energy**. The person perceives health mainly in terms of vitality and energy and associates it with an active life and keeping the body in good shape. The person perceives it as extremely negative if he or she is unable to exercise due to health problems.
2. **Pleasure**. The person attaches great importance to the fact that health also means emotional well-being, enjoying life, and maintaining social contacts.
3. **Norm**. Being healthy in this case means "avoiding illness" and "not having physical health problems." In addition, the person views health as a social responsibility and considers it very important to take care of the health of other family members.
4. **Awareness**. The person is very conscious of taking care of her health. She pays attention to the appearance and health of her body. The person has a strong interest in being fit and looking good for others. She knows her body and therefore has to take care of her own health without relying on the advice of others.
5. **Rationality**. In this case, the person has a predominant interest in the physiological and functional aspects of health, with the main aim of having the necessary competence to make life and work functional.

Using the different population profiles identified based on the five identified health motives, Geeroms et al. (2008) proposed ads to promote fruit and vegetable consumption that differed in two dimensions: tone and directionality.

In terms of **tone**, the advertising message can be either informative or transformational (Percy & Rossiter, 1997). *Informative advertising* focused mainly on the functional benefits of eating fruits and vegetables (e.g., prevention of disease or obesity) and used third person wording. These advertisements aimed to make people think by using information and focusing on the consumer's functional motives, such as solving or avoiding a particular problem. *Transformative advertising*, on the other hand, used vivid imagery, focused on the hedonistic aspects of fruit and vegetable consumption (e.g., enjoying life, experiencing freedom) and used first person (singular or plural depending on the condition) wording. The main objective was to evoke emotions in consumers.

In terms of **directionality**, the message could be *self-directed* if it emphasized identity, individuality, or a unique lifestyle. Or it could be *hetero-directed* if it emphasized relationships, family commitments, and shared choices (Wang & Mowen, 1997). It was found that people responded more positively to the advertising message when it corresponded to the person's predominant health motive.

More specifically:

- The *self-directed transformative* message was more effective for the group with the predominant "energy" motive, the *hetero-directed transformative* message was more effective for the group with a predominant "pleasure" motive.
- The *self-directed information* message was more effective for the groups with a high "awareness" and "rationality" motive.
- The *hetero-directed information* message was more effective for the group with a leading "norm" motive.

The presence of these interactions between the characteristics of the promotional messages and the health motives prevalent among the recipients confirms once again the usefulness of appropriately profiling the recipients of communication campaigns in order to send targeted messages that can stimulate them to adopt the desired behavior.

Following the promotion of fruit and vegetable consumption, we consider the promotion of another type of food consumption, namely, the consumption of local produce (Carfora et al., 2022a). In this case, the different consumer profiles were created a posteriori based on their greater or lesser propensity to purchase food for **healthy and/or environmentally friendly motives**. The researchers then sent messages about the possibility of buying local products via the PsyMe app for a fortnight and compared the effectiveness of the different messages in terms of outcome sensitivity (see Sect. 8.7). The experimental conditions consisted of sending messages with gain, without loss, without gain, or with loss. Finally, there was a control condition (no messages).

The effectiveness of the different messages was measured using a local food selection task in which participants had to choose five fruits from a list of ten. They were asked to imagine that they were buying fruit from an online retailer and to choose five of the ten fruits suggested. Each participant had to choose between five fruits produced in locations more than 100 km from the participant's home and five fruits produced in locations within 100 km of the home. All fruits were pictured and described with name, weight, size, category, origin, packing date, and price (Fig. 9.3). The origin information was intentionally inserted between other information so that it would not stand out too much. For the same reason, participants were not given a spending budget so that the price information would not stand out and be more relevant than the others.

The results showed that messages framed in terms of wins or no wins increased the tendency to buy local food among recipients who were predominantly driven by an environmentally friendly motive. In contrast, messages that spoke of losses or non-losses were more effective for participants who were primarily driven by a health motive. When consumers were driven by both motives, they preferred "simpler" messages (i.e., gain or loss) over "more complex" messages (i.e., non-loss or non-gain). Finally, consumers with low health and environmental motives were dismissive of messages, that is, they were not persuaded by any type of message.

The results just explained are further confirmation of the importance of profiling message recipients according to their predominant motives. They also prove that it is difficult to achieve a persuasive effect if such motives are not present. However, as we will see in the following chapter, other communication strategies can persuade even those who are not yet involved in a particular motive.

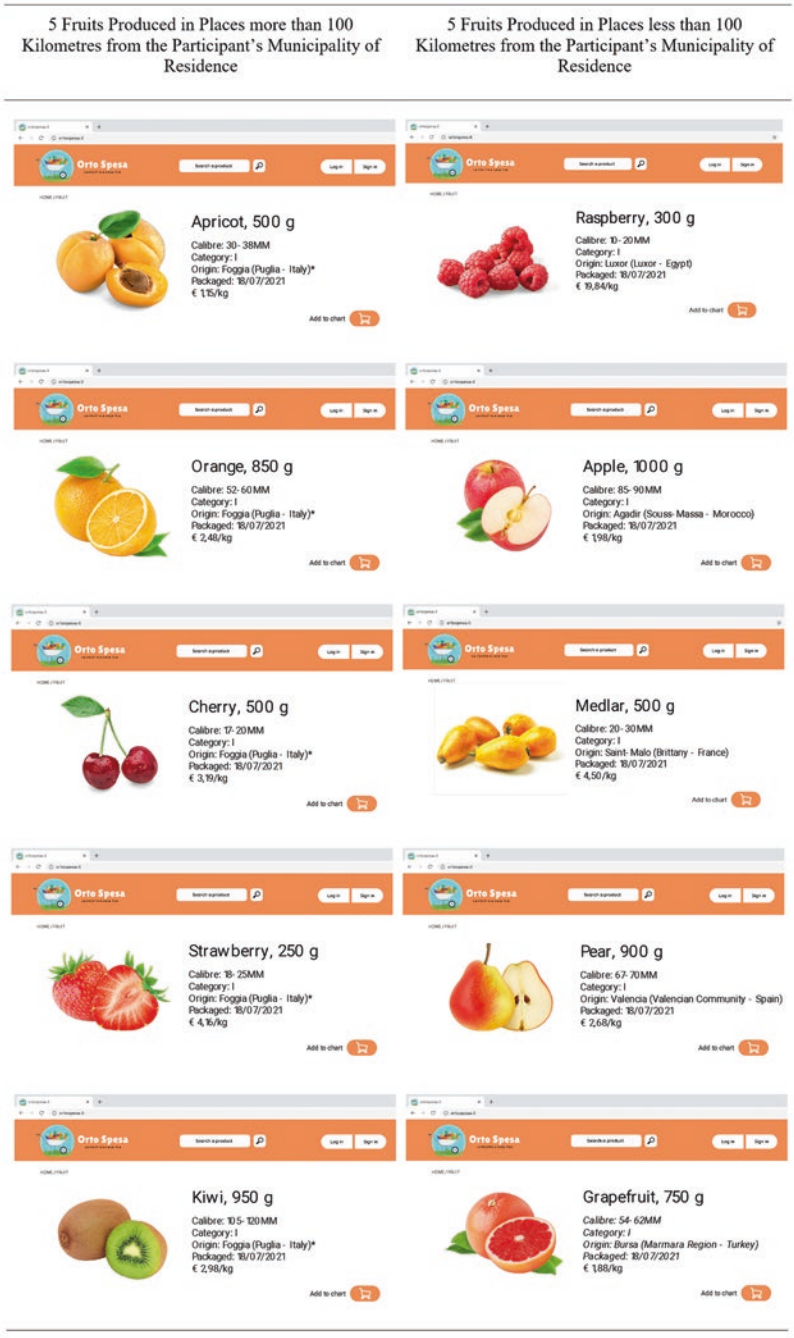

Fig. 9.3 Example of a randomized list of 10 fruits suggested in the choice task (Time 1 and Time 2). (Carfora et al., 2022a)

9.5 Beliefs and Attitudes

We already know (see Sect. 3.3) that pre-existing beliefs and attitudes play a central role in what we want to eat. Therefore, taking these dimensions into account is also essential when developing targeted messages. In general, people have positive beliefs and attitudes toward the diets they follow, just as they have negative beliefs and attitudes toward other diets (Povey et al., 2001). This is because people tend to avoid cognitive dissonance resulting from a possible contrast between their own attitudes and beliefs and those of others (Cooper, 2007, Festinger, 1957).

Various strategies are used to maintain consistency. These include the so-called **confirmation bias**, that is, *the tendency to trust and accept more information that confirms one's established beliefs and behaviors* (White et al., 2003). For example, highly health-conscious people tend to avoid or reject information that questions the healthfulness of functional foods (see Box 1.1 for a definition of functional foods) (Naylor et al., 2009). Similarly, those who view red meat as a necessary and healthy part of the diet do not pay attention to or reject information that contradicts their beliefs (de Boer et al., 2013), such as that eating a lot of red meat is unhealthy, unnecessary, unsustainable, or unethical (Piazza et al., 2015). These people are also often skeptical of the climate damage caused by red meat production and therefore reject information that supports the environmental impacts of red meat (de Boer et al., 2013).

It is clear, therefore, that communication aimed at changing eating behavior will be more successful if it is framed in a way that does not counter recipients' prior beliefs and attitudes too explicitly and directly. For example, with regards to red meat consumption, advice to reduce red meat consumption has been shown to be effective with individuals who are already inclined to believe that meat has a negative impact on health, while it is not effective with individuals who are skeptical in this regard (Vainio et al., 2018). As you will see in detail in Sect. 9.7, messages aimed at people who are not thinking about change need to be formulated with specific strategies to reduce rejection of the message itself (Table 9.2).

9.6 Self-Efficacy

Several studies have shown that the success of healthy eating communication campaigns is highly dependent on how well recipients feel able to follow the proposed recommendation, that is, how high their dietary self-efficacy is. As we have already seen (Sect. 6.3), eating self-efficacy can be defined as the person belief that they know how to successfully implement healthy eating behaviors. In general, individuals with higher eating self-efficacy are more likely to accept suggestions and change their behavior accordingly. Conversely, individuals with low eating self-efficacy tend to activate defense mechanisms that lead them to ignore or reject what is often perceived as a threatening message (Riet et al., 2008; Witte, 1992). However, the

Table 9.2 Messages focusing on the health benefits of a healthy diet with short- or long-term time reference (Churchill et al., 2014)

Short-term messages	Long-term message
EVERY DAY a significant number of people suffer the consequences of an unhealthy diet. For example, evidence suggests that people who avoid high-calorie snacks have a lower risk of many serious, life-threatening diseases compared to those who do not, and benefit from several potential health advantages. People who avoid eating high-calorie snacks have a LOWER RISK of heart disease, stroke, high blood pressure, type 2 diabetes, cancers (e.g., bowel cancer). Avoiding high-calorie snacks can also bring you other HEALTH BENEFITS, such as: Healthy looking skin and hair, a healthy weight, and more energy and vitality. We would like to ask you to give up high-calorie snacks at work for the next 7 days.	EVERY YEAR a significant number of people suffer the consequences of an unhealthy diet. For example, evidence suggests that people who avoid eating high-calorie snacks have a lower risk of many serious, life-threatening diseases and enjoy several potential health benefits compared to those who do not. People who avoid eating high-calorie snacks have a LOWER RISK of heart disease, stroke, high blood pressure, type 2 diabetes, cancers (e.g., bowel cancer). Avoiding high calorie-snacks can also bring you other HEALTH BENEFITS, such as: Healthy looking skin and hair, a healthy weight, and more energy and vitality. We would like to ask you to give up eating high-calorie snacks at work for the next 7 days.

response of those who feel more or less efficacious may also depend on how the messages promoting proper eating styles are framed.

Individuals with high self-efficacy are more likely to adopt healthy eating habits when exposed to direct or factually worded messages than when exposed to indirect or prefactually worded messages (for the distinction between factual and prefactual formulation, see Sect. 8.7). Therefore, only high efficacy individuals respond positively to direct messages such as "*A diet high in animal protein and fats has negative effects on your health/wellness*" (Bertolotti et al., 2020). People who feel they can control and change their diet are therefore also encouraged by messages that factually describe the risks of eating the wrong foods. This is not the case for people with low self-efficacy. They are more likely to be persuaded by prefactual messages (in this case, wording of the type "If you eat a diet rich in animal proteins and fats, it will have a negative impact on your health/well-being"). It is likely that people with low efficacy have historically been less able to control their diets and therefore feel more threatened by direct messages highlighting the negative consequences of unhealthy eating habits.

It has also been shown that you feel more effective and persuasive when messages are framed in terms of losses rather than gains. For example, when talking about the health risks of excessive salt consumption, a loss message such as "*Scientific research shows that a high-salt diet contributes to high blood pressure*" is more persuasive than a gain message such as "*Scientific research shows that a low-salt diet contributes to normal and healthy blood pressure*" (Reit et al., 2010).

Otherwise, those who feel they have little effect are more likely to be persuaded by messages of gain rather than non-loss. For example, research promoting the Mediterranean diet (Carfora et al., 2022b), has shown that gain messages that focus on the positive consequences of adhering to a Mediterranean dietary style (e.g., "*If*

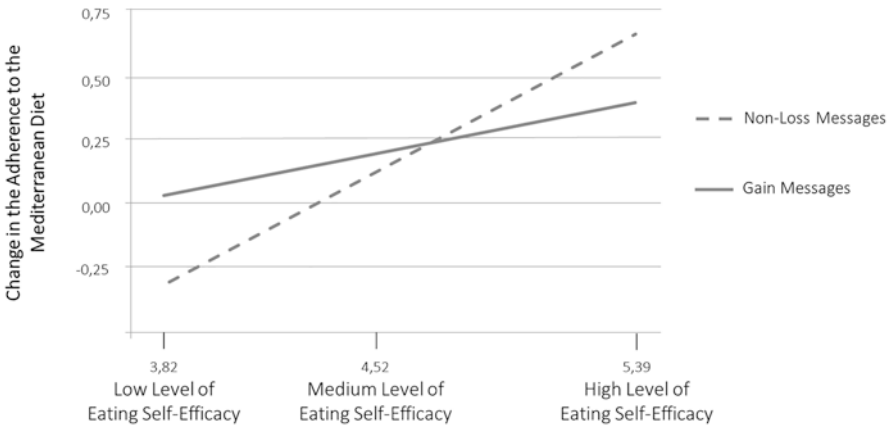

Fig. 9.4 Change in adherence to the Mediterranean diet depending on the degree of eating self-efficacy and the valence of the message. (Carfora et al., 2022b)

you eat three servings of fish or seafood per week, you will increase your ability to concentrate") are more likely to persuade people with low self-efficacy than non-loss messages (e.g., "*If you eat three servings of fish or seafood per week, you will decrease your tendency to be distracted*") (Fig. 9.4).

Finally, people with low dietary self-efficacy are also more persuaded when the suggested messages focus on the long-term benefits that can result from changing eating behavior, whereas they are less persuaded when the focus is on the short-term benefits (Churchill et al., 2014). This is probably because people who are less confident in their ability to control their behavior prefer a longer-term perspective that gives them the time needed to achieve the proposed goal.

9.7 Stages of Change and Past Behavior

As we mentioned earlier, it is difficult for a dietary recommendation to hit the mark if the recipient has not yet developed a positive attitude or motivation in that direction. One systematic way to study this problem is to analyze the interaction between the characteristics of the proposed message and the recipients stage of behavioral change in relation to the topic of the message (see Sect. 6.2). The theories of the stages of behavior change are an important reference point for deciding how to adapt persuasive communication measures to the characteristics of the recipient. As we saw in Chap. 6, the hypothesis is that behavior change processes develop through a sequence of qualitatively different stages (Sutton, 2005). Depending on which stage they are in, people should therefore benefit from targeted communication interventions that support them in moving to the next stage (Weinstein et al., 1998). In essence, an intervention that targets factors relevant to the transition to a later stage is more likely to be effective than an intervention that focuses on factors that

Table 9.3 Messages about the health risks and benefits of eating fruits and vegetables, differentiated by recipients' intentions (Godinho et al., 2015)

Messages about the health risks/benefits of eating fruits and vegetables for people who do not intend to do so	Messages about formulating plans to eat fruits and vegetables for people who do intend to do so
(…) Scientific research has shown that the disease is primarily linked to our lifestyle, and diet is one of the fundamental aspects for its prevention. One in five gastrointestinal cancers can be prevented by eating enough fruits and vegetables (…) (…) Eating fruits and vegetables provides vitamins and mineral salts that perform the crucial function of protecting the body. When you consume the recommended portions of fruit and vegetables, you help to strengthen the immune system, which ensures that you stay healthy and are protected against diseases such as cancer. In addition, a balanced diet rich in fruits and vegetables has a direct effect on the brain, contributing not only to more energy, but also to an increase in positive emotional states and feelings of satisfaction and joy (…)	(…) It is easier to eat five servings of fruits and vegetables every day if you carefully plan how to put this goal into practice (…) (…) To set up this plan, you need to think as carefully as possible about the situations in which you can increase your fruit and vegetable consumption. You should think about three basic aspects in particular: *when* (e.g.: At lunch? At dinner? Between meals, e.g., in the morning or afternoon?); *where* (e.g.: At home? At university? At work? At the supermarket? In cafés?); and *how* (e.g.: By always starting a meal with soup, accompanying the main course with salad or cooked/sautéed vegetables, and ending the meal with fruit) (…)

could theoretically also be relevant to the person, but only if they are in a different stage of change.

A person who is in a pre-contemplation stage does not yet have a firm intention to eat healthily. Targeted communication could then focus on developing or strengthening the intention by changing perceived knowledge, attitudes, or norms (e.g., it could inform about the benefits of healthy eating). Information about the risks associated with low consumption of fruit and vegetable and the benefits of regular consumption are more persuasive, for example, to people who do not intend to eat fruit than to those who do not (Table 9.3; Godinho et al., 2015).

A person who is in the contemplation stage has developed the intention to eat healthier but does not feel able to do so. In this case, targeted communication could provide information on how to develop such a perception of efficacy (e.g., information on how to read labels or prepare tasty and healthy meals) or how to avoid, remove, or overcome the obstacles that prevent this (e.g., information on how to make a shopping list that helps to avoid impulsively buying unhealthy food).

In the case just described, communication is intended to help people turn their intentions into action. A similar goal can be achieved with behavior change techniques such as implementation intentions (i.e., interventions where people are asked to specify plans "if… then… ", Sect. 6.5, Armitage & Arden, 2008). People who intend to change benefit primarily from communication that focuses on the importance of planning and strengthening beliefs in self-efficacy. For example, people who have a firm intention to consume fruits and vegetables benefit from an intervention that encourages them to plan this behavior and think about how to overcome any barriers that might prevent them from doing so (Table 9.3; Godinho et al.,

2015). Moreover, they are more motivated by messages about emotional benefits (Sect. 8.3) framed in terms of not losing (Sect. 8.7), that is, avoiding risks to emotional well-being (e.g., "*If you eat at least two portions of vegetables a day, you will feel less anxious*") than by messages about the same benefits framed in terms of gaining (e.g., "*If you eat at least two portions of vegetables a day, you will feel more relaxed*"). This suggests that people who have difficulty changing a particular behavior are more likely to be persuaded to avoid risks to their well-being than to gain new benefits (Carfora et al., 2021).

In line with the observations on the stages of change, previous behavior is also one of the factors that can cause the recipient to react differently depending on how the recommendation is formulated. When people are not yet practicing the recommended behavior, they are more likely to be persuaded by messages that talk about the immediate benefits of adopting the behavior. This is because they are more motivated to adopt a new behavior if they believe it will bring them immediate benefits. In contrast, if people have already adopted a recommended behavior, they are more likely to be persuaded by messages informing them of the positive long-term consequences of that behavior. This is because the knowledge that they will have long-term benefits in addition to the short-term benefits they are already experiencing is an additional motivation to maintain the recommended behavior. For example, in a communication designed to highlight the negative health effects of consuming certain energy drinks, it was found that those who do not consume these drinks are more likely to be persuaded by messages that focus on the short-term positive consequences, while those who already consume them are more likely to be persuaded by messages that focus on the positive long-term consequences (Kim, 2022).

The importance of tailoring messages to the previous behavior of recipients is also evident when the content relates to the environmental impact of food choices. This is supported, for example, by the results of a study that tested a communication intervention to promote the consumption of plant-based meat, that is, plant-based products that replace meat (Carfora et al. 2022c). After participants were asked if they had already purchased plant-based meat, they were sent different messages depending on the experimental condition to which they had been assigned. Sending the messages took 2 weeks and was done via the PsyMe app (which, as mentioned in Chap. 8, is a mobile app developed by the Catholic University of the Sacred Heart of Milan to support research in the field of social psychology and artificial intelligence). The experimental conditions are described in the following text.

- **Inclusion of plant-based meat in the diet**. Participants received daily messages promoting the inclusion of plant-based meat in their weekly diet (e.g., "*Plant-based meat has a lower environmental impact than animal meat. If you add plant-based meat to your diet, you will protect the environment!*").
- **Replacing animal meat with plant-based meat**. Participants received daily messages promoting the replacement of animal meat with plant-based meat (e.g., "*Plant-based meat has a lower environmental impact than animal meat. If you replace animal meat with plant-based meat in your diet, you will protect the environment!*").

- **Control**. Participants assigned to this condition did not receive any messages, but completed the questionnaire like everyone else at Time 2, 2 weeks after completing the first questionnaire.

The results showed that those who had not yet tried plant-based meat increased their positive attitude toward it when they read the messages about including plant-based meat in the diet and replacing animal meat in the diet. The increased positive attitude in turn motivated these participants to spend more on buying plant-based meat than they had before reading the messages. Those who had already tried plant-based meat only increased their willingness to pay when they heard the messages about replacing animal meat, while their already positive attitudes remained unchanged. In other words, people already eating plant-based meat seemed more willing to accept the advice to consume this product as an alternative to eating animal meat, rather than just as a supplement to their diet.

In summary, both behavioral and psychosocial factors influence how recipients respond to different types of persuasive communication. These factors need to be carefully considered if we are to create information content that is consistent with people's experiences and intentions when reading messages.

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Chapter 10
Digital Communication and Artificial Intelligence

10.1 Automated Communication Strategies

Let us imagine an ideal world where my currently vague intention to go on a diet to lose a few pounds is supported, accompanied, and encouraged by someone who is potentially always next to me, even in moments when the implementation of my intention becomes more difficult, and even when I come home hungry in the evening after a day at work or when I go to the pub to have a drink to distract myself. And this someone next to me manages to tell me exactly what I need, not in a pedagogical or accented tone, but on the contrary in a sympathetic, compassionate, and even funny way. What if that someone was a chatbot, that is, an automated conversation partner that I could access from my mobile phone at any time, if I only wanted? Of course, this seems like a lack of science, but it does not have to stay that way if psychologists and artificial intelligence experts decide to collaborate and develop automated systems that are in the service of people and their well-being.

In this chapter, we will see how the psychosocial models explored in this book, which focus on explaining food choices and how they change, can form the basis of artificial intelligence models for the automated management of personalized interactions by so-called conversational agents or chatbots. We have seen that food choices and changes in them depend on various psychosocial factors that can vary from person to person and interact in multiple ways. Similarly, we have seen that numerous factors contribute to making a communicative intervention effective, and that this effect is highly dependent on whether the intervention fits the resources and needs of the recipient. All these research findings, if properly formalized, can form the starting point for artificial intelligence models that develop automatic interaction systems that can adapt to the characteristics of the interlocutor and thus develop "happy" communication, that is, effective communication that is appreciated by the interlocutors.

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Let us see how the integration between psychosocial models and artificial intelligence models can be done. To do this, let us summarize the main stages of a study aimed at promoting the reduction of red meat consumption through different types of messages, taking into account the different characteristics of the recipients, and using the results obtained to develop an adaptive interaction strategy (Catellani et al., 2022). As you will see, the study draws on many concepts and measures that we have already dealt with in earlier chapters of this volume. The same applies to the research design used, which is based on three phases. In the first phase (Time 1), participants completed a questionnaire to measure the psychosocial antecedents to their intention to reduce (or not) red meat consumption. These dimensions were measured as follows.

- *Attitude* toward reduced red meat consumption, *subjective norm*, *perceived behavioral control*, *intention* to reduce consumption, *past behavior* (these are the dimensions predicted by the Theory of Planned Behavior; see Sect. 2.3).
- *Prevention/promotion regulatory focus* (see Sect. 9.2).
- *Perceived vulnerability* (i.e., perception of likelihood of developing health problems such as stomach cancer or bowel problems) and *perceived severity* of these.
- *Food involvement* (i.e., interest in information and food issues).
- *Hedonic pleasure* derived from the consumption of red meat.
- *Perceived benefits* resulting from reduced red meat consumption and *perceived risks* resulting from excessive consumption.
- Moral disengagement as measured by *diffuse responsibility* (i.e., the belief that it is not beneficial for individuals to reduce meat consumption when others do not), *desensitization* (i.e., the belief that the death and suffering of animals used for food purposes is a normal practice), and *denial of the negative consequences* that excessive consumption of red meat has on the environment, public health, and animal welfare.

In the second phase of the study (*Messaging Intervention*), participants read messages about the consequences of reduced or excessive consumption of red meat. The messages were formulated prefactually ("If... then..."; see Sect. 8.5) and differed in the formulation of the sensitivity of the outcomes, that is, the outcomes were formulated in terms of gain, non-loss, non-gain, or loss (see also Sect. 7.6). Four different subgroups of the participant sample were randomly assigned to one of the four versions of the messages listed in Table 10.1.

Finally, in the third and final phase of the study (Time 2), all participants completed a second questionnaire, originally designed to gauge their reaction to the messages they had read. For example, participants were asked to assess whether and to what extent they had found the news interesting, how thoroughly they had processed it, and so on (for similar measures, see Sect. 7.2). Finally, participants' intention to reduce their consumption of red or processed meat was measured again to check whether the original intention had changed.

The collected data were used to learn both the structure and parameters of a probabilistic predictor model (*Graphical Causal Model*, GCM). This predictor forms the basis for the development of automated interaction strategies using Deep

Table 10.1 Examples of messages framed as gain, non-loss, non-gain, or loss in the context of promoting reduced consumption of red and processed meat (Catellani et al., 2022)

Gain	Non-loss	Non-gain	Loss
If you eat little red meat and cold cuts…		*If you eat a lot of red meat and cold cuts...*	
... you will improve the function of your intestines	... you will avoid damaging the function of your gut	... you will miss the opportunity to improve the function of your gut	... you will damage the function of your gut
… you will improve the function of your heart	… you will avoid worsening the function of your heart	… you will miss the opportunity to improve the function of your heart	... you will worsen the function of your heart
… you would increase the proper function of your arteries	… you will avoid increasing the malfunction of your arteries	… you will miss the opportunity to increase the proper function of your arteries	… you will increase the malfunction of your arteries
… you will improve the health of your stomach	… you will avoid increasing the dysfunction of your arteries	… you will miss the opportunity to improve the health of your stomach	… you will damage the health of your stomach

Reinforcement Learning techniques, that is, techniques that train an artificial neural network to quickly: (a) estimate the impact of the different psychosocial antecedents of food choice; (b) automatically select the most effective messages to promote change according to the characteristics of the recipient. In particular, the predictor makes it possible to estimate the likelihood of effectiveness of each of the different types of messages that can be sent to the recipient.

A graphical representation of the probabilistic model obtained from the data can be found in Fig. 10.1. To make it easier to read the figure, we briefly describe it. The different rectangles in the first column on the left represent the probability that a hypothetical recipient of the messages has a low, medium, or high level of each of the psychosocial dimensions measured at Time 1. Of the many dimensions measured in the first phase of this study, only those that have a high probability of changing intention to eat meat are listed in the column. As these probabilities vary, the intention shown on the right of the figure also changes (intention at Time 2 – intention at Time 1). The change is influenced by the type of message sent to the person in addition to the factors measured at Time 1 (in the top center of the figure: gain, non-loss, non-gain, loss). Finally, at the bottom right, there is a rectangle indicating the benefit in terms of a change in intentions that can be expected from sending the different types of messages. The utility has a positive value if the intention to consume red meat decreases because of contact with the messages. Conversely, the utility has a negative value if the intention to eat red meat increases because of contact with the messages.

If we look at the first column of the figure and go from top to bottom, we first find the dimensions that directly affect the change in intention, regardless of the processing level of the messages read. As you can see, these are (in addition to the intention level measured at Time 1) perceived severity of health risks, diffuse responsibility, and prevention focus. While perceived severity and prevention focus decrease the

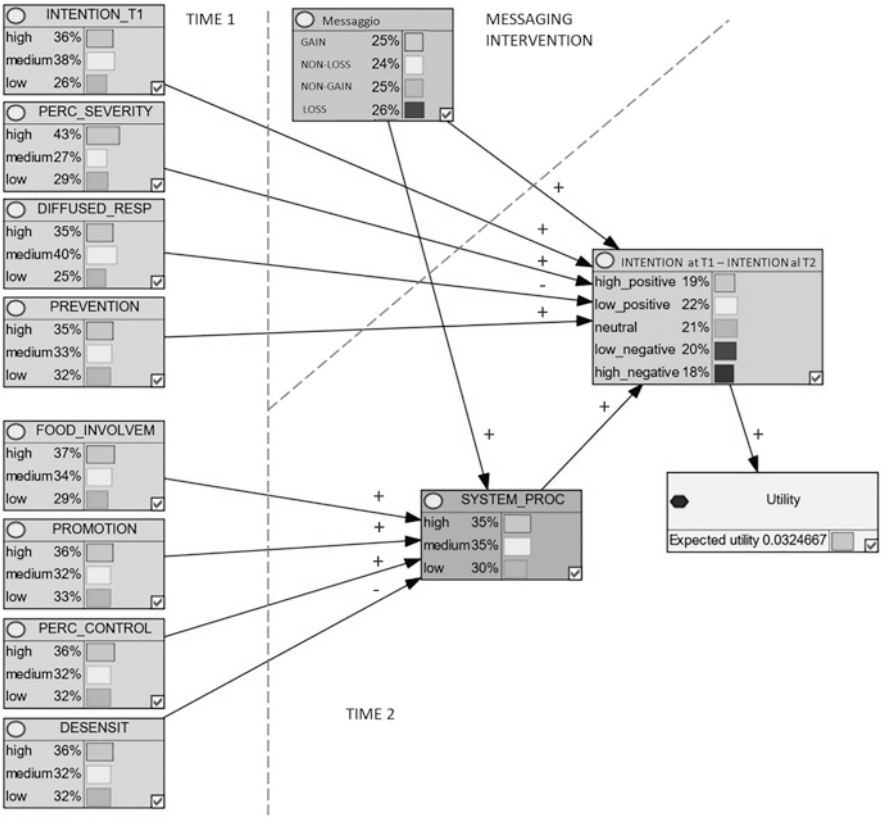

Fig. 10.1 Main determinants and consequences of the effectiveness of the messages to reduce meat consumption, according to the probabilistic model. (Catellani et al., 2022)

intention to eat meat, diffuse responsibility increases this intention. Further down, always in the first column, we find the dimensions that were also related to the change in intention, but in this case by mediating a systematic processing of the messages read. Thus, it has been shown that the more people are interested in nutritional information, place a high value on advertising, and believe that they can control their meat consumption, the more they tend to thoroughly process the messages they receive and change their intention to consume red meat accordingly. The same happens when they are made aware of the consequences of too much meat consumption for nature, health, and animals.

By applying *soft clustering techniques* to the data just described, it was also possible to describe the psychosocial profiles of the people most likely to be persuaded by the different types of messages sent (or by none of them). We describe them in the following text.

- **Gain messages**. Messages that focus on the positive effects of reduced red meat consumption are most persuasive to those who have an average intention to eat meat, a moderate level of prevention orientation, and are very concerned about their health.
- **Non-loss messages**. Messages that focus on the negative consequences that can be avoided by eating less red meat are most persuasive to those who have a low intention to consume meat, are strongly prevention-oriented, and are very concerned about their health.
- **Non-gain messages**. Messages that focus on the loss of positive health effects of overconsumption of red meat are most persuasive to those who always have a medium intention to eat meat, are not very prevention-oriented, but are very concerned about their health.
- **Loss messages.** Messages that emphasize the negative consequences of eating too much red meat are more persuasive to those who always have a high intention to eat meat and are focused on prevention, but who care deeply about their health.
- **All messages.** Those who intend to eat a lot of red meat, who are focused on prevention but who do not care much about their health, will be similarly persuaded by the different messages, regardless of how they are worded.
- **No messages.** Those who want to eat little red meat, who are not very concerned about prevention, and who are not very concerned about their health are more likely to be oppositional, that is, they will not be persuaded by any message, no matter how it is worded. These people are likely to be difficult to convince to further reduce their meat consumption through the recommendations contained in the proposed messages.

In summary, the results of this study pave the way for training an automatic interaction system to use the type of message that is more likely to be successful depending on the specific characteristics of the recipient of the message itself. Through methods such as those described earlier, it is thus possible to combine models of social psychology with machine learning. With the *deep reinforcement* that machine learning provides, we can develop targeted and personalized communicative interventions that can target a very large number of people and motivate and guide them to change based on their psychosocial characteristics (see also Catellani et al., 2021; Carfora et al., 2020).

10.2 Chatbot

The tools that enable us to use automatic communication strategies of the kind just described are conversational agents called **chatbots** (i.e., robots that can chat). *These are advanced forms of automated systems that are able to decode textual information from the sender and respond with meaningful and targeted textual output.*

In the case of chatbots designed to promote healthy eating, a distinction can be made between chatbots that are primarily designed to convey information and knowledge and chatbots that are geared toward more advanced and personalized forms of communication. Originally, the role of chatbots in food communication (as in other areas) was primarily that of a notification assistant, sending text messages to remind people to do something or achieve a goal. Later, technological development has led to chatbots being able to answer frequently asked questions from consumers (the so-called Frequently Asked Questions or FAQs) and refer them to an operator when the interaction becomes too complex. Subsequently, chatbots have also become context-aware, meaning that they can remember previous interactions with a person and take them into account in subsequent interactions.

The main goal of the current development of chatbots is to enable them to build and maintain an effective relationship with the user. Empathy, humor, and self-disclosure are some of the strategies that chatbots can be equipped with to increase the perceived reliability of those who interact with them (Bickmore et al., 2005). If the chatbot is respected and perceived as trustworthy, it is more likely that the relationship established with the interlocutor will be consistent with the purpose for which the chatbot was programmed (Sillice et al., 2018). From this perspective, another quality leap in the effectiveness of chatbot functionality may come from the personalization of its interaction mode, which, as we have seen in the previous paragraph, can be facilitated by the integration of psychosocial models and artificial intelligence models (Kowatsch et al., 2017; Stein & Brooks, 2017; Zhang et al., 2020).

First, as we saw in Chaps. 8 and 9, psychosocial models show that we can increase recipients' attention and engagement by varying the content, valence, and wording of nutrition messages. Consequently, we can influence their cognitive, emotional, and behavioral responses. For example, the chatbot can send messages that focus predominantly on the cognitive dimension (e.g., providing evidence of the benefits of healthy eating; Sect. 8.1) or conversely on the emotional (e.g., arousing fear, guilt, or hope; Sect. 8.2) (Zhang et al., 2020). To profile people for personalized messages, the chatbot can first ask some questions, for example, by measuring psychosocial dimensions such as focus on prevention/promotion or health concerns (Fig. 10.2). Depending on the answers to the first questions, the chatbot selects subsequent questions and adapts the conversation to the characteristics of the interlocutor to increase the likelihood that the intervention will be appreciated and persuasive.

One of the goals in developing chatbots could be for chatbots to be able to autonomously determine when it is appropriate to suggest a change in eating habits to the person based on a set of parameters. The personalized chatbot could know the background of each user, namely, their socio-demographic characteristics, personality traits, and living environment. And that's not all. It could gather additional information about the user's behavior and habits using various wearable sensors. In other words, the basic information can be supplemented with contextual information. In this way, it becomes possible to develop algorithms that produce personalized and thus more effective messages. Understanding the user's background serves to define the chatbot's characteristics and gather useful information that will feed into the

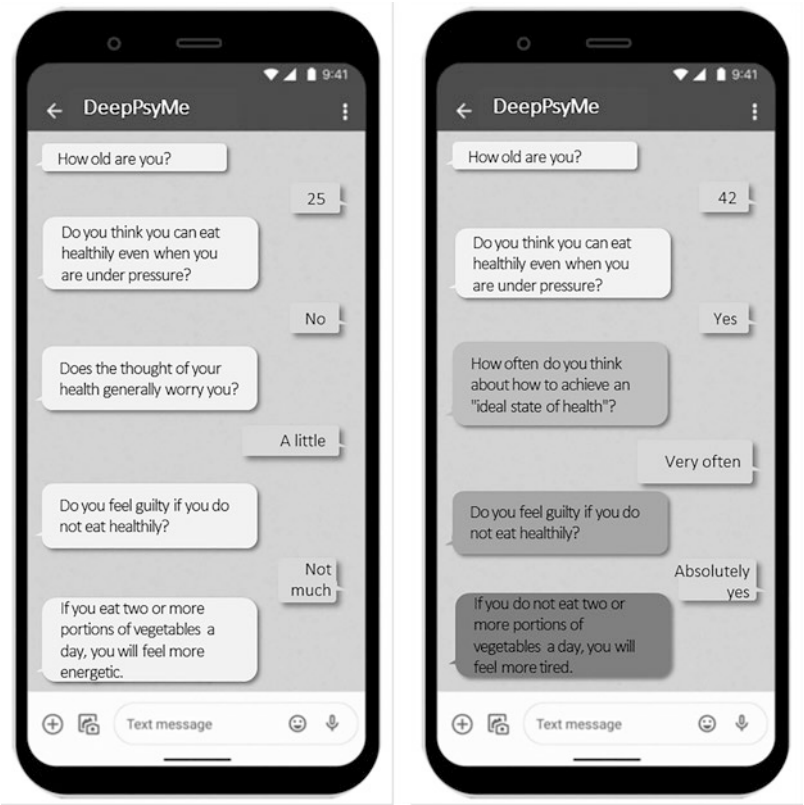

Fig. 10.2 Example of sending personalized messages via chatbots

development of optimized algorithms that guide subsequent conversations. As we have mentioned several times before, personalized interventions are more effective when they adapt the proposed behavior change strategies to the unique background of each user.

For the development of the chatbots we discussed earlier, the development of psychosocial models must go hand in hand with the development of the technology to produce chatbots. Many chatbots are based on *finite state systems*, that is, dialogues predefined by a sequence of steps (Zhang et al., 2020). Such systems are limited because they require the explicit definition of all possible paths that the conversation can take. An alternative technique is to use large databases of real conversations as a starting point for machine learning of advanced conversation strategies. This method has the advantage that different paths can be learned without having to define them explicitly. However, it is not realistic to expect that machine learning, even when done with large databases (which in truth are often hard to find), can fully support the contribution made by technologies and models developed in pragmatic communication and social psychology. Another step forward,

which is the subject of intense research and experimentation, is the possibility of developing hybrid techniques in which machine learning is flanked by and can make use of formalized models, for example, in the form of probabilistic predictors. Contributions such as the one described in the previous paragraph, which start from formalized psychosocial models and translate them into automatic interaction strategies, should be seen in this context.

10.3 The Risks of Digital Communication

Digital and automated communication is not risk-free and needs to be regulated (European Commission 2021). And it is appropriate that everyone involved with chatbots and artificial intelligence systems, both as a developer and as a simple user, is aware of these risks to avoid them. Only in this way will it be possible to make balanced and effective use of the many opportunities that arise from the use of these systems, to which we will return in the next paragraph. Let us now consider some of these risks.

- **Violation of individual rights and freedoms**. The ability to collect, analyze, and share a very large amount of data about people's lives can clash with the legitimate need of every individual to manage the information that concerns them themselves, to know when it is being collected, and to make it available only when they want it. Just think of how remote biometric identification can affect people's private lives in "real time," making them feel constantly monitored.
- **Manipulative use**. If misused, digital communication can be a powerful tool of manipulation that contradicts the values of human dignity, freedom, and autonomy of judgement and violates rights such as those of non-discrimination, data protection, and privacy. Subliminal components could be used that individuals cannot perceive, or vulnerable individuals could be exploited because of their age or physical or mental inadequacies.
- **Lack of transparency and verification**. The algorithms developed by artificial intelligence systems must be transparent, explainable, and regularly reviewed. Only in this way is it possible not only to monitor the effectiveness of the interventions based on these systems, but also to act promptly when, for various reasons, the participants no longer meet the needs of the recipients.
- **Cybersecurity**. Digital communication uses technologies such as the Internet or physical devices that allow it to access databases and other systems. For this reason, digital communication systems could be "backdoors" for "hacker" attacks that can compromise users' data and privacy.

In addition to the risks listed so far, there are others that are not due to malicious intent but can limit the functionality of digital communication because it does not meet users' expectations. Let us take a closer look at two of them.

- **Lack of understanding of context**. Chatbots may not fully understand the context of the conversation they are involved in. This is particularly the case with chatbots whose responses depend on certain keywords that, if not properly recognized, can affect the quality of the speech. In less serious cases, the incorrect or missing recognition of individual word exchanges or the entire conversation can lead to an abrupt interruption of the dialogue. In more severe cases, irrelevant or even inappropriate recommendations may result.
- **Limited usefulness for accessing relevant data**. Often a chatbot can be useful if it is part of a larger ecosystem. For example, if it is to suggest dietary recommendations, it is desirable that it can be synchronized with other relevant data, such as general medical conditions or diet plans already created. This is technically only feasible if it is planned from the beginning in the development of the chatbot.

In order to get a grip on all the risks we have listed, it is necessary, firstly, to consolidate the legislation on the use of chatbots and artificial intelligence systems and put it into practice, and secondly, to work toward making everyone aware of the potential and the dangers of these systems. Only in this way will it be possible to shape digital communication in such a way that is truly at the service of well-being, health, and sustainability.

10.4 The Opportunities of Digital Communication

The greatest opportunity that can arise from integrating the social psychological models of nutrition with those of artificial intelligence is likely to be the promotion of large-scale dietary change that reaches large numbers of people in a short time and at lower cost. This opportunity can be broken down into three main benefits, which we summarize in the following text.

- **Rapid and differentiated profiling**. Thanks to the integration of artificial intelligence systems, it is possible to enrich and speed up the profiling of people (see Sect. 8.1). As we have seen in the first paragraph of this chapter, some characteristics of the recipients, such as their eating habits, a preventive orientation, or their health awareness, are of great importance in responding to messages that promote healthy and sustainable eating. Of course, in real life it is not always possible to have all this data on recipients. However, it is possible to integrate data from the compilation of psychological questionnaires with behavioral data collected via various tools (e.g., fitness trackers) or via the web (e.g., last purchases and places visited) and thus obtain equally effective profiling.
- **Accurate personalization of communications**. The ability to carefully match communication to the characteristics of the recipient is not only beneficial to increase the effectiveness of the interventions, but also to avoid rejection reactions from the recipients (see Chap. 9). The traces we leave online (and of which we should be aware) could be used by a chatbot to personalize messages that

support us in adopting a healthy and sustainable diet. The initiative could come from both us and the chatbot. For example, by asking to receive feedback on the environmental impact of our food purchases. Or by asking to be notified about restaurants that follow a certain protocol for healthy and sustainable cuisine.

- **Continuous data collection**. While social psychology offers theoretical models and proven measures to identify the factors that drive food choices and changes, chatbots and artificial intelligence systems enable the collection of data before, during, and after an intervention to promote healthy eating. This continuous data collection allows intervention developers to monitor and evaluate its effectiveness as it progresses. Furthermore, because the data can be shared with users, they can use it to monitor their behavior and goal achievement, and more generally to receive feedback that is useful for promoting behavior change (see Sect. 6.8).

In summary, the integration of the social psychology of eating and artificial intelligence makes it possible to construct ecological interventions, or interventions that target at the many, in real life and in real time. Interventions that, if done appropriately and consciously, can reduce social inequalities in access to the skills needed to protect and improve ourselves and the environment. For this goal to be fully achieved, the development of new technologies must be done with full knowledge of and respect for people's motivations and needs, and help to make full use of their humanity.

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Index

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