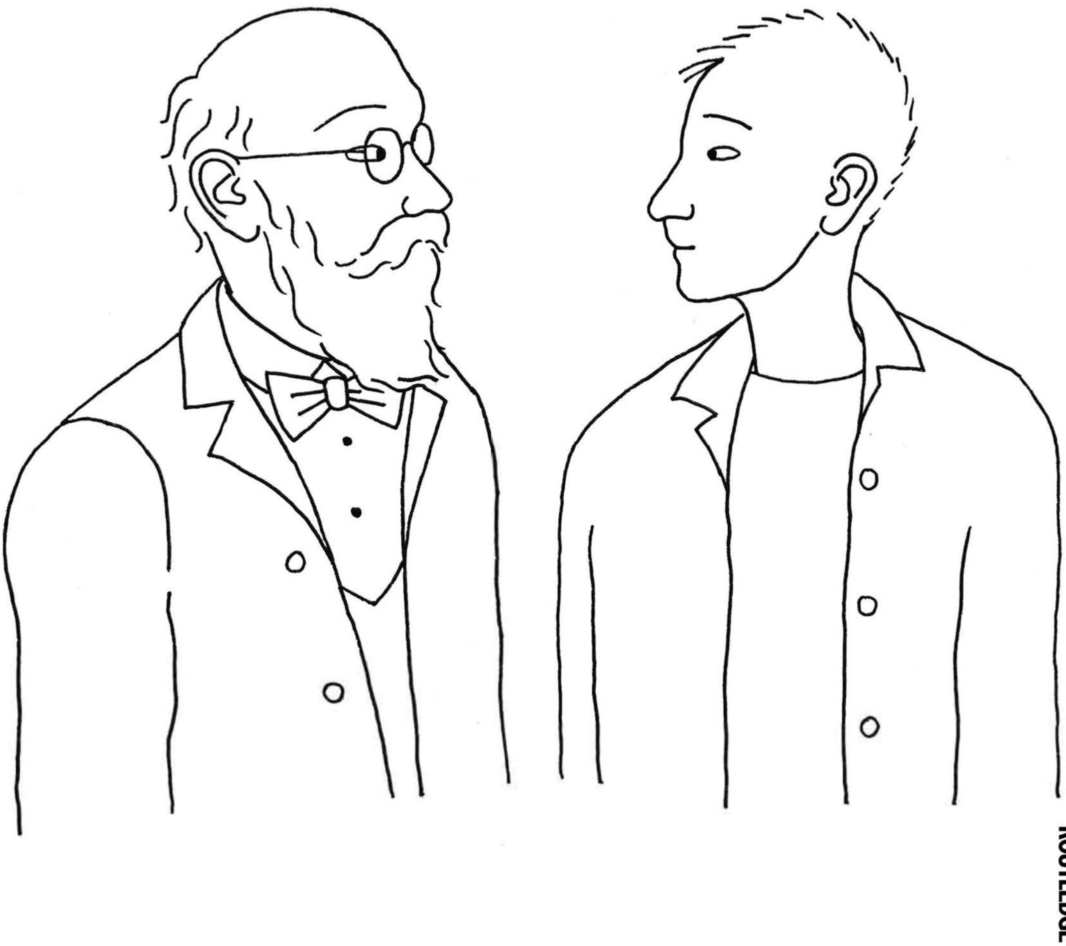
A HISTORY OF PSYCHOLOGY IN TEN QUESTIONS

Lessons for Modern Life

MICHAEL HYLAND

Second Edition



ROUTLEDGE

'Histories of psychology often come in three varieties: as the history of a school of psychology, as a history of the great men, or as the sequence of facts, or discoveries. But science doesn't start with facts, or schools or great scholars. Science starts with "why-questions," with "how-do-we know-questions," with "what-questions," and "is-it-true-that-questions." This is what attracts me in Hyland's approach. He starts with the questions that were asked some time ago by scholars, and with the questions students will ask when they want to know how puzzles and problems of being human became the scientific problems of psychology.'

René van Hezewijk, *Emeritus Professor of Psychology of the Open University of the Netherlands*

'*A History of Psychology in Ten Questions* is an inspired way of covering crucial questions in the history of the discipline. Students often come away from a foundational history course with a confusing hodge-podge of facts and names, but Michael Hyland instead engages the reader by examining the key questions that constitute this fascinating journey from philosophy to science. Without eschewing psychology's major challenges, this volume will enlighten as well as delight those trying to understand the sprawling field that the discipline has become.'

Henderikus Stam, *Professor Emeritus, University of Calgary, USA*

'Having taught history and systems of psychology for many years, I can say that this is the best book on the subject that I have ever read. Besides being eye-opening and informative, it is reader friendly and exceptionally entertaining, including some very clever cartoons illustrating points made in the text. Were I once again to teach a course on the history of psychology and the philosophy of science, this is certainly the textbook I would choose.'

Irving Kirsch, *PhD, Harvard Medical School, USA*

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A History of Psychology in Ten Questions

The second edition of this student-friendly book uses the history of psychology as a backdrop to provide a commentary on key historical developments and modern dilemmas, whilst encouraging readers to think about questions affecting life today.

How do you know if something is true? How do you explain and control behaviour? What is the relation between psychology and physiology? How will artificial intelligence affect humanity? This book answers these and other questions by covering a wide range of topics in psychology, including neuroscience, personality, behaviourism, cognitive and humanistic psychology, qualitative methodology, inheritance and hermeneutics, all brought up to date with recent research. Drawing on the author's own teaching, the book is structured around ten key questions where the history of psychology provides insight into modern life. Accessible for all readers, each chapter is also equipped with a 'Lesson for modern life' and nine 'Essays and discussion topics' so that readers can apply these ideas to their own thought practice. These provide interesting topics for discussion around issues that affect life and society.

This insightful text encourages readers to question their own lives and the wider society by providing an engaging introduction to debates in history and contemporary society. The book is also the ideal resource for undergraduate students of psychology taking CHIPS and other history of psychology modules, as well as for anyone generally interested in learning more about this fascinating subject.

Michael Hyland worked as a lecturer and later professor of health psychology at the University of Plymouth, UK, retiring in 2018 after 44 years of teaching history and theory in psychology.

A History of Psychology in Ten Questions

Lessons for Modern Life

Second Edition

Michael Hyland

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For my grandchildren, Orin, Theo and Elowyn.

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Preface

My aim for the first edition was to produce a book that was informative, interesting and entertaining by making it relevant to modern life. In furtherance of those aims, this second edition includes additional material on the applications and relevance of psychology and raises new questions about life choices and society. There is an increased emphasis on women and cross-cultural issues and there are extra text boxes that provide quirky facts. The second edition also includes additional illustrations that provide commentary through humour.

Although there is a logical sequence to the chapters, each chapter is a self-contained topic. Chapters 2, 3, 4, 5 and 10 cover the main topics in the history of psychology. They provide a narrative account of applied topics in psychology and have less conceptual content compared to the other chapters. Chapters 1, 6, 7, 8 and 9 have a conceptual focus. History is used to introduce concepts such as the logic of science, physiology versus psychology, heredity-environment, personality-uniqueness and intuition-hermeneutics. Modern research findings are included where relevant. The historical and conceptual issues are used as a commentary on topics such as truth, honesty, discrimination, empathy, pluralism, the control of behaviour, well-being, health and happiness. Compared to some other textbooks on the history of psychology, this book has less biographical detail, though biographical detail is included if it relates to dilemmas of modern life (e.g., mental health, work-life balance).

Teaching conceptual and historical issues in psychology (CHIPS) can be challenging because students often come with negative expectations. Students say they have chosen to study a psychology degree, not a history degree. One option is to provide a historical background to each of the different courses in psychology. For example, in this book Chapter 6 provides a background to neuroscience, Chapter 5 provides a background to clinical psychology, Chapter 8 provides a background to personality as well as humanistic psychology, and Chapter 1 provides a background to quantitative methods. Although this approach can create high student satisfaction ratings, the disadvantage is that it fails to give a picture of psychology as whole, as a science with a common thread and repeated problems running through it, rather than a series of separate topics.

When I started teaching the history of psychology as a single course, I did not do so out of choice, and I did not do it well. Over time I learned two lessons. The first is to avoid repeating material that has already been covered. Students who have studied psychology at school will be familiar with Freud, so this topic needs to be refreshed with ideas that students will not have come across previously. The second lesson is that events in the history of psychology and conceptual issues must be made relevant to life today. It is for this reason that the conceptual first chapter on the logic of science also provides an account of conspiracy theories today alongside scientific and ethical malpractice. Relevance is a theme that runs throughout this book. I believe it is possible to provide a course on this topic that students find interesting, but it requires selection and presentation of material that it is of interest not only for the student of psychology but also for the general reader. In my final year of teaching my overall student satisfaction rating was 4.7 out 5. It would have been very low when I started. This book reflects an accumulation of experience from feedback during teaching but, more importantly, the time to reflect after I finished teaching.

For instructors. Different teaching options are available, because each chapter forms a self-contained topic. This book can *either* be used as the textbook for a lecture or seminar course using either all or only some of the chapters, *or* individual chapters can be used to provide historical and conceptual background for other courses. Chapters where there is greater emphasis on conceptual issues are more suited for students who are at least in their second year of a degree course. Each chapter ends with ten 'Essays and discussion topics.' About half of these relate to the content of the chapter; the other half are discussion topics that encourage people to think more widely about issues that affect their life and society. The tenth discussion point in each chapter holds possible lessons for life that can be inferred from the chapter. Students should be encouraged to explain why they agree or disagree with them and whether there are other lessons that can be or should be learned from the topics discussed in the chapter. The discussion topics elicit opinions that can differ between students and therefore form a useful focus for discussion during a seminar course, as well as providing the opportunity to listen to others and understand other people's points of view. Their aim is to encourage students to make decisions for themselves in a considered and informed way, and to explore why people have opinions that differ from their own. This book can be assessed for historical and theoretical content in an exam format, and, to help achieve that aim, multiple choice, content-based questions on a chapter-by-chapter basis are available to lecturers through the publisher.

1

How do you know if something is true?

The logic of science and the psychology of scientists

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How do you know if something is true? That question is particularly pertinent in a world where news is sometimes described as 'fake news' and facts as 'alternative facts.' To know whether something is true it is necessary to have a criterion, a criterion that can distinguish truth from falsity. But how can you tell whether the criterion is true? The answer is that you cannot tell, because if there is a criterion for the criterion, then you don't know whether *that* criterion is true. Knowing whether a criterion is true or not is called the *problem of the criterion*. Philosophers have discussed the problem of the criterion for at least two thousand years, but it has only really mattered in the last 500 years or so. The reason is that, before that time, it was generally accepted that the person or institution in charge knew the truth. Truth was determined by power. Kings and religious leaders knew the truth because they were divinely inspired.

About 500 years ago a different criterion began to be accepted by a group of people who described themselves as scientists. This group of people changed the lives for everyone: gradually at first, but then with increasing rapidity. People who had been using horses for transport and fighting with bows, arrows and swords now had steam engines, and then cars and planes, and people fought with guns, tanks and artillery. The criterion for truth used by scientists is a criterion like any other criterion, and to that extent no different from the criterion of religious truth: it is simply a criterion that people believe in. However, there is one important difference between the criterion of science and the criterion of power. Science is a 'religion' that works. Science changed the world.

Modern science developed due to a particular set of circumstances in one part of the world. It developed during the eighteenth and nineteenth centuries in Europe, and the power provided by the technology of science enabled European countries to conquer other countries. Among the European nations, Britain was foremost in science and technology, and this advantage led to the British Empire. Why did it happen? Scientific development flourishes when anyone can go and seek new knowledge. Science is prevented when knowledge resides in a single authority, whether religious or secular, and where this single authority controls what is believed to be true or false. The authority of the Church was diminished in England when Henry VIII broke from Rome. The beheading of Charles I and the 'glorious revolution' of 1688 led to the diminished authority of the Crown and the emergence of a powerful parliament. Monarchy and religion were both weakened. Britain in the eighteenth and nineteenth centuries was governed by parliamentarians, not those who wanted to preserve the status quo, and the parliamentarians promoted science to further their purpose of making money through new enterprises.

During the Middle Ages, the Arabic countries were preeminent in science and mathematics. The words 'algebra' and 'algorithm' both derive from Arabic. We use Arabic numerals. However, a strong religious authority inhibited the development of science in these countries leading to the exploitation of Middle Eastern countries by the West in the nineteenth and early twentieth centuries (Lewis, 2002). Gunpowder was invented in China in the ninth century and, during the following five centuries, China produced art and ceramics far in advance of anything produced in the West. Ancient Chinese society was centrally controlled by the court that surrounded the emperor. Science did not develop. Many people in China today resent the way they were treated by the scientifically superior and therefore more powerful Europeans in the past. Science flourishes with intellectual freedom – something that dictators should note!

Science and responsibility

Science is the most powerful 'religion.' With great power comes great responsibility: power does not always create a better world for humanity. Scientists cannot escape that responsibility, but often have no control over how their inventions are used. When Einstein learned that German scientists were working on an atomic bomb in 1939, he wrote to President Franklin Roosevelt and his letter was instrumental in setting up the Manhattan project and the bombing of Hiroshima and Nagasaki. Einstein subsequently regretted writing that letter because the German scientists failed to create an atomic bomb. Some believe that these two bombs, despite the terrible loss of life, saved lives, as many more lives – on both sides – could have been lost if America invaded mainland Japan and won a war of attrition. There is an alternative view. Before the bombs were dropped, Japan knew it was losing and offered a conditional surrender. The condition was that the Japanese emperor could remain and not be prosecuted. President Truman rejected this offer, dropped the bombs, and Japan then offered unconditional surrender (Alperovitz, 1995).

Was Einstein right to write that letter? How might the atomic bomb have developed if Einstein didn't write that letter? Was Truman right to drop the bomb? Do winners rewrite history?

It is an inescapable fact that science works in a way that other criteria for knowledge do not. So, in this chapter, the criterion of science will be accepted as a useful criterion, a criterion based on empirical knowledge. The criterion of empirical knowledge is based on logic. This chapter starts with a brief discussion of logic.

Logic

Imagine you have a pack of cards face down in front of you. You take the first card from the pack, and you find that it is the ace of hearts. Let me explain, in case there is any doubt, that this is an ordinary pack of cards, and there is only one ace of hearts in the whole pack. Now, consider the two following statements

The next card you draw will be the ace of hearts.
The next card you draw will not be the ace of hearts.

You, the student, will know straight away that the first sentence is false and the second sentence true, and you know this without having to look. You know this without empirical evidence. The reason is that you are applying a logical rule. The logical rule is this: something cannot be in two places at the same time.

Logic is based on the application of rules, the rules of logic. There are many different logical rules, and only a few will be discussed here. However, students will already have come across logical rules in statistics. Null hypothesis testing assumes that a hypothesis is either true or false – but not both true *and* false at the same time. Statistical tests give the probability that a hypothesis is not true (e.g., two groups are not equal); statistical tests apply the rule that a hypothesis can be either true *or* false, but not true *and* false. The process of science is a logical one; it follows accepted rules.

What is the logic of science?

What is the logic of scientific enquiry? Philosophers and historians of science observe what scientists do and provide an answer, but that answer has changed over time. In the nineteenth century the view was that science was based on the *logic of induction*. In the twentieth century the view was that science is based on the *logic of deduction*. Both types of logic will be examined separately before a psychological analysis will show how both types are used in science.

Induction and inductive laws

The logic of induction assumes that general laws can be 'induced' from facts, or, to use the more technical term, singular occurrences. Here is an example of how it works. Suppose you are travelling round the country, and you see a white swan. The observation of the white swan is a singular occurrence. You go a little further and see another white swan. You keep on travelling seeing one white swan after another until you are ready to induce a general law:

> All swans are white.

The rule of induction can be summed up as this:

> If something has been observed to occur regularly in the past, the same will occur in the future.

Inductive rules are therefore useful for predicting and controlling the world in which we live. Inductive rules make practical sense.

In the example of the swans, induction has produced the statement 'all swans are white,' but is this statement true? In any group of psychology students, there will be some who know that not all swans are white – swans in (or originating from) Australia are black. So, after observing some black swans, it is possible to conclude that the original law – 'all swans are white' – is false; it is now possible to write a new statement:

> All swans are either black or white.

Again, it is possible to ask: is it possible to prove this statement true, in the sense that is known to be 100% true? The answer is no. It can never be proved with 100% certainty that all swans are either black or white as there may be some hiding away somewhere in the undergrowth that are not black or white. You may be interested to learn that the statement 'all swans are black or white' is in fact false. The reason is that in a far-away galaxy, on the planet Zog, there is a group of swans that are pink with blue spots. You don't believe me? You say they are green? No one can tell whether the swans on the planet Zog are green or pink with blue spots. You cannot be sure that there are no pink and blue swans any more than I can be sure that there are.

OK, so now it is possible to generate another rule:

> Some swans are white.

This rule can be proved true, but it cannot be proved false. The same applies to the following statement:

> Some swans are green.

It is always possible that there are some green swans hiding away somewhere, not necessarily on the planet Zog, so this statement can never be shown to be false.

ILLUSTRATION 1.1 Naughty green swan hiding from scientists on planet Zog.

From a psychological perspective, the statement that 'some swans are white' is a lot less interesting than the statement 'all swans are white.' Imagine being told this:

> After careful consideration and observation, I have concluded that it sometimes rains in England.

This conclusion would be true as well as being falsifiable, but it is also obvious and therefore uninteresting. Thus, the type of inductive generalisation is important. One criticism of the assumption that science is based on induction is that scientists do not collect facts randomly. They collect the facts based on 'ideas' about what is interesting. The collected facts should be important or interesting in some way. 'Some swans are white' is a lot less informative than 'all swans are white' – even though the latter is false.

Prediction and explanation

Inductive rules *describe* what happens in the world in which we live. They do not *explain* what happens. They describe the 'what' but not the 'why.' Because these rules describe regularities in things that happen, they can be used to predict the future. However, the prediction is limited to the rule of what has happened before. Explanations will be described in the next section and they enable the prediction of things that have not happened before. The early history of psychology was largely one of induction – of finding regularities but not providing explanations. The later history is one where greater emphasis is placed on explanation.

The logic of deduction and hypothesis testing

Karl Popper (and others) (Popper, 1935/1992, 1963) argued that the logic of science is not based on induction. Even when scientists collect facts, they don't do so randomly. Data collection is always based on a hypothesis or *conjecture*. Instead of science being based on induction, Popper suggested that the logic of science was based on deduction.

In science, deduction is the process of making a prediction based on a theory. The theory *explains* the regularities in things that happen. Again, it is best illustrated with an example. Instead of starting with an observation, let us start with a theory: the theory of gravity. It is possible to deduce from the theory of gravity that, if I let go of my keys, they will fall to Earth. This prediction is of a singular occurrence or fact. The next step is to test whether the singular occurrence, predicted by the theory, occurs. I hold out my hand holding my keys. I let the keys go. The keys fall, showing that the prediction of the theory is true.

Deduction is a logical rule that can be summed up as this:

> Based on these theoretical assumptions the following events will happen.

Has the simple fact of my dropping the keys proved the theory of gravity? The answer is no. Even if I keep dropping my keys and collect a sizeable pool of data supporting the theory, the theory of gravity can never be proved to be true, because there is always an alternative explanation. In fact, the reason that keys keep falling to Earth is nothing to do with this strange thing called gravity. There is a much simpler explanation. It is caused by a gravity monster who sits at the centre of the Earth and waves its tail. Whenever the gravity monster waves its tail, it attracts objects to its tail. That is the real reason why things fall to Earth. And the gravity monster is always waving its tail. Or is it something else?

The reality is that when data confirm a theory – i.e., when singular occurrences are consistent with the prediction of a theory – it is always possible that the same data can be explained by another theory. It is always possible that some data will be found in the future that cannot be explained by the theory. Therefore, theories can be confirmed but never proved to be true. Data do not *prove* theories. Scientists try to rule out competing hypotheses by setting up experiments where the competing hypotheses make different predictions. In principle, it takes only one observation that cannot be explained by the theory to show that a theory is false. Of course, as more and more data of different kinds are found to support the theory, the more the theory is corroborated by those data. So, some theories can be well confirmed, but they can never be proved to be true.

Popper suggested that science proceeds through a series of 'conjectures and refutations' – which is the title of one his books (Popper, 1963). Scientists have a hypothesis or conjecture. They test the hypothesis and for a while the data confirm (but never prove) the theory. Eventually data are found that falsify the theory and so it is necessary to develop a new conjecture or hypothesis. Science proceeds by a series of conjectures and refutations; each time the conjecture becomes 'more true' than the conjecture before. In practice, scientific advance is not quite the elegant process suggested by Popper. Disconfirming evidence usually leads to changes in, rather than the rejection of, a theory, or simply rejection of the disconfirming evidence.

The key difference between the earlier inductive view of science and the deductive/falsification model proposed by Popper is that the latter involves theories, and theories provide explanations as well as predictions. The theory provides an explanation of why something happens. The explanations have one key advantage over predictions based on inductive generalisations. They allow novel predictions. The ability of theories to make novel predictions

Science and proof

There is a common fallacy that science proves things. Science never proves anything. There is a belief that science is about certainty. Only logic provides certainty. True scientists accept their fallibility. The aim of science is to establish truth but whether it is induction or deduction, the truth is always uncertain. Doubt is a scientific virtue. Newton developed a mathematical theory to explain the relationship between force, mass and velocity. Newton's theory explains many things – including the path of a tennis ball and the orbits of planets. Everyone was so convinced by this theory, and the way they predicted things accurately, that they became known as 'Newton's laws of motion.' However, when mass becomes very large or when it is very small, Newton's laws no longer apply. Einstein predicted that space was curved by mass, a theory first tested by observing the position of the Sun during an eclipse. Other theories of classical physics have been shown to be false by quantum mechanics. Of course, theories of classical physics are true in the sense that they apply under most conditions, but the fact that exceptions exist shows that they cannot be treated as the universal laws they once were.

is not something that is automatic. Humans are needed to make the novel predictions. Science is a creative activity involving the insight of people both in creating the theories and in the application of the theories for new predictions.

Metaphysics versus science

Popper used his idea of conjectures and refutations to provide a logical criterion for science. Logic is not the only criterion for defining science. It is also possible to define science in terms of social convention. There is a social convention that scientists are those people perceived by others as scientists, for example by wearing white lab coats. Although the social criterion for science is often used in everyday life, it will not be explored here. Popper's criterion was based on the application of rule – i.e., on a logical rule. Popper's criterion of science is this:

> Scientific statements are those that can be shown to be false through observation.

> Statements that cannot be shown to be false through observation are not scientific statements but metaphysical statements.

This criterion, known as the criterion of falsifiability, distinguishes what Popper called science from metaphysics. Metaphysics, according to Popper, consists of statements that cannot be shown to be false through observation, and therefore are outside the realm of science.

There are a number of different types of statement that cannot be shown to be false by observation, and one of these has been presented already. The statement 'some swans are green' cannot be shown to be false through observation, whereas the statement 'all swans are white' can be shown to be false. The latter sentence is therefore a scientific statement – but false – whereas the former is not even scientific according to Popper's criterion. There are many types of statement that are non-falsifiable. One type relates to religious beliefs. Consider the following statement:

> God exists.

What kind of evidence is there that God does not exist? It is possible to cite miracles and other kinds of evidence suggesting that God exists, but there is no type of evidence that could prove – i.e., show with 100% certainty – that God does not exist. So, the statement that 'God exists' is therefore unfalsifiable, and the statement is metaphysical rather than scientific. It is also, note, impossible to falsify the statement that 'somewhere there are swans with pink spots on a green background.' Statements that, on logical grounds, cannot be shown to be false are not scientific.

Science and religions

Religious beliefs are metaphysical beliefs and therefore outside the realm of science. Some scientists are religious and believe in God. Some scientists are not religious and do not believe in God. Some scientists (and some psychologists) study how people practise and believe in religion. Some scientists believe that religion is a misleading delusion (Dawkins, 2006). Discussion of these different views is beyond the remit of this book but consider the following. Other people's beliefs do not affect you, only their behaviour does. What matters is not what people believe but whether they are kind. Scientists can be kind or unkind like anyone else.

Falsifiability and the strength of prediction

Popper makes one additional point in relation to his criterion of falsifiability. The degree of falsifiability determines the *strength* of a theory. Again, an example will illustrate how this works. Imagine that you are in England (where it rains a lot) and you want to do your washing and hang it on the line to dry. Consider the following two statements:

> It will be dry on one day and only one day next week.
> It will be dry on Wednesday and only on Wednesday next week.

Both statements are falsifiable. If it doesn't rain or if it rains on more than one day, then both statements are false. Both are scientific rather than metaphysical. Both show that washing is possible on one day next week. But the second sentence is a lot more useful in helping you decide when to do your washing. The second sentence is *more* falsifiable, in the sense that it is more likely to be wrong if weather is random. The second sentence gives a more powerful prediction.

Popper distinguishes between strong theories that are highly falsifiable and weak theories that are falsifiable in principle, but difficult to show wrong. Note that the degree of falsifiability has nothing to do with whether the theory is false or not. Evidence for the truth of a theory is determined through observation. The strength of a theory is evaluated without observation. The degree of falsifiability or strength of the theory is an 'internal' property of a theory and not an 'external' property. The strength of a theory can be determined independently of the observation that tests the theory. Strong theories are easily shown to be false, but if they are not shown false then they provide more useful information than weak theories that are less likely to be shown false.

Some theories are falsifiable but so weak – so difficult to show false – that they are not particularly useful. The strength and therefore usefulness of psychological theories is something that will be discussed later in this book. One of the criticisms against Freud's theory, although falsifiable, is that it is a very weak theory (see Chapter 5). Others have argued that his theory is in fact unfalsifiable, and therefore metaphysical. Both arguments cannot be true, but they certainly need consideration in relation to both psychoanalytic and other theories in psychology.

Prediction and explanation

Theories explain why things happen. They do this by introducing 'explanatory concepts' that then explain the regularities that have been observed. Explanatory concepts are also known as theoretical terms. In physics, examples of theoretical terms include molecules and electrons. In psychology, examples of theoretical terms include memory and cognitions. The theoretical terms explain why things happen in the way they do. However, explanatory terms can also be used to predict new observations. So, theories enable scientists to predict – and therefore control – the world they know.

There is an important difference between inductive rules and theories whose truth has been tested by deduction and data. Inductive rules enable scientists to predict what will happen in the future so long as it has happened in the past. Theories enable prediction of things in the future even if they have not happened in the past.

One way in which theories differ is whether they make quantitative predictions. Compare the following two statements:

It will rain tomorrow in my village.
Two inches of rain will fall tomorrow in my village.

The second statement makes a stronger prediction because it makes a quantitative prediction. If one inch or three inches fall, then the prediction is false. Some sciences make quantitative predictions, some make (on the whole) qualitative predictions. Psychology and medicine fall into the latter category. Physics and chemistry in the former. Theories of physics are typically represented by an equation. For example, Boyle's law predicts *how much* a gas will expand when heated. Hooke's law predicts *how much* a spring expands with different weights. In medicine, theories typically predict change but not the amount of change. So, for example, antibiotics reduce infection, but there is no prediction about the rate of reduction of infection. In psychology, research shows that childhood trauma leads to behavioural problems, but not the quantitative relationship between trauma and behaviour.

Quantitative predictions in psychology

Although quantitative predictions are very much in the minority in psychology, they do exist – for example, in psychophysics (see Chapter 2, Weber's fraction and Fechner's law), in behaviourism (see Chapter 4, Hull's theory), and in mathematical psychology (see Chapter 4, Luce's choice axiom).

Theories that make qualitative predictions – such as those in psychology and medicine – use statistics to test whether the qualitative prediction occurs or not. As an example, imagine a qualitative prediction that students' exam performances are enhanced by a mind-altering drug. A study is conducted where students are randomly assigned to receive the drug or a placebo and their performances are compared, statistically, to see if the probability of the drug and placebo having the same effect is sufficiently low (e.g., $p < 0.05\%$) for the alternative hypothesis to be accepted. Statistics are used to test whether a difference occurs or not, not to test the degree of difference.

Effect size

The degree of difference is indicated by the statistic called *effect size*. A small effect size between two groups is more likely to be found to be statistically significant if the sample size is large than if it is small. Hence, studies that employ very large samples will reveal effects that are statistically significant but may have little practical significance. Guidelines for psychological journals increasingly require authors to quote effect size along with statistical significance. This information is useful as it provides quantitative information.

Induction and deduction together: the psychology of scientific discovery

To sum up so far: inductive rules are created from data; the logic of deduction is used for testing theories. One view puts the primary unit of science as data, the other puts the primary unit of science as theory. Both views can be supported by examples from the history of science. As a general rule, inductive inference is more common in less developed or historically older sciences. The science of the nineteenth century was a science where there was a focus in facts. Science was all about establishing facts. Explanatory theories – from which deductions can be made – are a feature of more advanced or more recent sciences (Royce & Powell, 1983). Since the twentieth century science is more focused on theory. Modern science is science where hypotheses are conjectured and then tested with data. Conjecturing (i.e., hypothesis generation) is therefore a central part of modern science.

Popper was a philosopher rather than a psychologist. He didn't provide an answer to the question, where do the conjectures or hypotheses come from? Hypotheses must come from the minds of scientists. So how are hypotheses formed?

Where do theories come from?

The following is a quote from Popper's *The Logic of Scientific Discovery* published in 1935 (Popper, 1935/1992):

> The question how it happens that a new idea occurs to a man – whether it is a musical theme, a dramatic conflict, or a scientific theory – may be of great interest to empirical psychology; but it is irrelevant to the logical analysis of scientific knowledge.
>
> (p. 7)

The story of the discovery of penicillin illustrates the creative process of hypothesis formation and the relationship between theory and data. Alexander Fleming, a Scottish physician and researcher, was growing bacteria on a petri dish. He came back from a two-week holiday in 1928 to find that one of his dishes had been contaminated with what looked like mould, and no bacteria were growing where the mould had contaminated the petri dish. One possible reaction would be to say "Bother, my petri dish has been contaminated." Instead, Fleming made a connection with something outside his experiment. He hypothesised that the mould had killed the bacteria and the mould could therefore have therapeutic properties. This hypothesis was tested initially by Fleming and then by others. The stage of data collection took time. It wasn't until 1942 that the first patient was successfully treated with penicillin.

In this example, there was a chance discovery that created an observation. Fleming then formed a mental link between that observation with other knowledge that he had, but was irrelevant to the initial experiment. The creative process is one of forming links between ideas, of showing how existing ideas can be combined in novel ways to form entirely new ideas. Creativity is

Where do rules of logic come from? For curious students only

Science is based on the logical rules in induction and deduction. Are logical rules independent of observation? Consider the example used at the beginning of this chapter where it was possible to tell that the next card in a deck of cards was not an ace of hearts if the ace of hearts had already been drawn. In everyday life we observe that something cannot be in two different states at the same time. This rule can be applied to the state of being alive versus that of being dead. An animal is either dead or alive, but not both. The rule is based on observation. However, in the world of the very small, the world of quantum mechanics, something very odd happens. The principle of quantum superposition makes it possible for something to be in two different states at the same time. The example often used to illustrate this principle is Schrödinger's cat. A cat is placed in a sealed box where at some random point in time a cyanide capsule will be released, and the cat will die. Common sense tells us that *before* the box is opened, the cat must be either dead or alive. The principle of superposition says that before the box is opened the cat is both dead *and* alive. Niels Bohr, one of the fathers of quantum mechanics, said: "If you are not shocked by quantum mechanics, you don't understand it." If we experienced the world like it is in the quantum world, perhaps our logical rules would be different! So logical rules are based on observations about the universe in which we live. Science is based on observation, but the rules of science come, ultimately, from observation as well.

a synthesis, and in science the synthesis can come from many different sources. Creative ideas arise from data that are recently available, past data, past theories, past lived experience. The discovery of new theories is not a mechanical process that can be easily taught. New theories come by thinking, not by doing. Testing of theories is also a creative process because testable predictions require a person to deduce a prediction. Scientific development is not a purely logical process!

Data and theory are inextricably linked in the minds of scientists to the extent that inductive and deductive inference both feature in scientific discovery. An understanding of data helps determine what questions are asked, but the questions that are asked also depend on the scientist's prior knowledge and understanding of what is important and what is not. The modern view is that theories rather than data are the basic unit of science, but the development of those theories, and not only the testing of theories, is always linked to observation, observation that may occur over many years of a scientist's lifetime.

In summary, science has both rigorous methodology and intuitive creativity. In the history of psychology, the desire to be scientific in terms of methodology has sometimes been at the expense of intuitive creativity. Methodology without creativity does not provide solutions to human problems.

Metatheory, research programmes and paradigms

The story so far goes like this. Scientists test their theories with data. The theories are constructed based on a mix of prior theories and data, including chance observations, all informed by a lifetime of observation not necessarily related to science. It is observation and thought that enable scientists to make the intuitive guesses or 'conjectures' about how the world works.

The story continues like this. Although theories are tested by data, all theories are based on 'metatheoretical assumptions' that are never tested. These assumptions are not tested because they are (or they are assumed to be) so obvious that everyone thinks they must be true. Two historians of science have written about these assumptions and their work will be described below. They are Imre Lakatos (Lakatos, 1970; Lakatos & Musgrave, 1978) and Thomas Kuhn (Kuhn, 1962).

Lakatos' concept of research programmes

Science builds on previous knowledge. Read any psychology journal article and you will find a list of papers at the end. The article you are reading builds on previous research and the introduction and discussion sections make the relationship with previous research explicit. In fact, if authors fail to reference any earlier research, then they are unlikely to get their papers accepted. Furthermore, the article you have selected to read is likely to be cited by other articles that are published subsequently, and those subsequent articles will also cite articles cited in the article you have selected. Science builds on the past.

Lakatos suggests that, within a discipline, there are several strands of science building what he calls 'research programmes.' The research programme is based on assumptions. Lakatos calls these assumptions 'a positive heuristic.' The word *heuristic* means a useful tool for discovery. The assumptions or positive heuristics define what research questions should be asked within the research programme and how to go about researching those questions. The positive heuristic defines the underlying assumptions of the strand of research that makes up a research programme.

For example, in the research programme of 'early childhood trauma and later poor health,' the research programme defines the area of interest as that linking early trauma of varying kinds with later health of varying kinds. The research programme also defines the different methodologies that investigate the underlying hypothesis that early child trauma has negative consequences.

Lakatos distinguishes two types of research programme, those with a progressive problem shift, where theory precedes data, and those with a degenerating problem shift, where data precedes theory. The relationship between these two types of problem shift, and inductive versus deductive approaches to science could not be clearer. In the progressive problem shift programme, research is based on hypotheses that are tested. Research follows the conjecture and refutation approach suggested by Popper, and the creative part of theory construction comes before data collection. In the degenerating problem shift, research is based on careful data collection after which theory is generated – the approach suggested by the earlier inductive approach to science. The progressive problem shift relies on the creativity of scientists, the degenerating problem shift on their methodological rigour.

Lakatos was a historian of science. He provided evidence that the progressive problem shift tends to produce better results than the degenerating problem shift (and hence his choice of terminology). In the progressive problem shift, the discovery of new data doesn't lead to outright rejection of the theory but rather modification that is then tested with more data. The theory progresses with the data. The degenerating problem shift gets stuck in problems of methodology because the focus is on examining data without developing a new theory.

Stages of a scientific discipline

Joseph Royce (Royce & Powell, 1983, p. 19) suggested that sciences go through four stages of development: "(a) prescientific philosophic speculation, (b) empirical exploration, (c) sophistication of methods of controlled observation and quantification, and (d) theoretical formalization and unification." Royce felt that psychology was between (b) and (c) – but psychology may have moved on since 1983.

The distinction between progressive and degenerating problem shifts is based on whether research is theory-led or data-led. This distinction is not a binary one but a continuum. In evaluating research in psychology and other disciplines, the question to be asked is: to what extent is the research theory-led versus data-led?

Are there examples of progressive and degenerating problem shifts in psychology? In Chapter 4, I suggest that one of the reasons for the decline of behaviourism was that it became a degenerating problem shift. Behaviourism was largely data-led. Lack of theoretical development and decline characterises other types of early psychology, such as the early German psychology of Wilhelm Wundt (see Chapter 2). By contrast, theory plays a much greater role in cognitive psychology, in neuroscience, and in the more recent connectionist psychology (see Chapter 10).

Theoretical physics is a respected part of physics where speculative theory plays a major part in empirical research. The Large Hadron Collider was built at a cost of more than £6 billion to test theories developed by theoretical physicists. Theoretical psychologists lack that status in psychology. The Center for the Advanced Study of Theoretical Psychology was founded by Joseph Royce (1921–1989) in 1966 at the University of Alberta, Canada, and closed in 1990, shortly after his death. Royce's vision was to create the psychological equivalent of theoretical physics. The International Society for Theoretical Psychology, founded in 1985, has conferences every two years, but much of the focus is on critiquing mainstream psychology rather than presenting new theories. Royce's vision of a highly respected and influential theoretical psychology has not been achieved – but psychology is still a young science compared to, say, physics. The students of today will determine the psychology of the future.

Kuhn's concept of scientific revolutions

Kuhn (1962) uses the term *paradigm* to describe the metatheoretical assumptions that underpin theories. According to Kuhn, sciences go through stages. When a science first develops there are often many competing metatheoretical assumptions. Kuhn calls this the pre-paradigmatic stage, because no paradigm has become universally accepted. Then one or other of these competing sets of assumptions becomes dominant, and the science has its first paradigm. The paradigm defines the kinds of theories that can explain the phenomena under consideration, as well as defining the kinds of phenomena that require investigation.

Once the paradigm is settled, there is long period of normal science when scientists investigate the theories within the paradigm. At some point in time, the original assumptions are challenged in one way or another to the extent that they are replaced by another set of metatheoretical assumptions – i.e., new types of theory and things to be investigated. This shift from one set of assumptions or paradigms to another set of assumptions or paradigms is called a paradigm shift. Researchers then work on the new paradigm until that paradigm is replaced by yet another. Science therefore proceeds by a series of paradigms and paradigm shifts.

When scientists are working within a paradigm, they are working within what Kuhn calls *normal science*. Normal science consists of a series of 'mopping up' studies to find out the answers to things that require an answer as defined by the paradigm. When a paradigm changes, then this is called a *scientific revolution*. So, science proceeds by a series of periods of normal science followed by a short scientific revolution and then a new period of normal science.

Why do new paradigms occur? There are several reasons, but a common one is that there is a body of data that simply cannot be explained by any of the theories using the original paradigm. A good example of this is the paradigm shift that led to the development of quantum mechanics. Light sometimes behaves as though it were a wave. It sometimes behaves as though it were a particle. None of the explanations of classical physics could explain why light could behave in different ways at different times. The theories of quantum mechanics provided the answer.

Kuhn's paradigms and Lakatos' research programmes are similar. Both refer to metatheoretical assumptions. The difference is that the paradigm involves a more fundamental sort of assumption than the programme. However, the difference between Kuhn and Lakatos is best thought of as a continuum, rather than a dichotomy. The term *paradigm* is often used for units of research activity that Lakatos would describe as a research programme. The term *paradigm* will be used here in this more general sense. Lakatos' distinction of theory-led versus data-led research applies to both.

The psychology of scientific revolutions

One view is that science proceeds through the falsification and therefore improvement of theories. One might imagine that scientists are therefore happy for their theory to be proved false. Nothing could be further from the truth. When a scientist develops a theory and then tests it, they will be hoping that the results come back confirming the theory. Scientists *like* their theories. They like to find evidence to *support* theory, not find evidence that shows that they are wrong. Falsification of theories in psychology is surprisingly rare.

Falsification in psychology

Students reading this book might like to ask themselves what psychological theories have been shown to be false. The issue of falsification is related to the crisis of replication described later in this chapter.

However, when it comes to research paradigms, scientists are even more protective of what they have assumed in the past to be true. No one wants to find that they have invested years of their careers carrying out research – or practice – based on assumptions that are incorrect. When paradigm shifts are proposed, there can be strong resistance from scientists working in the older paradigm. New paradigms are met with two kinds of response: enthusiasm from those who believe that the new paradigm provides a novel solution, and hostility from those who don't. If the latter camp is stronger, the new paradigm takes longer to become established.

The development of the paradigm of modern medicine is a good example of how people can respond to a change in paradigm. Since the time of the Greeks till the middle of the seventeenth century, medicine was based on assumptions that originated with Hippocrates. Illness was believed to be caused by an imbalance in four 'humours' that flowed round the body. The humours (in case you were wondering) were black bile, yellow bile, blood and phlegm. An alternative paradigm became available during the Middle Ages, as clockwork and mechanical systems became more common. The body is a mechanical system and illness is caused by faults in that mechanical system. The mechanical paradigm was the new paradigm, and early evidence in favour of this new paradigm was published by William Harvey in 1628 who described how the heart was a pump that pumped blood round the body. Harvey wrote at the time that he expected his discovery to be met with scepticism and downright hostility and that is exactly what happened. The following (see text box) was written in 1647 (Parisano, 1647), shortly before Harvey's discovery became accepted.

Rejection of a new paradigm

The following is a translation of the original Latin written by Emilio Parisano in 1647. Parisano was an eminent physician of Venice.

> We have no problem to admit that, if the horse swallows water, we can perceive a movement and we can hear a sound. But that a pulse should arise in the breast that can be heard, when the blood is transported from the veins to the arteries, this we certainly can't perceive and we do not believe that this will ever happen, except Harvey lends us his hearing aid. But above all, we do not admit such a transport of the blood … If blood is transported from the veins of the lung … into the branches of the arteries, how could a pulse be felt in the breast, how a sound? I am completely innocent of such subtle speculations. Above all, Harvey has it that a pulse should arise from the movement of the blood from the heart into the aorta – no matter from which ventricle. He also claims that this movement produces a pulse, and, moreover, a sound: that sound, however, we deaf people cannot hear, and there is no one in Venice who can. If he can in London, we wish him all the best. But we are writing in Venice.

There are two points to note about Parisano's criticism of what is now universally accepted as true – the heart does actually pump blood. The first is that the critics of the new paradigm deny that a pulse can be heard there. This point illustrates a general principle known in the philosophy of science as the theory-ladenness of observables (Hanson, 1958). The principle of the theory-ladenness of observables means that observation is always coloured by expectations about what is being observed. People perceive only what they believe to be possible. Observation is not independent of theory. The principle of ladenness of observables is represented in psychological theory (see Chapter 10) as part of the gestalt movement – perception is based on hypotheses. The idea that science is based *only* on induction does not stack up. Not only are data selected for observation because of theory, but what is seen is also informed by theory. The physicians of Venice could not hear a pulse because they 'knew' that no pulse existed!

The second point to note in this criticism is in the final sentence "but we are writing in Venice." In the seventeenth century, Venice was a magnificent city, looking very much as it looks today and was a world-recognised centre of learning and art. London was a hotchpotch of timber-framed buildings, many of which burned down in the Great Fire of 1666. Parisano is, in effect, telling Harvey: "You come from an inferior place and should listen to us clever people from a superior place."

It is not unusual for paradigm shifts to be made from people working in less prestigious institutions or who, at the time of writing, are less well known, simply because they are less immersed in the old paradigm. Freud was responsible for a paradigm shift where mental illness was treated by a 'talking therapy' and his work and legacy will be discussed in Chapter 5. Albert Einstein published his theory of special relativity (and other ground-breaking papers) while employed at a patent office and in the same year that he was awarded his PhD in Zurich.

Progress of psychology as a science

The history of other sciences shows that they start as pre-paradigmatic and then become paradigmatic by one or other of the original paradigms becoming universally accepted. Once a science is paradigmatic it progresses in several ways. There is an increase in knowledge as represented by the range and type of theories. There is an increase in truthfulness, reflecting the Popperian idea that theories gradually become more truthful through conjecture and refutation. There is an increase in the usefulness of the science as reflected in an increase in practical applications (Shan, 2022). Finally, there is an increase in understanding, that is, there is insight into the field as a whole.

Where is psychology in terms of scientific progress? Students will notice that their lecturers have different views about psychology, and their lecturers do not always agree about the type of explanation psychologists should employ. Some lecturers believe that explanations should involve the words and the meanings of words that people speak. Explanations should be based on a description of discourse, and interpretation of what that discourse means. Another group, associated with cognitive psychology, believe that explanations should be based on the description of information processes. Yet another group believe that explanations should be based on the description of events in the brain. How should this multiplicity of paradigms be interpreted?

During the history of psychology, changing dominant psychological paradigms have co-existed with other paradigms. Some would consider that the current dominant paradigm is cognitive neuroscience (see Chapter 6). It is certainly the case that at the time of writing cognitive neuroscience is the paradigm of psychology with the highest status, but the history of psychology is where dominant paradigms have come and gone, and the dominant paradigm has never prevented the existence of other paradigms. This multiplicity of types of explanation can be used to conclude that psychology has not formed an accepted paradigm and is still pre-paradigmatic.

An alternative view is that psychology is special and different from other sciences. The nature of psychology means that it is impossible to explain all phenomena using a single type of explanation and so complementary explanations are needed. That is, psychology is a science that differs from others in that it requires multi-paradigmatic explanations as a mature science, not as an immature pre-paradigmatic science. The idea of complementarity is consistent with the view expressed by Feest (2022) who suggests that progress in psychology is reflected in the increase in resources available to study the subject where the subject matter itself changes over time. Psychology has progressed because it has more tools in its toolkit for solving problems. It is certainly the case that psychology has become more useful as it has progressed, consistent with the view that usefulness is an important indicator of scientific progress (Shan, 2022). Psychology has many more tools in its toolkit compared with when it started.

Complementarity

Complementarity is a philosophical idea first proposed by the physicist Niels Bohr. Physicists realised that light sometimes behaved like a particle and sometimes like a wave. What was it? Bohr proposed that reality sometimes needed to be explained by incompatible theories, both of which are correct. Light is a wave or particle depending on how it is observed. The same idea features in Heisenberg's uncertainty principle. The more you know about the position of a particle, the less you know about its movement and vice versa. Position and movement cannot be determined exactly at the same time. The idea of complementarity applies to psychology. There are different paradigms. Physiology and psychology provide complementary descriptions (see Chapter 6). Qualitative and quantitative methodology are different ways of investigation (see Chapter 9). The idea of complementarity is particularly important in a world where tolerance of others' views is often lacking. There may be more than one type of truth.

At the end of this book, the student should be able to form a view about psychology. Whether it is pre-paradigmatic, paradigmatic or necessarily multi-paradigmatic, and to what extent each paradigm has contributed to knowledge, truthfulness, usefulness, understanding and resources. And, of course, it is always necessary to remember that there are often strongly held views about what psychology should or should not be, so whatever conclusion you come to will be both wrong and right according to other people!

What do scientific psychologists do?

Karl Popper paints a noble picture of what scientists do. Scientists are motivated by the search for truth, and they know that truth is uncertain. Scientists come up with conjectures or hypotheses. They then test these hypotheses rigorously, trying to falsify them. Eventually the hypothesis is shown to be false, and a new hypothesis is proposed. Is this really what happens? The answer is no.

Scientists, and that includes psychologists engaged in scientific enquiry, are human. They have the same psychological characteristics as other humans. One of these characteristics is confirmation bias. Confirmation bias means that people tend to accept information confirming their existing hypothesis and ignore or discount disconfirming information. This bias is compounded by another factor. Psychologists, like other scientists, have an emotional attachment to theories they are working on. Just as football enthusiasts will support 'their' team, so psychologists and other scientists will support 'their' theory. The result is that evidence contrary to a theory may have less impact in developing new theory than might otherwise be thought. If evidence is found contrary to a theory, then a possible response is to doubt the replicability of the data – which is not necessarily a bad thing to do, as will be shown later. Another response is to find a way of modifying the theory to explain what is considered an exception. Yet another response is to simply ignore the data. Here are two examples that illustrate this point. Both examples come from theories that inform current practice:

Example 1. The serotoninergic theory of depression is that depression is caused by low levels of serotonin in the brain and that drugs that increase serotonin levels (antidepressants) reduce depression. The prescribing of antidepressants is justified by the serotoninergic hypothesis. Irving Kirsch (Kirsch, 2010, 2014) and colleagues have shown that at least 80% of the effect of antidepressants in clinical practice is due to placebo. These results have been confirmed independently by other authors, and a recent review concludes that there is no evidence to support the serotoninergic hypothesis (Moncrieff et al., 2022).

Example 2. Cognitive behaviour therapy (CBT) is based on a theory developed originally by Aaron Beck that cognitions play an important role in the causes of depression, and that changing erroneous cognitions leads to improvement. Bruce

Wampold and colleagues (Wampold & Imel, 2015) reviewed several types of data to show that, although CBT therapy is effective, its effectiveness cannot be explained by cognitions having the causal role originally suggested. Wampold's analysis and conclusions have been confirmed by independent authors.

In both cases there is evidence that throws doubt against accepted and dominant paradigms. The serotoninergic hypothesis is the basis for a multi-million-pound drugs industry, and CBT provides the accepted rationale for the funding of talking therapies. This is not the place to provide evidence for or against the various positions – which are robustly supported by both sides. Students may wish to do this independently, and further details are provided in Chapter 6 (for antidepressants) and Chapter 5 (for CBT). The argument presented here is simply that the issue of evidence and falsification of scientific theories is by no means a simple logical process. Science involves humans. Humans are messy. Humans are influenced by cognitive dissonance (Festinger, 1962) and reinterpret conflicting data so that the data support their original beliefs, which, in the case of scientists, mean their preferred theory.

Mistakes, fraud, and scientific misconduct

A central argument of this section is that scientists are human and have the features of other humans. What is the motivation of scientists? To a naïve observer, the motivation of scientists might be to push back the boundaries of knowledge: a pure, noble and selfless motivation to improve knowledge and help humanity. I am sure there are scientists who are motivated in this way. However, other motivations can come into play. Scientists can be motivated to demonstrate that their theory or hypothesis is correct. Scientists can be motivated by personal glory, and the status and regard achieved by scientific discovery. Some are also motivated by money – though, if one were motivated by money, it would be sensible to choose a different career.

Mistakes can be made – it is human to err. Fraud is different. Fraud involves an intentional flouting of the underlying principles of scientific enquiry, namely, that of honesty. One of the best-known cases of fraud in the history of psychology is that associated with the eminent British psychologist, Cyril Burt. Burt published data supporting the idea that there was a substantial heredity component to intelligence. In a study of 53 monozygotic twins reared apart, Burt reported a correlation of 0.77 between the intelligence scores of twins (Burt, 1966). These results were interpreted to support the view that intelligence was largely inherited. Shortly after Burt's death in 1971, Kamin (1974) and then others (e.g., Hearnshaw, 1979) published critiques, arguing that the data had been made up and that the research assistants Burt had cited as co-authors did not exist.

Others came to the defence of Burt: the 'missing' research assistants were found, and it was pointed out that data supporting similar correlations to those reported by Burt were replicated by independent researchers (Rushton, 2002). In 1980 the British Psychological Society condemned Burt as a fraud, but in 1992 revised this judgement, writing:

> Council considers that it is now inappropriate for the Society as such to seek to express a fresh opinion about whether or not the allegations directed at Burt are true. Moreover, in the light of greater experience, the British Psychological Society no longer has a corporate view on the truth of allegations concerning Burt.

To his defenders, Burt was a good scientist who did not fake his data. Others take a different view.

Burt is not the only famous psychologist subsequently accused of creating fraudulent data. Hans Eysenck was a famous psychologist, best known for his work on personality – he developed the Eysenck Personality Inventory. Eysenck argued that personality was a major cause of fatal diseases such as cancer and that the link between smoking and cancer was not because smoking caused cancer, but because both correlated with a cancer-prone personality. Eysenck collaborated with another researcher, Grossarth-Maticek, and together they published cohort data showing an extraordinarily high association between the cancer-prone personality and cancer, and published experimental data showing that psychological therapy, either delivered through a therapist or through bibliotherapy, had a substantial effect in reducing cancers in those with a cancer-prone personality. That this research was funded by the tobacco industry was an early indicator that it might be flawed and at worst fraudulent. Criticisms and analysis of this case have recently been made public (Marks, 2019; Pelosi, 2019), including criticism of the British Psychological Society's failure to act to previous complaint made in 1995 (Craig, Pelosi & Tourish, 2021).

Burt and Eysenck were senior scientists. For junior scientists, personal ambition can be a motivator for fraudulent activity (Steen, 2011). There is increasing competitiveness in science between researchers competing for scarce jobs and scarce research grants. University appointment policies and tenure are often linked to publications. In a profession where time is often scarce, there can be a temptation to short-circuit the arduous business of collecting data and to simply make it up (Aulakh, 2016). There is a societal component to fraud created by a competitive research environment: fraud is not entirely explained by characteristics of some 'rogue' scientists. Although fraud is not common, it occurs with sufficient regularity for it to be something to be taken seriously.

How frequent is fraud in scientific practice today? The term used nowadays is *scientific misconduct*, which is defined as (a) any aspect of falsification of data or any other aspects of the study and (b) plagiarism – copying without citation. Gross (2016) provides a useful review of several studies on scientific misconduct, including studies based on anonymous reporting by scientists. In this review, Gross reports one study of 99 universities where 44% of students and 50% of staff were aware of scientific misconduct. In a meta-analysis of 18 studies, 2% of scientists had admitted that they themselves had falsified data and 14% had observed others doing it. The frequency of scientific misconduct varies between disciplines: it is most common in cell biology and oncology, least common in politics and sociology, with psychology falling somewhere in between (Gross, 2016).

Exposing others' scientific misconduct carries risks. In one study of whistle-blowers, 60% of whistleblowers found that their actions had negative consequences (Gross, 2016). When scientific misconduct is discovered, it has negative effects on the careers of perpetrators as well as innocent collaborators (Hussinger & Pellens, 2019).

When journal editors become aware of scientific misconduct, they publish a retraction of the original article. However, retractions can also be published because the authors themselves note problems with the way they have reported the study, and the authors themselves initiate the retraction. In a study of 2,047 retractions published in biomedical articles, only 21.3% were due to error, whereas 67.4% were due to scientific misconduct (expected or proved), of which 43.4% were due to duplicate publication (where the author submits the same paper to two journals and both accept), and 9.8% due to plagiarism (copying from someone else's paper), the remaining 11.3% being unknown or miscellaneous causes (Fang, Steen & Casadevall, 2012).

Even if findings are *not* the result of scientific misconduct or error, it does not necessarily follow that they are true. If a probability of <0.05 is used as the criterion for significance, then 1 in 20 studies that really are non-significant will appear to be significant. Journals are more likely to accept papers with significant results compared to non-significant results, particularly if they are novel results that are interesting in some way. The publication bias towards significant findings means that there is a bias towards Type 1 error.

Type 1 versus Type 2 error

Type 1 error means that something is assumed to be significant when it isn't. Type 2 error means that something was thought not significant when really it is.

The possibility of Type 1 error in publications has led to something known as 'the crisis of replication.' Many studies are conducted – many more than are published. There have been several instances where an initially interesting finding fails to replicate. The interesting finding is often published in a high-status journal, because high-status journals tend to accept only the most scientifically interesting papers. The crisis of replication occurs across all sciences but particularly those that use statistical testing. This problem – the result of a combination of genuine chance events and publication bias – has become recognised in recent years, and the issue of replication is accepted as an important part of the scientific process (Zwaan et al., 2018).

The existence of fraud and the replication crisis could lead to the conclusion that science is fundamentally a flawed process. On the contrary, the fact that these problems are aired in print shows that problems are being attended to, problems that naturally follow from research conducted by messy humans. In some areas of science, where there are commercial interests such as clinical trials of new drugs, the regulatory requirements of conduct and reporting make any kind of fraud difficult, and the sponsors of such studies are keenly aware of the very negative consequences should there ever be evidence of wrongdoing. Science is not perfect, but just as theories become improved over time, the process of conducting science is also improving. Many journals now require scientists to make their original data available for scrutiny. Conflict-of-interest statements are required routinely in medical journals.

Unethical science

Nowadays scientific studies normally require ethical approval before they can be carried out. This was not the case in the past. It is very unlikely that Stanley Milgram's studies on obedience would get past a modern ethics board. Research that might have been considered unethical research even at the time includes the CIA's studies into psychological torture (the MKUltra project), which took place after the Second World War and which involved harm to participants without their consent (McCoy, 2007). Studies included injecting North Korean prisoners of war and psychiatric patients with psychoactive substances, and studies on sensory deprivation (Harper, 2007, 2021). Similar studies were carried out in the UK (Harper, 2007). Unethical studies are not limited to psychology. The Tuskegee Syphilis study started in 1932 when African Americans with syphilis were recruited into a study designed to measure the natural history of the disease. They were told they were being treated for 'bad blood' and given free medical care and free meals and promised free burial. When penicillin (the recommended treatment for syphilis) became widely available in 1943 the men remained untreated until the study was stopped in 1972. Compensation eventually followed to the men, their wives and their children (Jones, 1993).

Cults and conspiracies

Scientists get things wrong when beliefs and motives become stronger than evidence. The tendency to interpret information in terms of prior beliefs is a human characteristic called confirmation bias and a phenomenon investigated by Festinger (1962) under the heading of cognitive dissonance. This phenomenon affects everyone.

At the beginning of this chapter, I explained how the development of scientific thinking 500 years ago led to the rapid technological advances we know today. The value of science is not only that it helps gets thing done, but also that it helps society by promoting truth through evidence. Evidence-based truth is something that should be valued. Scientific thinking is often lacking in society in general. Many of the most terrible events in history are due to sincerely held beliefs in the absence of evidence. The witch persecutions of the seventeenth century, the African slave trade and the Holocaust were all carried out by people who thought they were doing the right thing based on beliefs and motives that are now known to be both wrong and bad.

Recent conspiracy groups are a modern version of earlier triumph of belief over evidence. The idea that there is a 'deep state' of powerful individuals who drink the blood of children and control politicians may (or may not) seem entirely implausible to the student reading this book but is believed by a surprisingly large number of people at the time of writing in the American Republican Party (Tollesfon, 2021). In the seventeenth century witches were also believed to drink blood, showing an interesting parallel between the old and new. Beliefs that satisfy psychological needs but are inconsistent with reality are easily promoted in today's Internet society, and because of the far-reaching influence of social media and the Internet, erroneous beliefs are more easily promoted today compared to the witch persecutions of the seventeenth century. Just in case you were wondering, nasty witches on broomsticks don't really exist – not even at Halloween. Followers of Wicca sometimes describe themselves as witches, but that is something entirely different.

Conspiracy theories have received particular attention in recent years as social media provides an easy method of disseminating false information or 'alternative facts.' The tendency to believe in a conspiracy theory varies between people. Goreis & Voracek (2019) write:

> Conspiracies appear to appeal to those who feel disconnected from society, who are unhappy or dissatisfied with their circumstances, who possess a subjective worldview that includes unusual beliefs, experiences and thoughts, and do not feel in control of their life.
>
> (Goreis & Voracek, 2019, p. 10)

Some conspiracy theory beliefs are unfalsifiable. It is not possible to provide evidence against the conspiracy theory that the world is controlled by lizard people coming from another planet (Lepselter, 2019) any more than it is possible to provide evidence against my belief that there are green swans on the planet Zog. The difference, however, is that my (hypothetical!) belief in green swans makes no difference to how I live my life, whereas those who believe in conspiracy theories can engage in maladaptive behaviours. A point made at the start of this chapter is that science is powerful. That power in the hands of people with strange beliefs is dangerous. Power in the hands of those who have no understanding of the meaning of truth is dangerous.

Lizard people

There are numerous conspiracy theories and the proportion of people believing in any particular conspiracy varies. Estimates suggest that 4% of Americans believe in the lizard conspiracy – apparently, lizards in human form can be recognised by their low blood pressure, love of space and science and their changing eye colour of green, hazel or blue (Bump, 2013) The lizard people conspiracy theory has similarities with Capgras syndrome. People suffering from Capgras syndrome believe that a loved one has been substituted by an imposter who looks exactly the same. A historical parallel can be found in the belief that the fairies have taken your good baby off to fairy land and substituted a naughty fairy baby instead. The study of conspiracy theories is an interesting topic but beyond the scope of this book. Other well known conspiracy theories include the belief that the moon landing was faked, that Obama is the anti-Christ and that vaccines kill people. There is a saying in the north of England: 'There's nowt as queer as folk.'

Autocratic societies with limited press freedom provide ideal opportunities for dictators to stay in power by manipulating beliefs with false information and 'alternative facts.' Research shows that authoritarianism is on the rise in the twenty-first century (Berberoglu, 2020), a problem that will be revisited in the final chapter of this book in the context of artificial intelligence. Science and scientific understanding coupled with freedom of speech are protectors of democracy. They illuminate dark corners. They provide an independent method of establishing truth where people can see the evidence from which conclusions have been drawn and where conspiracy theories are called out as unfalsifiable nonsense. But freedom has its downside in providing a platform for false information, and that balance between freedom of speech and censorship of false or damaging information has yet to be managed effectively. The philosopher Immanuel Kant (1724–1804) said that as rational beings humans should always tell the truth. People do not always tell the truth, nor do they always understand the meaning of truth, but the fundamental goal of science, the overarching goal, is to establish truth. How that truth is then applied is an entirely different matter.

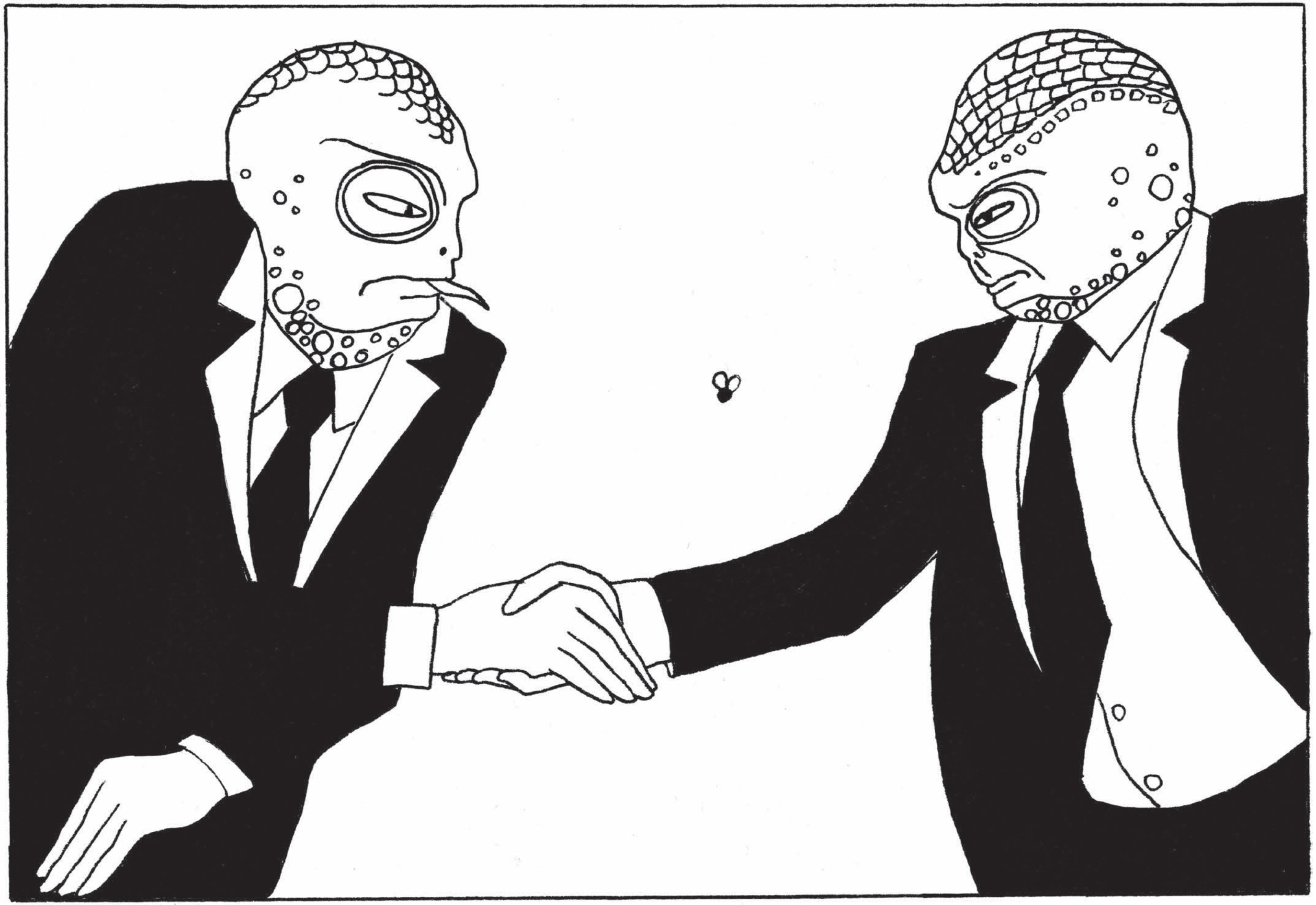

ILLUSTRATION 1.2 The world is ruled by lizard people. Any resemblance to real politicians is accidental.

Summary

Scientific advance coincides with increased freedom of thought, and the knowledge provided by science is changing the world. Science is a way of establishing the truth of falsifiable statements through evidence. Unfalsifiable beliefs such of those of religion are part of metaphysics rather than science. Science is based on the logic of induction and deduction. An earlier view was that science was defined by a collection of facts (data), and any theory was an inductive generalisation from those facts. The modern view is that science is a collection of theories (conjectures or hypotheses), and the theories are tested by evaluating whether the predictions of the theory are consistent with data. Theories are corroborated through observation but not proven true. Theories vary in their explanatory power; some theories make quantitative and others only qualitative predictions. The psychology of theory generation is as important to science as theory testing. Research programmes differ as to whether they are data-led or theory-led, with the latter often being more successful. All theories are based on metatheoretical assumptions and changes in these metatheoretical assumptions lead to paradigm shifts. Scientists sometimes get things wrong and sometimes they engage in scientific malpractice. The knowledge provided by science does not necessarily lead to changes that are good for people or for humanity as a whole. False statements masquerading as truth are a problem for modern society as truth can be manipulated by autocrats and dictators. Cult membership and conspiracy theories result when belief triumph over evidence. Democracies are effective only when truth is told. Truth should be valued as something that is intrinsically good.

The rest of this book

One particular theme runs through the remaining chapters of this book. It is that different groups of psychologists have different assumptions about psychology. These assumptions create different paradigms of psychology. These paradigms have changed over time, often with one paradigm being dominant but others co-existing at the same time. That is the situation now. There are differences of opinion about psychology's status as a science, what psychologists should be studying and the role and type of theory used to explain psychological phenomena. Understanding the different underlying assumptions that have been featured in the history of psychology and remain today is a good way of understanding the discipline of psychology as a whole.

Essay questions and discussion topics

1. What is the logic of induction and deduction and how are they used in scientific enquiry?
2. Why are theories never proven to be true?
3. What is the difference between a strong theory and a weak theory?
4. What is a paradigm and what is a paradigm shift?
5. Can you believe everything you read in peer-reviewed journals?
6. What is your personal experience of conspiracy theories and harmful online material? What should be done about it?
7. Science has saved millions of lives through better health care and increased lifespan in many countries. Science has created terrible ways to kill people. Taken overall, has science been good for humanity? Has science been good for the planet we all share?
8. How can you tell if someone is telling the truth? Who should you trust?
9. Is it ever right to tell a 'white lie' and if so when is it right? How should you balance the moral requirements of truth and kindness?
10. Which aspects of this lesson for life do you agree or disagree with, and can you explain why? Can you think of other lessons that might be drawn from this chapter?

> *Be careful not to confirm your own biases by selecting only data showing you are right. Always consider the possibility that you might be wrong! Be tolerant of others. It is not other people's beliefs but their behaviour that affects you. Psychology degrees teach critical thinking. Critical thinking is a valuable skill for life in general. Tolerance is a virtue sadly lacking in modern life. And, finally, to quote Mark Twain (1935), "If you tell the truth, you don't have to remember anything."*

2

What compromises should you make if you want to join a group of people?

How psychology joined the science club

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The modern meaning of the word science was described in the last chapter. Science consists of hypotheses that are falsifiable through evidence. Modern psychology meets that criterion. That is uncontroversial. Two hundred years ago, however, psychology was not considered a science, and even today there are those who consider that psychology is different in some way. When I was applying to study psychology more than 50 years ago, I was advised by a physiology lecturer to study a 'proper science' first. I ignored that advice.

A search on the Internet for definitions of psychology provides "Psychology is the scientific study of the mind and behaviour." The same search for a definition of physics gives "Physics is the branch of science concerned with the nature and properties of matter and energy." One is a science, the other a scientific study of something – and by implication there is also a non-scientific study. Not all psychologists think that psychology should be a science like any other natural science, and these other approaches will be described in Chapter 9. However, most psychologists think psychology should involve only falsifiable statements and therefore is a science.

Psychology has not always been considered a science, and it is for this reason that the scientific label is so important to most psychologists. During its history, psychology had to join the club of sciences. To join a club, you need to make clear why you deserve to be a member. When psychology first joined the science club more than 100 years ago, science was different from what it is today. They were not joining the modern science club. The earliest scientific psychologists were joining the science club of the nineteenth century where the focus was on establishing the facts rather than testing theories. They were joining a club where the predominant logic was one of inductivism.

Science and gender

The science of the nineteenth century was dominated by men, as were many other types of work. There will be no mention of women in this chapter, but consider this. Many people have heard of Florence Nightingale. She is remembered as 'the lady of the lamp,' a nurse who was kind to wounded soldiers in the Crimean War. In fact, she was a brilliant statistician, and it was her scientific research that saved lives through its influence on the way battlefield hospitals were run. Few members of the public realise what an important scientist she was. The role of women in the history of science is diminished when modern histories reflect the earlier prejudice against women. The next two chapters will provide more detail about this prejudice, how it existed and how it affects our modern description of earlier events.

When psychology was definitely not a science

The French philosopher Descartes had a problem. In seventeenth-century France, the Roman Catholic Church asserted its authority over all knowledge, including knowledge that would now be considered the realm of science. Descartes wanted a diplomatic way of freeing science from the shackles of religion without upsetting the religious authorities. He came up with the following solution. There are two kinds of substance in the world. A mind substance, which the Church could have jurisdiction over, and a body substance, which was the remit of scientists. This solution helped establish science as being independent of religion, but it had several negative consequences. One, and only one, of these negative consequences was that it left the study of the mind as being outside that of real of science.

Psychology translates from Greek as 'the study of the soul.' Psyche was originally a human who became a goddess, a goddess representing the soul. Psyche married Eros, the beautiful god of love. The god of love and the goddess of soul are linked in the romantic story of Eros and Psyche. The soul, psychology and religion were brought together in Descartes' mind-body philosophy, a philosophy now called Cartesian dualism. Until the nineteenth century Psyche and psychology were part of the irrational world of myth and religion.

The success of science in nineteenth-century Europe and America coincided with the loss of faith in traditional religion and the emergence of an alternative to Christianity: the religion of spiritualism. The essence of spiritualism is that people have a universal soul. Manifestations of souls of dead people in this world take the form of paranormal phenomena. The concept of a universal soul, like the concept of God, is unfalsifiable. As the influence of religion waned, psychology was associated with the paranormal and therefore still seen as something separate from science. From the middle of the nineteenth century until after the First World War, there was a widespread interest in contacting people who had died – people who were from 'the other world' or 'on the other side.' It was considered normal to try to contact relatives through mediums or by using other techniques at home, for example the ouija board (pronounced weedy or weedjy board). Although some of the early psychologists believed in paranormal phenomena and thought they could be investigated, the association with the paranormal was associated, at least in the mind of the public, with non-science rather than science. Psychology was still associated with religion, albeit a different sort of religion. The start of modern psychology is therefore when psychology had to make a clear break with its past including a break with the paranormal. This first scientific psychology called itself 'new' psychology.

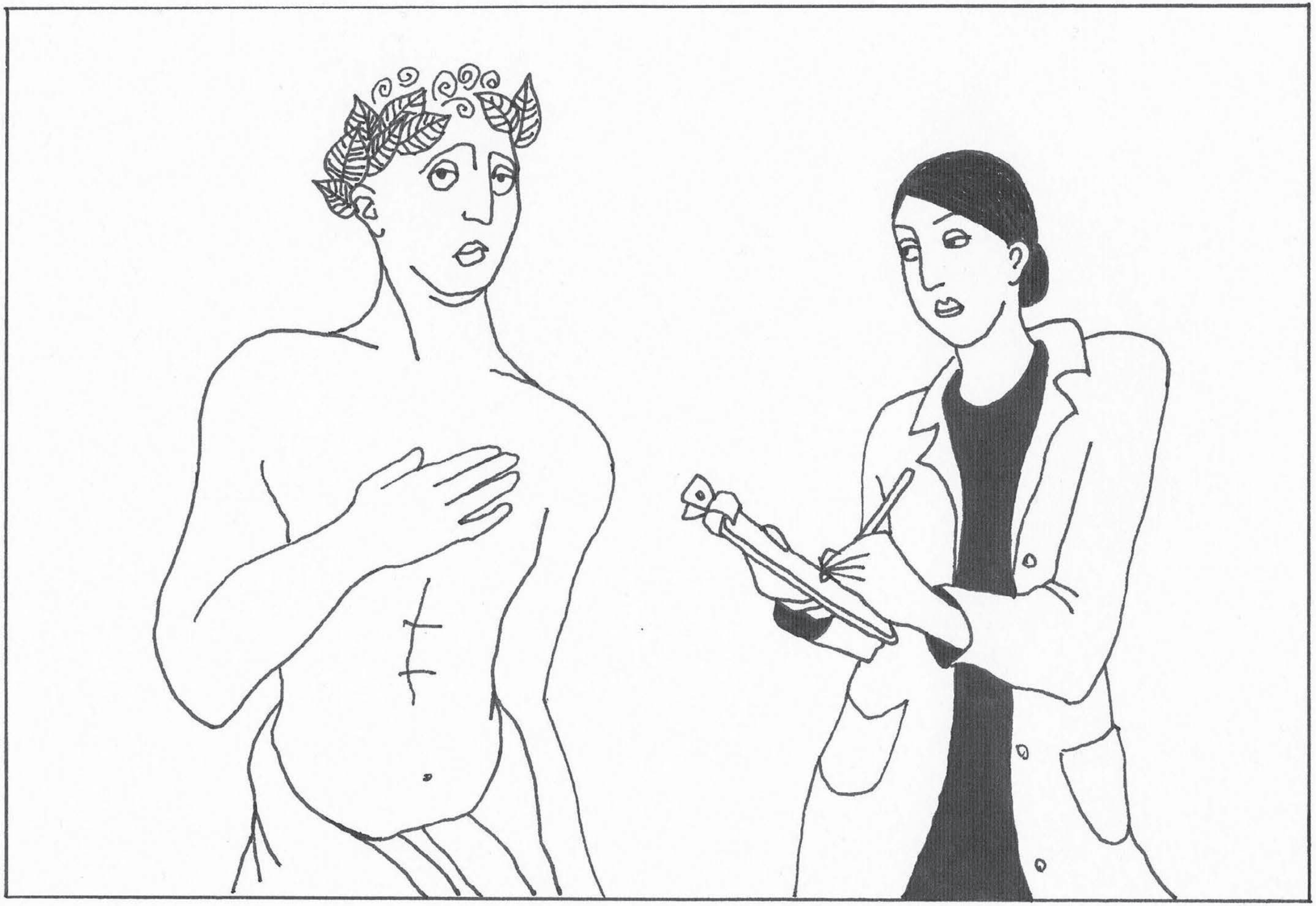

ILLUSTRATION 2.1 Psyche studying Eros.

Contacting the dead

The ouija board is interesting in that it illustrates a psychological phenomenon. What happens is that the letters of the alphabet are arranged in a circle on a table and an upside-down wine glass is placed in the middle. A group of people sit round the table, each placing one finger on the base of glass. Someone calls out "Is there a spirit who wants to talk to someone here?" or some such statement. The glass then starts moving mysteriously from letter to letter, spelling out words and messages for the group of people. Everyone honestly believes that they are not pushing the glass. In fact, people do push the glass. They are simply unaware of what they are doing, and they spell out what they would like the spirit to say to them. Other psychical phenomena of the time can also be explained by psychological mechanisms known today.

The Society for Psychical Research was formed in Cambridge, England, in 1882 to investigate claims of the paranormal. The British Psychological Society was formed in London in 1901. The *Journal of the Society for Psychical Research* continues to be published ever since it started in 1882.

Psychical versus psychological

There is a cartoon from the magazine *Punch* in the early 1900s entitled "Dinner Dance of the British Psychological Society." The cartoon shows men and women dancing with invisible partners. The confusion between psychical and psychological persisted for many years.

Very early beginnings

One of the points made in the previous chapter is that science is cumulative. Research builds on previous research. Some textbooks provide a definite time and place for the start of scientific psychology – such as the founding of the first psychological laboratory by Wilhelm Wundt in 1879 in Leipzig – but it is never quite that simple in practice. Wundt was influenced by earlier researchers at Leipzig but also by researchers at other universities.

The first psychology laboratory, given the name 'new psychology' by Wundt to distinguish it from the old, came about from an integration of three strands of thinking – it is too much to call them research programmes. These are (a) developments from sensory physiology that provided a scientific approach to the study of sensation, (b) contributions from the philosophy of mind that showed that higher mental processes could be studied, and (c) medical findings that higher or cognitive processes were linked in some way to the brain.

Sensory physiology, sensory psychophysiology and psychophysics

Ernst Weber (1795–1878) studied anatomy at university and completed his thesis on the anatomy and physiology of sensory nerves at the university of Leipzig. As their name suggests, the sensory nerves are associated with psychological sensations, such as touch. It was therefore a small leap for Weber to study how stimulation of a sensory nerve gave rise to sensations and then to study sensations in their own right. During the nineteenth century, scientific advance was associated with advances in measurement. Measurement was key. Hence, when Weber studied sensations, his first reaction was to measure them. He called his new field of research 'sensory psychophysiology.'

Weber (Weber, 1834/1978) developed a method for assessing touch sensitivity in terms of the ability to discriminate the two-point threshold – i.e., to be able to detect whether the skin is being touched by one or two points.

Weber's method for assessing touch sensitivity

Weber's two-point threshold demonstration is easy to do yourself with the help of a friend. Weber used a draughtsman's compass that had two pointed ends, but it can be done just as well with a couple of pencils. Ask your friend to look away and touch them on the skin with the pencil ends about two centimetres apart and ask your friend what it feels like. Your friend will notice being touched by two pencils. Now place the ends about 2 millimetres away: Your friend will now feel just one pencil. Increase and decrease the distance until you arrive at the two-point threshold – the point at which your friend just notices that there are two pencils rather than one. You can repeat this exercise on different parts of the body, and you will find that sensitivity varies over the body. For example, the back is much less sensitive than the hand.

Weber systematically measured the sensitivity of the skin across the whole of the body, using an adjustable compass, which was given the rather dignified name of an aesthesiometer (Weber, 1834/1978). He made several interesting observations – for example that we are less sensitive if the two compass points are placed in the direction of the limb rather than across it. Having started with the sensation of touch, Weber then went on to study the two-point threshold in other sensory modalities, including weights, lengths of lines, and pitches.

In studying the sensory modality of weight Weber asked a person to compare the weight of two objects (he got people to do this sequentially using the same hand) and tell him if they seemed the same or one was heavier than the other. The 'just noticeable difference' (JND) was the smallest difference in weight between the two objects that led to a person saying they were different.

Weber found that, irrespective of the sensory modality tested, there was a relationship between a JND between two stimuli and the magnitude of the stimuli. Imagine a kilo bag of sugar, and another bag that is 1.5 kilos. It is easy to tell the bags of sugar are different from their heaviness (note they *weigh* different amounts, and the *sensation* is also different). Now imagine a 50 kilo sack of sugar, and another sack 50.5 kilos in weight. It is now impossible to tell the sacks apart – they appear equally heavy. Weber noticed that the ratio of the JND to the stimulus intensity was approximately constant, irrespective of the stimulus intensity. So, for example, if the JND is 0.2 kg when the stimulus intensity is 1 kg (0.2/1 = 0.2) then the JND for a stimulus intensity of 50 kg is likely to be 1 kg (1/50 = 0.2).

Weber studied the JNDs in other sensory modalities and found that the ratio of JND to stimulus intensity was always approximately constant, though the ratio differed between sensory modalities. Although the constants were different, all sensory modalities could be described by an equation

JND/Stimulus intensity = Constant

This equation was described by others as 'Weber's law.'

Weber's family

Weber came from an academic family. His younger brother was a famous professor of physics. Measurement was a family business!

Gustav Theodor Fechner (1801–1887) was a student at Leipzig where he learned about and was influenced by Weber. Fechner continued the work done by Weber, promoted it more widely, and developed it. Whereas Weber called this newly developing science 'sensory psychophysiology,' Fechner called it 'psychophysics,' which is the name that it is known by today (Fechner, 1860/1948).

Fechner developed new methods for assessing thresholds first developed by Weber. Weber had simply asked people to say whether two objects were the same or not. Fechner developed two other methods.

Method 1: The person is presented with pairs of objects, such as a pair of lines, and asked which one is longer. The person is told that they must say which line is longer – they cannot say they are the same. If one of the lines is noticeably longer, the person will always get it right. As the lines become more similar, the person will tend to make errors. Fechner defined a just noticeable difference using this method as the level of difference just greater than that which produced a random result.

Notice that the advantage of this method is that it avoids a problem, later noted in psychophysics, of people having different criteria for difference, which is a problem with Weber's method. If people are asked to state whether something is different or not, some people will be more prone to say yes only when the difference is noticeably clear. Others will say yes, even if there is only a slight suggestion of difference. The criterion of difference is something that is not fixed. The result is that 'false alarms' and 'missed hits' vary systemically between people, and this possibility is systematically investigated in the later science of signal detection theory. Fechner's work is a precursor to the modern science of signal detection theory, a theory that developed from Fechner's earlier work. Many courses in psychology teach signal detection theory as part of a perception course.

Method 2: This method requires the person to adjust a stimulus so that it appears to be the same as another. When a person does this, there is always a small error, either greater or smaller. Fechner took the average of these two errors as a measure of JND. Again, this method has been given different names over the years, Fechner calling it the method of average error, others calling it the method of adjustment.

A second development by Fechner was to show that Weber's law followed a logarithmic function, and could be expressed as

$$S = k \times \log R$$

where S is the psychological sensation, which is equal to a constant (k) multiplied by the logarithm of the physical stimulus intensity (R) (Fechner, 1860/1966).

This equation is called Fechner's law – and it is recognised as a slight extension of the earlier Weber's law.

In summary, Fechner played an important role in the science of psychophysics, a science that was the precursor to the modern science of signal detection theory (Wixted, 2020).

In addition to developing the science of psychophysics, Fechner developed the experimental study of aesthetics (Fechner, 1865, 1871). For at least a thousand years, there was an observation that a particular ratio had pleasing or divine properties. For example, consider the following three rectangles.

Which do you find most beautiful? Decide *before* going on to read the next sentence. The underlying hypothesis of 'the golden ratio' or 'golden section' is that rectangles where the ratio of the short to long side is 1 to 1.62 are considered most beautiful. Did you find the middle square above the most beautiful?

Fechner developed methods used in psychophysics by asking people to compare two rectangles and say which they thought more beautiful. His results confirmed that the golden ratio is indeed 1 to 1.62. Later researchers, however, showed that Fechner's results were anomalous and that preference for a particular ratio depends on the method used (Höge, 1997). Despite later criticism, Fechner is looked on as the father of experimental aesthetics.

Fechner and health

Illness struck Fechner in middle life, brought on by excessive work. He became deeply depressed. His recovery came suddenly in October 1834, and he embarked on writing books reflecting a deep spiritual conviction, suggesting that consciousness pervaded the whole world. His book titled *The Little Book of Life after Death* was published in 1835 under a pseudonym, the book being translated into English with an introduction by William James some 70 years later (Fechner, 1904/2005).

There is one final point which is important to note in relation to Weber's law and Fechner's law. Both laws make quantitative predictions. That is, they present a theory where the prediction is not qualitative, but quantitative. The theories do not only assert that a JND increases with the magnitude of the stimulus. The theories predict precisely how much the JND should increase. Weber and Fechner did not use statistical testing. (They did not have to attend stats classes as students!) It is only later that statistics were used in psychology to test qualitative predictions (see Chapter 1). Why did Weber and Fechner propose quantitative theories? The answer is they were simply copying what was done in physics at the time. Weber's brother was a physicist. The theories of physics in the nineteenth century were based on mathematical equations that provided quantitative prediction. Weber and Fechner created theories in the same way that physicists were doing at that time.

British associationist philosophy

Although the scientific study of sensation is clearly part of the discipline of psychology, psychology as a discipline is far wider. Where does higher level consciousness, such as thoughts (or what are now called cognitions), come into the story? The story of 'thoughts' starts much earlier with the work of associationist philosophers.

David Hartley (1705–1757) was born in Yorkshire, England, and trained in medicine at Cambridge. Although he is now best known as a philosopher, he worked on philosophy in his spare time. His 'day job' was that of a practising physician. Although medicine was still at an early stage, Hartley studied anatomy and pathology and would have assumed that the body functioned as a kind of mechanical system (see Chapter 1). Hartley was one of the earliest people to suggest that the brain and nervous system were connected to thought. In earlier years, the brain had been dismissed as at best some kind of cooling device as the soul or mind was assumed to reside in the heart, not the brain.

Hartley believed that the brain, spinal cord and nerves contained particles that vibrated. He suggested that moderate vibration caused pleasure and large vibration pain. Hartley's assumption that the brain contained vibrating particles arose from his observation of positive after-images. Hartley had noticed that if he looked fixedly at a candle, and then closed his eyes, the image of the candle remained. He assumed that this was because the vibrating particles continued to vibrate for a short while after the cessation of a stimulus (Hartley, 1749). Although Hartley's theory is wrong, it adopts the correct metatheory that mental events are the consequence of physical events. Theories can be wrong, even though the metatheory is correct.

Hartley also believed, like others before him, that the mind of the newborn baby was blank, and ideas came from experience. Much of his writing is about 'the association of ideas.' He believed that ideas became associated with other ideas to form new ideas. The result is that the ideas a person has are not just the result of the experiences the person has, but from how the thoughts combine. This emphasis on combination of ideas is given the label 'associationist philosophy.'

A blank sheet

The idea that the mind of the newborn baby is a blank sheet – or *tabula rasa* – was first suggested by the philosopher John Locke (1632–1704). The alternative view is that certain ideas – such as fear of spiders – are 'programmed' into the body. Thus, the *tabula rasa* hypothesis is relevant to the hereditary-environment controversy (see Chapter 7). Those supporting a *tabula rasa* interpretation place emphasis on the environment, not heredity.

The idea that thoughts combine to form new thoughts was not accepted by all philosophers. James Mill (1773–1836), best known at the time as a historian, suggested an alternative in his book, *Analysis of the Phenomena of the Human Mind*, in 1829. Mill suggested that the mind was a kind of machine and ideas came into that machine and were fixed in that machine. Note that whereas Hartley was using a biological model to inform his understanding, Mill used mechanism.

There were therefore two positions being presented by associationist philosophers. Hartley's view that thoughts combined to form novel thoughts was called the 'coalescence' hypothesis. Mill's view that thoughts always remained separate was called the 'brick wall hypothesis.'

James Mill's son, John Stuart Mill (1806–1873) (named after James Mill's benefactor, Sir John Stuart), agreed with his father's brick wall hypothesis, but later changed his mind, largely because of evidence from chemistry. The science of chemistry showed that, when combined, chemical substances could produce entirely new chemical substances. Copper and zinc are both soft metals, neither as strong as bronze, which is formed when zinc and copper are combined.

The coalescence and brick wall hypotheses reappear in several different forms in the history of psychology. The gestalt movement is based on assumptions of coalescence. Behaviourism is based on the atomistic assumption of the brick wall hypothesis. Like many opposed views, the truth is neither exclusively one nor exclusively the other.

Testing the coalescence hypothesis versus the brick wall hypothesis

Lemonade is made from two substances: sugar that tastes sweet and lemons that taste sour. Is the sweetness of sugar and the sourness of lemon still discernible in lemonade, or is lemonade an entirely new taste? Ask yourself this question and try to come up with an answer. When I ask this question to groups of students, about a third report that the lemon and sugar are still discernible. These students are reporting an experience consistent with the brick wall hypothesis. The remaining two-thirds report that lemonade is an experience that is entirely different from lemon and sugar, and the experience of these students is consistent with the coalescence hypothesis. This simple demonstration shows that 'reality' depends on the person doing the reporting. Perhaps both perspectives are correct.

The findings from neuroscience

The story so far is as follows. Weber and Fechner had measured sensations. The associationist philosophers had discussed thoughts, ideas or cognitions. The final building block comes from evidence that the brain is associated with the higher mental content, and not only with sensations via sensory nerves.

Modern medicine developed from earlier discoveries in anatomy in the seventeenth and eighteenth centuries. Physicians compared the bodies of people who had died from disease and those who died naturally and found that there were differences. These differences – extended into tissue differences and then cellular differences in the nineteenth century – were used to define disease. Each disease had a different abnormality or pathophysiology. It was therefore natural for doctors to also look for differences in the brains between their patients and those who died of natural causes.

Pierre Broca (1824–1880), who was chief of surgery at a hospital near Paris, had a 51-year-old patient who could understand everything said to him, but could never speak beyond saying "*tan, tan*" or when frustrated "*Sacré nom de Dieu*" (Sacred name of God). When the patient died, Broca carried out an autopsy and found an area missing (a lesion) in the frontal lobe – a part of the brain subsequently called Broca's area that is responsible for language (Sagan, 1979).

About ten years after Broca's discovery, the German neurologist Carl Wernicke (1848–1905) reported a patient who was able to talk but whose speech was meaningless. Wernicke found from autopsy that there was damage to the top part of the left temporal lobe, the part of the brain that connects speech with meaning. Broca and Wernicke had both demonstrated *localisation of function*, i.e., the idea that different parts of the brain do different things. These findings provided detail for the increasingly accepted view that the brain was responsible for thought. If mental life is caused by the brain, and the brain can be studied through natural science, then it follows that mental life can also be studied through the methods of natural science.

There is one other case that is so famous that it appears in many introductory psychology texts. Wundt also referred to this case in one of his early textbooks, and that is the case of Phineas Gage. The case is shown in the box here for those who have not come across it before.

The strange case of Phineas Gage

Phineas Gage worked at as quarryman in the USA where he was responsible for setting explosives in holes that were drilled into the rock face. One day, as he was pushing the explosive into the hole with an iron rod, the explosive exploded prematurely, driving the rod out of the hole like a bullet out of a gun. The rod entered Gage's cheek and came out above his right temple. To everyone's amazement, Gage got off the ground and looked around to see if he could see where the rod had got to. Phineas Gage was taken to hospital where the rod was removed, and he made a complete physical recovery. However, his personality was changed. He was no longer the hard-working quarryman he was before. He was irritable and could not settle to making any decisions. His friends said that he "was no longer Gage." Gage's inability to settle to any decision is now known to be consistent with damage to the prefrontal lobe of the brain. Gage spent some time appearing as a curiosity in a travelling circus, but never settled to any form of work.

Wundt and the first psychology laboratory

Wilhelm Wundt (1832–1920) trained as a medical doctor, receiving his MD in 1855 from the university of Heidelberg where he then worked at the medical clinic. In 1857 he was appointed as a lecturer, before being appointed to a more senior type of lecturer in 1864 (until 1874), lecturing in medicine and physiology. During his time at Heidelberg, Wundt assisted and worked with Helmholtz.

Helmholtz

Herman Ludwig von Helmholtz (1821–1894), like Weber before him, studied sensory psychophysiology. One of his achievements was to measure the speed of conduction of nerve impulses, both for motor nerves and for sensory nerves. Helmholtz made significant contributions to the field of vision, developing an early theory of colour perception. He believed that illusions occur when visual conditions are not normal, but that these illusions can provide insight into the normal functioning of the eye, an idea adopted by much later researchers in the field of perception (Gregory, 2007). Helmholtz developed some interesting optical instruments such as optometers, ophthalmometers, and ophthalmoscopes that are still used by scientists today to investigate the function of the eye (Pearce, 2009; Wade, 1994; Wade & Finger, 2001).

Wundt developed an interest in the link between physiology and sensory perception while at Heidelberg (Bringmann, 1975). He published a short monograph on sense perception in 1862 (Wundt, 1862), publishing his book *Principles of Physiological Psychology* in 1874 (Wundt, 1874/1969). It should be noted that although this book includes the term *psychology* in the title, most of it is about the physiology of sensory nerves, but with a final chapter with the title *General Principles of the Central Functions* where Wundt describes how the structure of the brain influences thought. Wundt showed how the experimental method used in the study of physiology could be applied to psychology.

Although Wundt was developing a career in medicine and physiology linked to psychology, he was also interested in philosophy. His skill and understanding of philosophy developed independently of his employment at Heidelberg. In 1874, Wundt accepted the post of professor in inductive philosophy at the University of Zurich (note the term *inductive* – see Chapter 1). He remained at Zurich for only one year, because in 1875 he accepted the post of professor of philosophy at Leipzig. As a professor of philosophy, Wundt published an important work on *Logic* (Wundt, 1880–1883) followed in 1886 by a work on Ethics (Wundt, 1886). At Leipzig, Wundt was at the same university as Weber and Fechner and was able to put his plan for a discipline of scientific psychology into practice.

We know about Wundt as a person from the writings of others. Elwood Worcester attended Wundt's lectures in Leipzig and provided this description in his own autobiography (Worcester, 1932). He describes Wundt as follows:

> Clad in a conventional black frock-coat and black trousers, he would steal into his great lecture hall, attended by his *famulus*, as if he wished to avoid observation. As soon as his familiar figure appeared, applause in the form of shuffling feet on the part of his hundreds of students would greet him. … Utterly unmoved, as if he had not heard us, Wundt would glide to his place on the dais, assume his accustomed position, fix his eyes on vacancy and begin his discourse. There could not be a better scientific lecturer. Without a scrap of writing, he would speak for three-quarters of an hour so clearly, concisely, and to the point, that, in listening to him, one would imagine one were reading a well-written book in which the paragraphs, the important text of the page, the small print, and the footnotes were plainly indicated. Wundt told no stories, gave few illustrations, scorned any attempt at popularity. His only thought was to deal with the topic of the day as thoroughly and exhaustively as the time permitted … With all this, he was followed almost breathlessly, sometimes by eight hundred students, and, if the lecture had been unusually amazing, they would burst into spontaneous applause. As unconscious as at the beginning, Wundt would glide from the hall, and another great and unforgettable experience of life had ended.
>
> (p. 90)

Another of Wundt's students, Bernhard Berliner, wrote in a letter (Boor & Hamill, 1978):

> He spoke without notes in the most beautiful German language. The most fascinating part of his philosophy lectures was on the oldest Greek philosophers for whom he seemed to have a special love.
>
> (p. 191)

So, Wundt was an excellent lecturer, and he was an excellent lecturer not only in psychology but also philosophy.

Wundt's view of psychology

Wundt believed that there should be two different kinds of psychology. First there would be experimental psychology (Wundt, 1862, 1874/1969) that would be studied using scientific methods. Second, there would be *Völkerpsychologie*, or folk psychology, that studied culture, rituals, religion and so on, and which did not use scientific methods – i.e., the experiment.

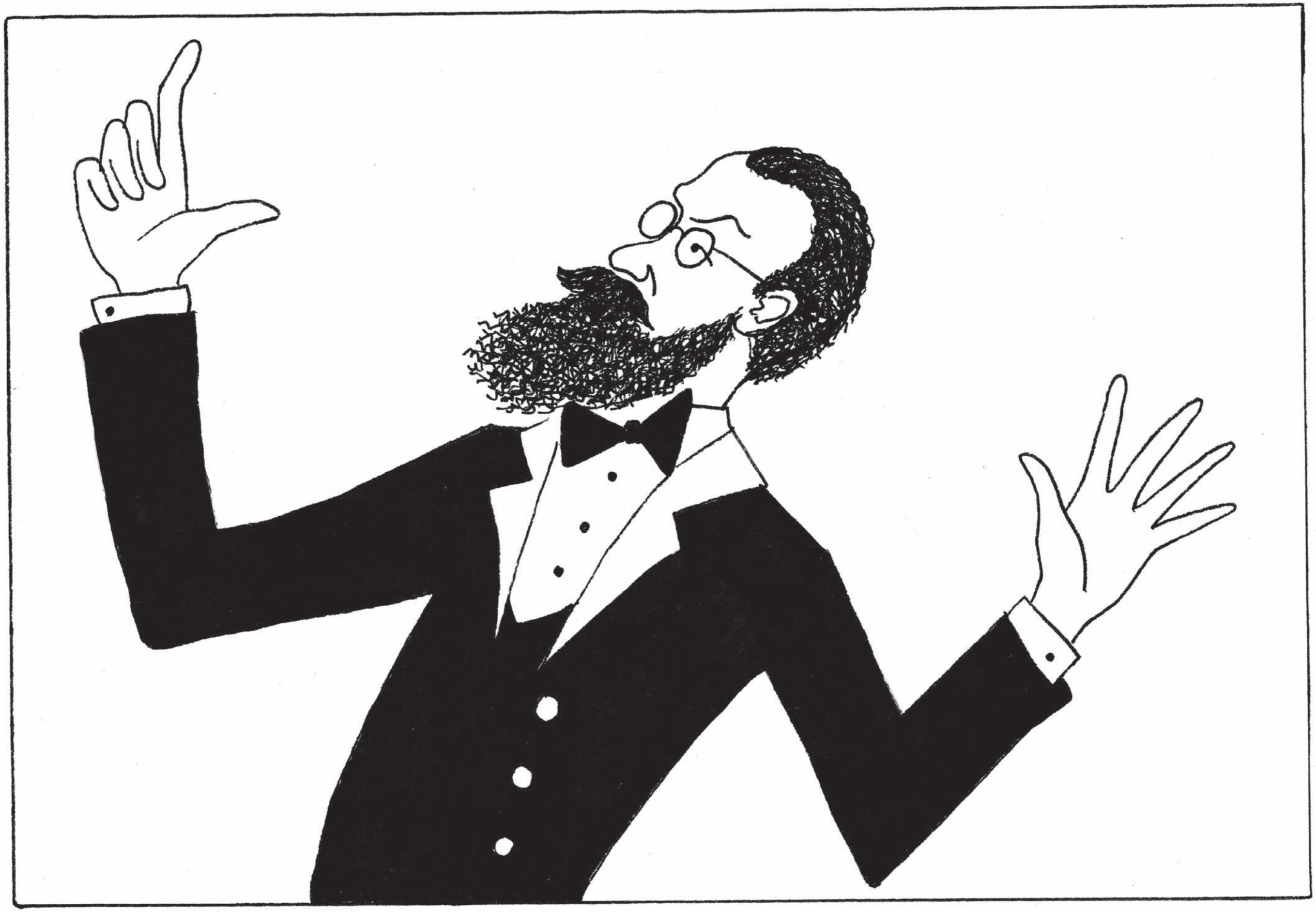

ILLUSTRATION 2.2 Wilhelm Wundt was an inspiring teacher.

The meaning of the word *experiment*

In the nineteenth century, the term *experiment* was used slightly differently from the way it is used today. An experiment simply meant any active manipulation of a variable by a scientist and the observation of that manipulation on some other variable. The terms *independent variable* and *dependent variable* appear only in the 1930s (Winston, 2004) at the same time that the idea of control conditions appear in medicine.

Note that Wundt's belief that there should be two different kinds of psychology is a metatheoretical assumption (see Chapter 1). No evidence is presented, and there can be none. Wundt is suggesting that there are two entirely different paradigms of psychology. In one paradigm, there is active manipulation of a variable by an experimenter. The psychologist makes something happen and observes the result. In the other paradigm, the psychologist simply observes what happens and thinks about what is seen. The former is defined as experimental psychology. The latter is not.

Wundt promoted the discipline of scientific (i.e., experimental) psychology at the University of Leipzig. One thing he insisted upon was that study of the paranormal was outside the field of his new psychology, because the paranormal was associated with non-science. The paranormal was not studied in his institute for experimental psychology. He started a journal with the title (translated from the original German) of *Psychological Research*, because there was an existing journal with the title *Journal of Psychology* that was devoted to parapsychology. Wundt also defined psychology as a pure rather than applied science for reasons that will become clear in the next chapter.

Wundt's experimental psychology

Wundt believed that only one part of conscious experience could be studied experimentally: that of *immediate experience*. Immediate experience means the immediate reaction of something *independent of prior knowledge or interpretation*. Mediate experience refers to the reaction mediated by knowledge and understanding. Most of knowledge, including the knowledge of physics and chemistry, comes from mediated experience. By limiting the study of experimental psychology to immediate experience, Wundt focussed on the direct perception of objects – just as he had done when working earlier as Fechner's assistant. This focus meant that psychology was different from other natural sciences in that there was access to immediate experience, not just mediate experience as in the case of natural sciences (Bringmann & Tweney, 1980). As the historian Van Rappard (2004, p. 146) has pointed out:

> The natural sciences study the objects of experience abstracting from the subject and, since their perspective is mediated by this abstraction they are called mediate. The significance of psychology may be seen in the fact that that it nullifies this abstraction and thus studies experience in its non-mediated reality.

Psychology was therefore 'special.' According to Wundt, the higher mental processes (i.e., mediate experiences) were not amenable to experimental investigation, but they could be studied non-experimentally, and so non-scientifically, as *Völkerpsychologie* (Farr, 1983). Additionally, Wundt believed that psychological events had a form of causality all their own, which he referred to as *psychic causality*. Psychic causality exists in parallel with but cannot be explained by physical causality. This idea is referred to as Wundt's principle of psychophysical parallelism.

Immediate experience

A good way of characterising the difference between mediate and immediate experience is by examining the technique used by artists to paint representational paintings. Suppose an artist wants to paint a yellow brick just as it would look like in a photograph. The artist must look at the brick not as a brick but as a series of yellow rectangular shapes of slightly different colours. The artist then creates the impression of a brick by drawing exactly what the eye sees. The artist does not say "I am drawing the feeling of brickness" – at least not for representational art. The artist must draw the immediate experience of the colours and shapes without any interpretation of what those colours and shapes mean. However, artists often do not simply try to represent things as they appear visually. They also want to draw the feeling of 'brickness' – something about the way a brick feels rather than looks – and they do this either with abstract art or art that differs from the photograph in some way. It is the difference between the photograph and what the artist draws that captures the mediated experience of the brick, rather than immediate experience that is found in the photography.

Some authors have suggested that Wundt's psychology represents a *dualist* interpretation of the mind-body problem, that is, there is a mind substance and a body substance. This view is not correct. Wundt's interpretation was monist, i.e., one physical substance that manifests in terms of two different kinds of causality (Van Rappard, Sanders, & Swart, 1980). Wundt's approach to the mind-body problem is consistent with more recent mind-body theories, such as methodological complementarity (see Chapter 6). Methodological complementarity derives from the suggestion of an atomic physicist, Niels Bohr, that reality can only be fully described by several mutually incompatible forms of description. The underlying reality is physical, but to describe that reality fully it is necessary to have psychological description (see Chapter 6).

Wundt used a form of introspection to investigate immediate experience, but his introspection was different from that normally associated with that word. Wundt did not use the word introspection; instead, he used the term *inner perception* (*innere Wahrnehmung*). Inner perception means focussing on the experience of sensation itself – not on any interpretation of that sensation. The ability to engage in inner perception was a skill only achieved after lengthy training, because there is a natural tendency to report mediate experience rather than immediate experience. For example, if a stool is presented as a stimulus, there is a natural tendency to report seeing a stool, i.e., something for sitting on. However, if immediate experience is reported, then the stimulus should be reported as a flat plane under which are three cylindrical objects (assuming the legs are round) of a certain colour.

Wundt developed scientific rules for his form of introspection, all based on the procedure of presenting a stimulus to an observer. These were the following:

- First, the observer needs to be properly trained. It is interesting to note that in Wundt's laboratory there was no demarcation between participant and experimenter. His students experimented on themselves!
- Second, the observer knows when the stimulus is about to be presented. The observer mustn't be taken by surprise.
- Third, the observer must be in a state of 'strained attention.' The observer must be waiting and ready for the stimulus, so the stimulus and not some memory of the stimulus is reported.
- Fourth, the stimulus must be repeated several times, so that the description of the stimulus can be ascertained with certainty.
- The final condition introduces the importance of the experimental method: the stimulus must be varied in some way and the effect of this variation on immediate experience noted.

It will be immediately apparent that this form of introspection is different from simply examining the contents of consciousness. It is also worth mentioning that William James (see Chapter 3) considered Wundt's inner perception an exceptionally boring thing to do. However, this method of introspection had one important characteristic: By insisting on rules and rigorous training, it appeared to be a scientific activity. When psychology was in its infancy, 'being scientific' was considered a positive attribute.

> **Observer, subject, participant**
>
> Wundt used the term *the observer* to describe the person who nowadays would be called the participant. However, for much of psychology's history, the term *subject* was used instead of participant. Subject implies someone who is entirely passive – which is seen as demeaning of the person taking part in the experiment. Hence, the change from *subject* to *participant* occurred at least 25 years ago.

Goals of psychology

Wundt used his form of introspection to achieve three goals of psychology. First, to analyse the contents of consciousness into their basic elements; second, to discover how these elements are connected; and third, to determine the laws that underlie the connections between elements (Boring, 1929). The use of the term 'elements' is not accidental. Wundt was modelling psychology on the achievements of chemistry at the end of the nineteenth century; he was trying to make a psychological equivalent of the periodic table. Wundt's approach to psychology was consistent with the nineteenth-century view that science should be data-driven. This purely inductive approach to hypothesis generation does not generate explanatory theories. For Wundt, scientific psychology was a matter of observing and cataloguing the contents of the mind. Wundt promoted the idea of psychology as a science in a world where psychology and science were viewed differently from the ways they are today.

The elements of consciousness: sensations and feelings

Wundt distinguished two elements of consciousness: sensations and feelings. Every sensation is connected to a particular sensory modality – touch, hearing, sight, smell, taste. That is, sensations are modality-specific. Sensations are also 'out there' in the sense that they refer to a particular event that is occurring in the observer's environment.

Feelings, on the other hand, are not associated with any particular sensory modality. Feelings are not 'out there.' Although an external event may trigger a feeling, the feeling is not uniquely associated with that external event. Wundt developed a three-dimensional theory of feeling. The dimensions were pleasurable/unpleasurable, exciting/depressing, relaxing/straining.

Association and apperception

Wundt suggested that the contents of consciousness were associated in two ways. Associations occur where there is a passive association of one element with another. Apperceptions occur where there is an active association. The difference between association and apperception is that in the case of apperception there is a feeling of intention. There is feeling of trying to find the connection rather than the connection just occurring. Apperception requires attention, association does not. This emphasis on intention and attention led Wundt to describe his system as *voluntarism* because it reflected a voluntary act made by the observer.

Voluntarism reflects the fact that immediate experience reflects an active process of intention (Danziger, 2001). In common sense terms, you can control your thoughts. The idea of controlling one's own thoughts is relevant to more recent ideas in psychology, ranging from cognitive behaviour therapy (where the client learns to avoid negative thoughts) to mindfulness meditation (where people learn to focus on the present). The behaviourists (see Chapter 4) rejected the idea of voluntarism along with the introspection, leading to a negative attitude towards Wundt among psychologists in the first part of the twentieth century (Blumenthal, 1975).

How to experience associations and apperceptions

First, ask someone to call out a word and then say the first word that comes into your head. The caller should use one of the following words: table, up or black. Likely associations are, respectively, table-chair, up-down, black-white. These associations will spring spontaneously into your mind. You do not have to try to do anything. Second, ask someone to call out any number, and then say the number that is 3 more than the number called. Any number can be called. For example, if 12 is called, you must say 15. If you do this, you will notice that you must make an attentional effort to find the number – it isn't automatic. You are now apperceiving, rather than associating.

Wundt suggested that when the elements of consciousness are associated or apperceived, there is sometimes a *creative synthesis*. Wundt's creative synthesis is similar in some respects to the earlier coalescence hypothesis and the later gestalt movement in psychology (see Chapter 10), though in other respects his psychology was consistent with the brick wall hypothesis.

Völkerpsychologie

One mistake often made in describing Wundt was that his interest was limited to the narrow confines of what he called experimental psychology, namely, the study of low-level perceptual processes. This mistake arose from using Titchener's account of Wundt. Edward Titchener (1867–1927) was a student of Wundt who moved to America and did not agree with *Völkerpsychologie*; he therefore didn't report this aspect of Wundt's work. Some of the earlier histories of psychology relied on Titchener's account of Wundt. In fact, Wundt had wide-ranging interests in other aspects of psychology, but he believed that higher mental processes could not be studied experimentally – i.e., from his perspective, scientifically. Evidence for his interest in this 'other' psychology is provided by work carried out in the last two decades of his life, when he wrote the ten-volume *Völkerpsychologie* (Wundt, 1904) The content of these volumes illustrates the topics Wundt studied. They consisted of two volumes on language, two on myth or religion, two on society, and one each on art, culture and law. Wundt's *Völkerpsychologie* would now be recognised as having similarities to modern anthropology or ethnography.

Wundt believed that, when trying to understand the subject matter of *Völkerpsychologie*, the most basic unit of thought could not be expressed by a word or linguistic term but was a 'general impression' (*Gesamtvorstelling*). That is, this subject matter could not be explored with the scientific method because it required an element of intuitive insight (Sabat, 1979). It was the intuitive insight that Wundt rejected as unscientific (Greenwood, 2003). Later psychologists, including those using qualitative methods (Chapter 8) and humanistic psychologists (Chapter 9) showed how it is indeed possible to study intuitive insight scientifically. Although Wundt is often described as the founding father of experimental psychology, in his autobiography, published in 1920, Wundt wrote that *Völkerpsychologie* was the most satisfying part of his academic life (Wong, 2009).

The impact of Wundt's experimental psychology institute

Wundt started giving lectures in experimental psychology in 1879, four years after arriving in Leipzig. He encouraged his students to carry out experiments, and initially four rooms were given over to this purpose, the space allocated gradually expanding so that by 1897 there were 14 rooms. Wundt's students attended his lectures, and he then encouraged them to carry out their own research in the rooms made available. His students worked in pairs, one working as 'the observer' who did the introspection and one the experimenter. All his students were first trained in the method of introspection described previously, as this skill was required for any study of introspection, though not all experiments required introspection.

Wundt taught many, many students both as undergraduates and postgraduates for PhDs. Many of his PhD students went on to create psychology laboratories in cities in their own countries. Misiak and Sexton (1966) report 16 students who started psychology departments in the USA; 10 in Germany; two in each of the UK, France, Italy, Poland and Switzerland; and one in each of Belgium, Greece and Russia. Most universities now have psychology departments, though the psychology taught today is very different from that taught 100 years ago. The staff are also different. Then psychology was dominated by men. Now psychology is predominantly a female discipline – look around you during the next lecture. Psyche was a female Greek goddess, so perhaps we shouldn't be surprised.

Wundt's place in history

Many textbooks on the history of psychology, as well as sources on the internet, state that Wilhelm Wundt (1832–1920) was the founding father of modern psychology. Why is that? After all, Weber had been conducting psychological experiments many years earlier and Wundt was a student of Herman Ludwig von Helmholtz (1821–1894) who, like Weber, conducted studies in the physiology of sensation. Furthermore, the discipline of scientific psychology envisaged by Wundt is very different from that of today. There are two interpretations.

Interpretation 1. Whereas others had conducted experiments that would now fall within the remit of psychology, Wundt defined the *discipline* of psychology – except that he called it the 'new psychology' to distinguish it from the old psychology of paranormal phenomena. Also, Wundt was an excellent lecturer and communicator and promoted psychology as a discipline. He trained many psychology students who went to set up psychology laboratories in many other countries. He played a pivotal role in developing psychology and his reputation is deserved.

Interpretation 2. Wundt's reputation is the result of a much later interpretation of events. Events happen. Historians interpret those events, and later historians rewrite history. Wundt's fame is the result of historical interpretation by later psychologists studying their discipline who are looking for a neat starting point. In reality, Wundt was just one of several people who helped found psychology.

Irrespective of which interpretation is true, Wundt was pivotal in the process of psychology becoming a science. Wundt restricted the subject matter of psychology, and in so doing enabled psychology to join the science club. In retrospect, this was a strategic masterstroke. Once psychology was perceived as science and one that was taught at universities, it was then possible for psychology to expand and scientifically investigate the other topics Wundt had termed *Völkerpsychologie*. Wundt's compromise was a turning point. Compromise sometimes works!

Wundt and his contemporaries

How was Wundt perceived towards the end of his life? The following comes from the 13th edition of the *Encyclopaedia Britannica*, which was published in 1926 but written before Wundt's death in 1920. This entry was also written before the first textbook on the history of psychology was published by E. Boring in 1929 (Boring, 1929). The entry starts by stating that that Wundt is a "physiologist and philosopher." It notes that "his earlier works deal chiefly with physiology, though often in close connection with psychology." Although the entry states that he "founded an Institute for Experimental Psychology, the precursor for many other institutes," the entry focusses on Wundt's contribution to logic and ethics and the relationship between ethics and psychology. "According to Wundt, the straight road to ethics lies through ethnic psychology, whose special business it is to consider the history of custom and ethical ideas from a psychological standpoint" (*Encyclopaedia Britannica*, 1926, vol. 27, p. 855).

Summary

In the 19th century, the term *psychology* was not associated with science. Psychology, the study of the soul, was associated with the paranormal. Measurement was a feature of 19th-century science. During the middle of that century, sensation was measured in a variety of ways and called sensory psychophysiology or psychophysics. Advances in medicine and earlier work in philosophy was combined by Wundt with the emerging psychophysics to create what he called the new psychology. Wundt's goal was to make the new psychology a respectable science, and he therefore restricted psychology in ways that were consistent with views of science at the time, rejecting the study of higher mental processes as unscientific. His restricted view of psychology modelled on chemistry's periodic table as his aim was to measure the elements of consciousness, specifically, sensations and feelings.

Wundt wrote books on what he considered non-scientific, folk psychology whose subject matter is consistent with the scientific psychology of today. Students from around the world studied psychology with Wundt in Germany, though many rejected Wundt's view of psychology and went on to study higher mental processes and behaviour. Wundt made psychology a respectable subject for scientists by being sensitive to how the word *science* was interpreted in Europe. Wundt made psychology accepted as a science by proposing a very restricted view of psychology modelled on chemistry's periodic table, and this started psychology on the road to becoming the science it is today.

Should Wundt be considered the father of psychology? All the reports given by Wundt's students are of a very kind and generous human being. It is nice to have people like that as the father of a discipline. But might that be a reinterpretation of history imposed by people looking for a good story.

Essay questions and discussion topics

1. What is psychophysics? Describe Weber's law and Fechner's law.
2. How did nineteenth-century science influence the way Wundt defined his new psychology?
3. What was Wundt's role in the early days of scientific psychology?
4. What is the difference between association and apperception? Illustrate your answer with examples.
5. What is the difference between the coalescence hypothesis and the brick wall hypothesis?
6. Wundt suggested that there was a scientific and a non-scientific way of studying psychology. Do you agree?
7. Should the study of paranormal phenomena be part of a psychology degree and, if so, how should it be presented?
8. To what extent should you compromise to join a club that you want to join? How much are you prepared to compromise and for what?
9. Do you believe in the existence of a soul that is separate from the body? What are your reasons?
10. Which aspects of this lesson for life do you agree or disagree with, and can you explain why? Can you think of other lessons that might be drawn from this chapter?

Flexibility and compromise can be an effective way of influencing others and achieving your own aims. Be welcoming and generous to others who want to join your group. Their diversity could be an opportunity for development, not a threat.

3

How do social attitudes influence science?

Applied psychology, prejudice and intellectual snobbery

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Prejudice means to prejudge something. Prejudgements are based on prior beliefs. Social psychologists have shown that simply labelling something leads to prejudgement, irrespective of the label (Billig & Tajfel, 1973). Everyone makes prejudgements and so everyone tends to make prejudicial judgements. A person's behaviour depends on how they respond to those judgements. Being aware of prejudice is a good first step to reducing its effects. Prejudice takes a variety of forms. Racial prejudice will be covered in Chapter 7. This chapter covers a type of prejudice that is seldom mentioned: intellectual snobbery. In the history of psychology, intellectual snobbery has led to the belief that pure science is better than applied science and that women are unsuited to being psychologists. Intellectual snobbery exists today in the form of league tables of universities, where some universities are judged 'better' than others, and it can contribute to discrimination against women.

Let us begin with terminology: pure science versus applied science, basic science versus applied science, fundamental science versus applied science. These words have different connotations. Pure science is noble and good. If applied is the opposite of pure, then applied must be dirty and bad. Basic science implies that this is something that must be done first – something that is done before applied science. Fundamental science implies the research deals with more general or important issues than the (potentially dirty) applied science. Pure, basic and fundamental. All three words reflect different attitudes of those who want to make this distinction.

Why 'pure' was believed to be better

When Wundt founded an experimental psychology laboratory in Leipzig, he insisted that his new psychology would be a pure science, not an applied science. Why was this? To understand Wundt's reasoning, it is necessary to know a little about social history in Europe.

Before the industrial revolution, there were two classes of people in Europe. The landed gentry and aristocracy who did no work, and everyone else who worked and provided for those who did not work. What did the gentry and aristocracy spend their leisure time doing? They did a number of different things, none of which involved growing food, building houses or serving others, but they were happily involved in 'non-applied' activities, often with some intellectual content. The upper classes did pure; the lower classes did applied. In Germany, it was the lawyers, judges, university teachers and government officials who made up the elite of society rather than the entrepreneurs and wealth creators (Ringer, 1967). The result of this social arrangement was that applied was seen as inferior. Applied research and applied activity were seen as less noble than activity that had no material benefit. Of course, this is pure snobbery and prejudice, and students today may be surprised at this attitude. Nevertheless, it was a widespread attitude that existed in the UK when the author was a student and a young lecturer, even though this attitude is far less prevalent today. The idea that work is inferior to other things is not unique to Europe. In the Indian caste system, Brahmins are at the top of the hierarchy and have the role of priests, teachers and judges. Brahmins were traditionally provided for by the work of other castes. In India people classified as Dalits (the lowest class, who traditionally did the most menial manual work) still suffer from the prejudice of other castes despite government efforts to the contrary. The English class system and the Indian caste system are different types of snobbery and prejudice but in some respects are similar. Prejudice takes a variety of forms and is not limited to prejudice based on ethnicity or gender. Academic snobbery is a form of prejudice that will be described towards the end of this chapter along with gender bias.

The universities were set up as places of learning, originally the learning of the classics – i.e., the plays, history and philosophy of the ancient Romans and Greeks. In Europe, the classics remained an important part of university life in the nineteenth century and beyond. During the nineteenth and twentieth centuries many subjects that had practical applications and that required practical skills were taught in technical institutes or technical colleges, not in universities. In the UK, the Science and Art Department of the Board of Trade was founded in 1853 to promote applied learning, and the Technical Instruction act of 1884 enabled local authorities to raise funds to support technical education. Although medicine and engineering were taught in universities in the nineteenth century, the latter had a low status in England and hardly featured in nineteenth-century university life (Albu, 1980). The history of universities is one where gradually more and more applied topics have been moved from colleges, schools and

Applied results from Wundt's pure research

Although Wundt defined scientific psychology as pure rather than applied, the findings of his laboratory had applications. Research into reaction time (called at the time 'mental chronometry') attracted the interest of astronomers. Stars appear to move across the field of a stationary telescope due to the rotation of the Earth. Astronomers wanted to measure the speed of movement by recording the time interval need for the star to move between two parallel wires placed in the field of vision. They did this by pressing a button when the star traversed the first wire and then again for the second. They found that different astronomers pressed at different times. The study by psychologists in Leipzig provided insight into why this occurred. People have different reaction times (Williams, 1912). Although Wundt intended psychology to be a 'pure' rather than 'applied science,' a use was soon found for it!

technical institutes to within the university system. Art colleges, colleges of agriculture, nursing schools, physiotherapy schools, etc., are now departments or schools within universities. Physiotherapy became an all-graduate profession in the UK in 1992, and nursing training became degree-level in 2000.

Wundt insisted that psychology should be a pure rather than an applied topic because, by doing so, it would form part of the higher-status university life, rather than the lower-status technical college life. If Wundt had suggested that psychology should be studied to solve applied problems, his psychology would not have fitted the ethos needed for a university science.

William James and the beginning of psychology in America

The social structure of America was different from that of Europe. Whereas European wealth was based on hereditary entitlement, American wealth – and therefore social class – was based on practical – i.e., applied – success of varying kinds. The idea that 'pure' was better than 'applied' was therefore less common in America. Hence the development of applied psychology starts in the USA, and the story of psychology development in the USA is connected strongly to the application of psychology to real life problems.

Wilhelm Wundt can be described as the father of psychology in terms of promoting psychology as an institution and he has a prominent position in the history of European psychology. William James (1842–1910) can be described as the father of psychology in America. James helped psychology become an applied science.

The first undergraduate course with the title *Psychology* was taught at Harvard University in 1872 as part of a philosophy degree (Coon, 2000) – note, this was five years before Wundt started teaching psychology at Leipzig. However, that early psychology course at Harvard was not scientific psychology. James had the same problem as Wundt in trying to make psychology a scientific discipline, but his approach to the problem was different. In America, science solved problems. Psychology was a science because it too could solve problems.

William James came from a wealthy liberal, intellectual and artistic family who travelled widely. James was educated at schools in Europe and in the USA. His younger brother became a famous novelist (Henry James). The young William James was skilled in drawing and painting and, when still young, decided to be an artist. For unknown reasons (possibly parental pressure) he gave up this career. Instead, he enrolled in a course in science and then studied medicine, graduating with an MD in 1869. Throughout his schooling James suffered from bouts of depression, gastric problems, and what was described at the time as neurasthenia – now known as ME/CFS or chronic fatigue syndrome. He considered suicide on many occasions. After being awarded his MD, he lived at home due to illness for three years, before taking up a lecturing post in 1872 at Harvard (Myers, 2001).

James was an excellent university teacher; he enjoyed the process of helping a student develop, and his interest in psychology was based on his own personal experience and the experience of teaching others (Croce, 1999). James' liberal education included philosophy. He was appointed assistant professor in philosophy in 1880 at Harvard University, and full professor in philosophy in 1885. By 1889 he had changed his title to professor of psychology, changing it back to professor of philosophy again in 1897. The 1926 *Encyclopaedia Britannica* describes James as a philosopher, though later interpretation is that he remained a psychologist throughout his career (Taylor, 1996). James' personal life almost certainly influenced his view of psychology. He suffered illness even when he was well established as an academic, and published a paper in 1895 with the title "Is life worth living?" (James, 1895).

Throughout his life James was plagued with self-doubt (see James, 1895) and felt that his ability to write was poor. In fact, an Internet search for 'quotes of William James' will show how many well-written and sensible suggestions he makes. James' best-known work is his *The Principles of Psychology*, published in 1890. This book summarises much of what was known of psychology at the time. However, James noted that the people he talked to were particularly interested in how psychology could be applied to problems in life, and so he wrote a much shorter book focussing on application that was published in 1899. This book is based on lectures he gave to teachers, and has the title *Talks to Teachers on Psychology*. Much of the early practical application of psychology in America was on education and James was a pioneer in this regard.

James and Wundt

James was aware of Wundt's work in Germany. One of the first students to attend Wundt's lectures in 1879 was Stanley Hall. Hall had just completed his PhD at Harvard supervised by James and did postdoctoral training at Leipzig. Both Hall and James respected Wundt but had fundamental differences with his approach to psychology. Apart from the difference of practical application, James believed that Wundt's attempt to identify the components of consciousness was flawed, as consciousness flowed as a stream. Whereas Wundt supported the 'brick wall hypothesis,' James supported 'the coalescence hypothesis' (see Chapter 2).

William James and the function of psychology

William James' psychology was influenced by two earlier developments in philosophy and in science. One was Charles Darwin's book *The Origin of Species*, published in 1859. Darwin showed how the physical structures of animals were adapted to their use. For example, birds evolved bills suited to eat food in their environment. The second source of influence was that of the philosopher and mathematician Charles Peirce (1839–1914) who, like James, was educated at Harvard and was a friend of James. Peirce promoted a form of philosophy called pragmatism. Pragmatism is based on the belief that for any living organism to survive, it must develop habitual behaviour that will enable it to satisfy its needs. Both Darwin and Peirce emphasised the importance that physiology and behaviour must be useful – it must be adaptive in some way.

James took these ideas of Darwin and Peirce to suggest that the mind has a use and can be observed in use.

> Our sensations are here to attract us or deter us, our memories to warn or encourage us, our feelings to impel, and our thoughts to restrain our behaviour, so that on the whole we may prosper and our days be long in the land.
>
> (James, 1899/1922, p. 24)

(Note the biblical ring to this quote – James' father was an eccentric theologian.)

James believed that consciousness had a function. Whereas Wundt studied the structure of the mind for its own sake, James believed that the mind had a function in that it controlled behaviour. This idea – that the mind had a function – was to be developed by other American psychologists and formed a distinction between Wundt's type of psychology (given the label of structuralism) and that of American psychology (given the label of functionalism). Structuralism and functionalism were two competing paradigms for the direction of psychology at the end of the nineteenth century and early twentieth century. Both placed introspection as the defining method of psychology, but used introspection for different reasons – i.e., had different assumptions about how introspection should be used.

Two psychologists at the University of Chicago were responsible for developing James' idea that the mind had function. They were John Dewey (1859–1952) and James Angell (1869–1949). Angell was elected president of the American Psychological Association in 1906, and in his presidential address coined the term *functionalism* to distinguish the approach of many psychologists from the structuralist approach advocated by students of Wundt. Wundt's approach to psychology as a pure (i.e., non-applied) science existed in tandem in America along with others who advocated an applied focus. Wundt's approach was supported in America by Edward Titchener (see Chapter 2) who founded a group describing themselves as experimentalists. These experimentalists expressed a strong bias against women, which is described towards the end of this chapter.

Educational psychology: the contribution of James

James made several contributions to education, including providing advice to teachers about how they should teach. Here is a summary of his advice.

James distinguished 'native reactions' from 'habits.' Native reactions are instinctive responses to particular situations, and James made a list of these including curiosity, fear, imitation and ambition. Some responses are therefore simple 'native reactions' to a particular situation. Habits, on the other hand, are acquired responses that, once formed, occur without conscious intention. Much of James' advice to teachers is how to form good habits in children, which is done by exploiting the child's natural tendency to behave in certain ways, i.e., by building 'habits' from 'native reactions.'

> You may take a horse to water, but you cannot make him drink; and so you may take a child to the schoolroom, but you cannot make him learn the new things you wish to impart, except by soliciting him in the first instance by something which natively makes him react.
>
> (James, 1899/1922, p. 39)

James provided some practical suggestions about how to go about this. Children have a 'native reaction' to movement and change. So, the teacher should move about and introduce novelty into the lesson. James stated that voluntary attention is of short duration, so the teacher should engage with the pupil by introducing new ideas that are of interest.

What ideas are of interest to the child? James believed that learning was based on the association of new ideas with ideas that are already established. Therefore, learning is most effective if the new material can be linked with the old. This idea of learning by association was part of the earlier theory of the German educationalist Johann Herbart (1776–1841), which was acknowledged by James – note that Herbart does not feature in early German psychology as education was separate from psychology.

> When we wish to fix a new thing in either our own mind or a pupil's, our conscious effort should not be so much to *impress* and *retain* as to *connect* it with something else already there.
>
> (James, 1899/1922, p. 143, emphasis in original)

James argued against 'cramming' as a way of teaching children. New ideas are most effectively retained if they are associated with many rather than few ideas. Therefore, the most effective learning is that which is done gradually and where numerous connections are made with the new material. This principle is now accepted in modern educational theory and has been developed in several ways, for example problem-based learning.

Quoting experimental work by Herman Ebbinghaus (1850–1909), James showed that forgetting occurs more rapidly at first, but the rate of forgetting decreases with time. James used words such as 'recency' and 'immediate memory,' both of which will be familiar to modern students of cognitive psychology. James showed that, although a pupil may not be able to recall something, the memory trace was not completely absent as memorisation would be faster the second time. Recognition can occur even if recall does not – which is why examinations (James pointed out) may not be the most effective form of assessment.

Finally, James provided advice about the will, or, in modern language, motivation. If a child wants to do something of which the adult disapproves, then rather than inhibit the 'native reaction' of the child, the adult should find a substitution for that native reaction. This substitute should be something else that the child is interested in. Modern child-rearing advice is similar – distraction is a remarkably effective technique for managing young children as parents soon find out.

From where did James get the advice he gave to teachers? Part of it is based on his theory of habit, which he developed from the observation of people. Part is based on a theory of memory, partially supported by research carried out by others. What James did not do is test whether his recommendations actually worked. James' recommendation that teachers should move around when teaching was not based on any evidence and is not supported by any subsequent research – even though teachers' non-verbal behaviour is important (Gorham, 1988). James did not test his theory on children. His recommendations are based on theoretical speculation, albeit sensible theoretical speculation. His recommendations are based on deduction from theory but without the subsequent testing that is required in scientific research. However, he gives generally sound advice by modern standards.

William James and Stanley Hall: Was this applied psychology?

William James was a teacher and educator rather than administrator. It was his ex-pupil, Stanley Hall (1846–1924), who set up the first psychology laboratory in the USA in 1883 at Johns Hopkins University, moving to Clark University at the time it was founded in 1889. While still at Johns Hopkins University, Hall founded the *American Journal of Psychology* in 1887 and after moving to Clark University founded the American Psychological Association in 1892.

Hall wrote a textbook on adolescence in 1904 that influenced educational policy (Hall, 1904). Hall argued that adolescence was characterised by heightened emotions and vigour, something that is self-evidently true, but nevertheless worth saying. Hall recommended sex-segregated schooling (Hall, 1906) in part due to his own personal experience and guilt-ridden feelings concerning sex

James and Hall

William James came from a wealthy liberal family, Hall from a wealthy conservative family. Despite James being Hall's mentor, the relationship between the two men was not good – Hall formed the American Psychological Association in 1892 when William James was out of town (Taylor, 1995)! William James was close to his author brother Henry, and one of Henry's books may have been inspired by his brother's experience of academic life. The novel is called *The Aspern Papers* and describes an academic editor who is ruthlessly pursuing his academic goals with little insight into others, their feelings and the effect he is having on them. A clever aspect of the novel is that it is told in the first person from the point of view of the academic, who feels completely justified in doing what he is doing because his academic goals take precedence over everything else. My guess is that Henry knew about academic competitiveness from his brother and wrote a novel about it. All academics should read this novel and be warned!

(Graebner, 2006). Most modern educationalists do not support sex-segregated schooling, though arguments for and against remain.

What is clear from reading the works of William James or Stanley Hall is that these authors did not make a distinction between applied and non-applied psychology. James refers to the nature of consciousness in the same book that he makes recommendations for teachers. Hall points out that adolescents have a heightened interest in sex, and recommends segregation, but also points out that they have a heightened interest in spirituality without making any specific recommendations. James' and Hall's recommendations were based on theory confirmed to some extent by experience. Neither attempted to test their theories with children in educational settings. Modern research on educational psychology is completely different in that recommendations are based on evidence gathered from pupils. Is the work of James and Hall 'applied psychology'? Their psychology certainly had application, but it would not have counted as applied according to the writing of one of James' colleagues, Hugo Münsterberg.

Münsterberg and forensic psychology

Hugo Münsterberg (1863–1916) was German but he was a critic of Wundt's idea that psychology should be a pure rather than applied science. Although Münsterberg had set up a psychology department in the University of Freiberg, his negativity towards Wundt's ideas led to difficulties and, at the invitation of William James, Münsterberg took up a post in Harvard in 1897. This invitation stemmed from the fact that James was not personally interested in running a laboratory and he felt that Münsterberg was the man for the job – because Münsterberg was a critic of Wundt. Münsterberg has been described as the father of applied psychology because he took a particular interest in the meaning and promotion of applied psychology.

Münsterberg is best known for his book *On the Witness Stand*, which was published in 1908 although it is based on essays written earlier. This book was a bestseller it its day and is still available. In the introduction to this book, Münsterberg provides a clear distinction between experimental psychology and applied psychology. The distinguishing feature of applied research is the intent of the researchers. This is what he wrote:

> If experimental psychology is to enter into its period of practical service, it cannot be a question of simply using the ready-made results for ends which were not in view during the experiments. What is needed is to adjust research to the practical problems themselves and thus, for instance, when education is in question, to start psychological experiments directly from educational problems. Applied Psychology will then become an independent experimental science which stands related to the ordinary experimental psychology as engineering to physics.
>
> (Münsterberg, 1908, pp. 8–9)

The difference between (what Münsterberg calls) experimental psychology and applied psychology is whether the researcher is trying to solve applied problems or is interested in psychological problems that may or may not have an application. Münsterberg defines applied research in terms of intention, and his comparison between engineering and physics shows how he perceives the difference. The difference is not so much pure and applied but basic and applied. Although physics comes into many explanations of engineering, there will also be explanations that are found in engineering but not physics. Applied science solves problems that are not solved by basic science, even though some applied problems are solved by basic science.

Münsterberg's lasting contribution to the field of applied psychology was in the field of forensic psychology. Münsterberg carried out experiments that showed that witnesses were not reliable. The experiments took place during his lectures. Münsterberg would arrange for a scene to be acted out – for example, two students having a heated argument. Then he asked the other students, who did not know that it was an act, to write down what they had witnessed. Münsterberg showed that many of the descriptions were factually inaccurate. Similar experiments were carried out by other researchers in other universities leading to the same conclusion.

Münsterberg carried out other experiments with students. In one type of experiment, he showed students a picture and asked them to memorise the content. Then he provided a list of questions that the students were asked to answer. Some of the questions referred to objects that were in the picture. Some of the questions referred to objects that were not in the picture. Münsterberg found that many students provided answers to the 'not present' objects, and therefore invented content of the picture. He concluded that people were 'suggestible,' and he also showed that children were more suggestible that adults. The implications of this for modern research on false memory should be clear (Principe & Schindewolf, 2012). Not only did Münsterberg demonstrate suggestibility, but he also was able to show that prejudice could affect memory.

> All our prejudices and all our convictions work as such suggestions.
>
> (Münsterberg, 1908, p. 190)

As part of his work on suggestibility, Münsterberg studied false confessions – where someone says that they have committed a crime that they have not committed. He provided examples of this happening in the American criminal justice system and showed how people, when placed under pressure, can imagine and therefore report what they have not done.

Münsterberg experimented with an early form of lie detection test based on an association task. In this task, a person is asked to say the first word that comes into their head when presented with a word. The rationale for this test was that dangerous words (i.e., those associated with guilt) have longer reaction times. Interestingly, a similar method but with a different purpose was developed by Freud (see Chapter 5). Münsterberg wrote:

> A word which stirs emotional memories will show an association-time twice or three times as long as a commonplace idea.
>
> (Münsterberg, 1908, p. 86)

As part of his study into detecting lies, Münsterberg showed that safe words tended to produce the same association when repeated, dangerous words produced associations that tended to change.

Münsterberg concluded his studies with principles that remain true in forensic psychology today:

1 It is important to obtain eyewitness testimony as soon as possible after the event as forgetting increases with time.
2 Leading questions should not be asked because doing so induces false memories.
3 Witnesses can genuinely believe they saw something, and swear that what they say is true, and yet their memory is false.

At first Münsterberg was a popular figure in American psychology and contributed to a number of different areas in applied psychology, including (though not with any great significance) psychotherapy and industrial psychology. However, over time he became a very unpopular figure, and in part this was due to his personal style. Münsterberg never fully integrated into American society and was always hoping for a post back in Germany. William James was irritated by his vain and self-aggrandising personal style. The idea of 'Herr Doctor Professor' was not welcome in a society that was democratic. Coupled with Münsterberg's defence of German intentions just prior to the First World War, Münsterberg became the object of ridicule, receiving letters addressed to 'Dr Monsterbug' and 'Baron Munchausen' – named after the fictional character Baron Munchausen, who told exaggerated stories of his ability (Landy, 1992). Münsterberg's papers were hardly ever cited after his death.

Witmer and the first clinical psychology clinics

In the nineteenth century, mental illness was treated by medical doctors who specialised in psychiatry. Although both Wundt and James had medical training – and although James had experience of mental distress – neither contributed to the study or the understanding of mental illness.

Lightner Witmer (1867–1956) trained under Wundt in Leipzig and on returning to the USA in 1882 took up a position at the University of Pennsylvania where he taught the kind of psychology taught by Wundt. Witmer also joined the American Psychological Association (APA) as a charter member when the APA was formed in 1892. In 1894, his university put on courses for schoolteachers and Witmer became involved in teacher education. One teacher described a boy who had difficulty learning to spell – this would now be called dyslexia. Witmer met the child and tried to help him. Soon after that, Witmer offered a course on how to work with students who were "mentally defective, blind, or criminally disturbed," and formed the world's first psychological clinic at his university in 1896. Witmer coined the term *clinical psychology* to name this new profession which he set about promoting, publishing an article entitled "Practical work in psychology" in the journal *Pediatrics*, also in 1896 (Witmer, 1896). In 1908 Witmer set up a residential school for the care and treatment of children with intellectual or behavioural problems.

Although the diversity of Witmer's clinical cases increased, there was always an emphasis on education in his clinical psychology (Witmer, 1907). Witmer emphasised measurement, in particular physical and neurological traits. Witmer first believed that heredity was important for mental illness, but later concluded that the environment was more important. Although many people in the nineteenth and early twentieth centuries believed that mental illness had a biological and hereditary cause, an alternative approach, called ‘moral treatment,’ had been developed and promoted by people from a religious or non-medical background. William Tuke (1732–1822) was a Quaker and philanthropist who founded the York Retreat in England (Tuke, 1813/1964) for ‘insane’ people, as he believed that contact and influence by a moral person would be helpful. Similarity, in the USA, Dorothea Dix (1802–1887) campaigned for better treatment of the mentally ill (Dix, 1843–1852/1971) in contrast to the asylums where they were often incarcerated in appalling conditions.

The Bethlem Hospital

In England a parliamentary enquiry in 1815 documented widespread abuse of the mentally ill in both private and charitable institutions despite the Madhouses Act of 1774, which sought to regulate how the mentally ill were treated. The enquiry documented all forms of physical abuse, including murder, as well as the excessive use of mechanical restraint (inmates were put in manacles for lengthy periods of time) and ‘conditions of utter filth and neglect.’ The Bethlem Hospital in London (pronounced Bedlam by Londoners) was one of those singled out for its appalling treatment of inmates. At the Bethlem anyone could come and look at the inmates until 1770 when a ticketing system was introduced. The authorities encouraged voyeurism as a means of obtaining charitable donations. Complaints increased after the ticketing system was introduced as there was less public scrutiny of the poorly paid staff who carried out the abuse (Andrews et al., 2013). Change was slow, with the County Asylums Act of 1828 providing better regulation and provision of public service, though abuse of those mentally less able continues to the present day.

If mental illness is purely genetic, then there is little that can be done about it. However, if mental illness is the result of an unsatisfactory environment, then improving the environment of patients may help them get better. Whereas the environmentalist approach had been associated with morality and religion, Witmer promoted it in a way that brought the environmentalist approach within the scientific sphere. Instead of moral treatment where the emphasis was contact with a morally superior person, Witmer proposed that mental illness was caused by a poor environment and that the mentally ill could recover their health if exposed to a better environment. This environmental and educational focus for the mentally ill was consistent with the broader educational focus that was feature of late nineteenth-century and early twentieth-century psychology. The related idea that mentally ill people had learned things incorrectly was to resurface in the later behaviourist approach to mental illness.

Witmer's clinic was headed by a psychologist, was staffed primarily by psychologists and was a starting point for psychologists rather than physicians (i.e., medically trained staff) managing mental illness. Other and later clinics in the USA also had a focus on mentally ill people. William Krohn started a laboratory for the study of the insane in 1897 in Illinois, and in the early part of the twentieth century several hospitals in the USA introduced the practice of a psychological examination of patients on admission. Psychologists worked alongside psychiatrists in a way that was later to be characteristic of clinical psychology in general. These early psychologists provided ways of measuring mental illness, and although there was no specific psychological treatment (Reisman, 1991), the introduction of measurement was the beginning of a scientific analysis of mental illness provided first by psychologists. Note: Witmer was not influenced by Freud – Freud visited the USA in 1909, though Freud had published much earlier – see Chapter 5.

Scott and the beginnings of industrial psychology

Walter Dill Scott (1869–1955) obtained his PhD with Wundt but, like many others, he rejected Wundt's insistence that psychology should not be an applied science. Scott was appointed professor of applied psychology at Carnegie University and combined his academic work with practical contributions to industry. In 1919 he set up his own corporation which helped develop industrial psychology.

Scott made two contributions to industrial psychology. The first was that he was one of the pioneers of advertising (Scott, 1911). Scott believed that "consumers are not rational beings and can be easily influenced" and so set about finding ways of influencing consumers. Part of this was through advertisements that provide a direct suggestion to purchase a product. For example, he developed a successful advertisement that had a picture of Pears Soap, and under which was written in large letters "Use Pears Soap." He also introduced advertisements aimed at women that had an emotional component as he felt that feelings of sympathy were more likely to be responded to by women. Finally, he introduced the idea of return coupons. Consumers were able to return a coupon for a small free sample. Scott argued that this required positive action on the part of the consumer, and so was likely to generate a positive purchase at a future date. The idea of return coupons became particularly popular in the 1960s – Green Shield stamps were introduced in 1958, and unused ones are now collectors' items. A description of how psychology has been used in advertising from a psychoanalytic perspective is provided in Chapter 9.

The second contribution Scott made to industrial psychology was in personnel testing. Scott was interested in finding ways of distinguishing good from bad employees and developed his own way of researching this question. He asked employers to rate their employees in terms of their usefulness, and then gave the employees questionnaire-based tests. The tests were like intelligence tests, except that they were administered in groups. Scott found that some of the items in his tests distinguished the good from bad employees (as rated by the employers), and then employed these items for his tests of personnel selection. Like James, Scott used psychological theory to make recommendations without testing them, but like Witmer, he developed methods of assessment. Psychological assessment was to become a major factor in the development of psychology as a science in the early twentieth century.

Binet and psychological testing

Alfred Binet (1857–1911) was born in Nice, France, the son of wealthy parents. He was independently wealthy. He was appointed to the important but unpaid post of director to the Laboratory of Physiological Psychology at the School of Advanced Studies in 1894.

In the late nineteenth century, the French government introduced a law that all children should be provided with (at least a limited amount of) education by the state – i.e., the beginning of universal state education. However, a problem soon emerged as some children had such low intelligence that they were unable to benefit from the standard education in schools. In 1904 a government commission was set up to investigate the education of these pupils. Binet was appointed a member of that commission, partly because he had started working in 1899 with a physician, Théodore Simon (1873–1961), on measuring people who were called mentally retarded.

Binet and Simon's first test was produced in 1905, with revisions in 1908 and 1911 – the year Binet died (Binet, 1903, 1909/1975). Binet introduced about 30 different tests to measure mental faculties, and these included a kind of testing of higher mental facilities that are now recognised as standard in intelligence tests. His tests enabled him to compare the 'mental faculties' of different pupils. Binet assumed that there were many different mental faculties, and that it was possible to be high on one and low on another. So Binet was not measuring intelligence as a single concept. The concept of general intelligence, or 'the *g* factor,' was introduced some 20 years later by Charles Spearman (1863–1945) (Spearman, 1927). Binet believed that his tests could not "make us know the totality of an intelligence." Instead, Binet's aim was to measure the many mental faculties that he thought were important to guide the selection of pupils through an educational system. Spearman used the finding that the scores on the different mental faculties correlate (he used the method of factor analysis, see Chapter 8) to infer there was an underlying construct of general intelligence that affected all mental faculties. Spearman's idea of general intelligence was used later to allocate children to different schools in the UK – in contrast to Binet's assumption that differences in specific intelligence were important for allocating students to different classes within schools.

When this author was young, intelligence tests were used to allocate pupils to three classes of school in the UK at the age of 11 years: grammar school, technical school and secondary modern – this tripartite system was introduced in the Education Act of 1944. The arguments for the early allocation of pupils to different types of school was later condemned as discriminatory as well as being based on an incorrect assumption that intelligence remains constant as children grow older. Comprehensive schools (i.e., schools that were non-selective) were introduced in 1965 by the Labour government. Some grammar schools still exist and have both supporters and detractors. The several factors that inform this debate are beyond the scope of this book but may be interesting for students.

The politics of applied versus non-applied research

In Europe in earlier times, pure research – i.e., research carried out for its own intrinsic value – had higher status that applied research – i.e., research carried out for commercial gain or for other practical reasons. That attitude remains in some people, primarily by those doing the pure research. However, attitudes are changing, and for some applied research has higher status. Differences of opinion between those supporting applied versus non-applied research have a long history.

The author of *Gulliver's Travels*, Jonathan Swift, was a satirist. His book, published in 1726, describes several different lands, each of which is a satire on some aspect of his society. One of the chapters, about the 'flying island of Laputa' is a satire on the Royal Society – i.e., a society of scientists. The inhabitants of Laputa are a nasty bunch. They have mastered levitation and have created a flying island that they use to extract taxes from ordinary people by hovering over towns and throwing rocks down if they are not given food and drink. Other than that, they spend their time in useless pursuits, such as extracting sunbeams from cucumbers and making marble soft so it can be used in pillows. Swift wrote that there are no women in Laputa because they are too sensible to live there. Swift spoke Spanish. His choice of name for this land was not accidental. *La puta* means 'whore' in Spanish.

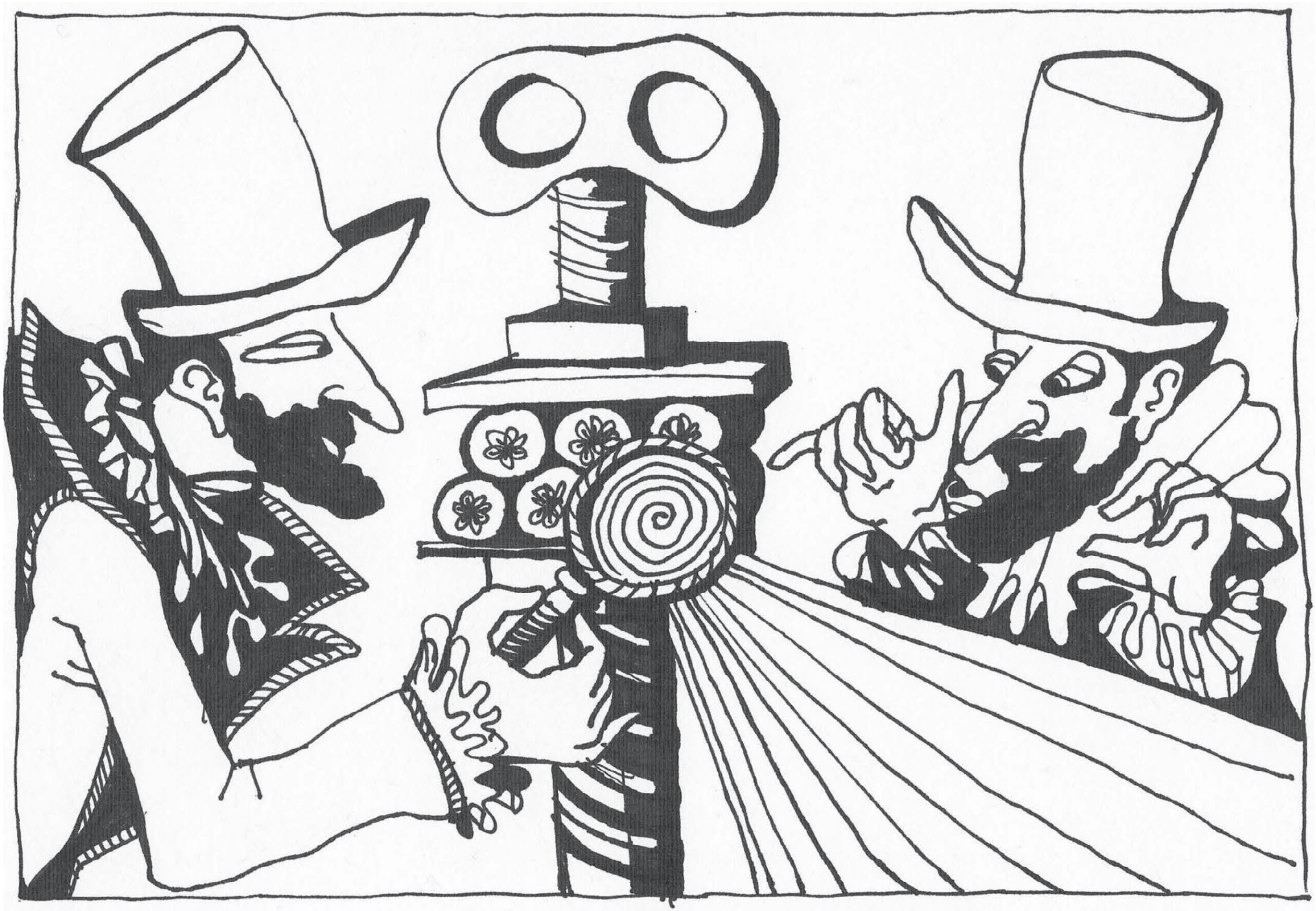

ILLUSTRATION 3.1 Pure science: extracting sunbeams from cucumbers.

Although university authorities in the nineteenth century might consider Latin and Greek the pinnacle of academic achievement, the need for applied education at a higher level was clear to politicians. The nineteenth century saw the formation of the first polytechnics in the UK. These provided education in applied topics, but there were few of them. The polytechnics awarded diplomas, but they did not have degree-conferring status. In 1964 the Labour government created several new polytechnics to meet what was described by Prime Minister Harold Wilson, as “the white-hot heat of the technological revolution.” The intention was to shake up the educational system with brand new, shiny polytechnics that would forge ahead with applied topics. At the same time the Labour government formed the Council for National Academic Awards (CNAA), a body that enabled the existing and newly created polytechnics to award degrees validated by the CNAA. Only applied courses (including psychology) were taught in these new polytechnics, but there was recognition of the need for a broader, more liberal education within the curriculum. However, the polytechnics were seen as having lower status than universities, possibly because they lacked degree-awarding status. The polys, as they were known, never achieved the high status that was their original intent, but in 1992 they were given degree-awarding status and hence converted to universities. Although the ‘new universities’ as they were now called had an emphasis on technological subjects, the ‘upgrading’ of the old polytechnics to new universities also meant that their original aim was abandoned. The universities, not the government, had won.

This is how the UK government eventually won. Universities received and still receive money to carry out research that is allocated without strings attached to the type of research (i.e., money in addition to money allocated to teaching). In order to distribute the money fairly, allocation is based on research output. The original way of measuring research output was the ‘Research Assessment Exercise’ (RAE), which was carried out every five years starting in 1986. The RAE was a type of competition between universities for research money, and the assessment was based on the quality of research – as defined by the universities – and represented primarily in the form of published journal articles. University authorities are (quite reasonably) interested in their funding, so academics were encouraged to engage in high-status research – high-status as defined by their university colleagues – and publish in high-status journals. After this competition had been running for several years, the government came up with a novel idea. Why not specify that, as part of the competition, universities have to explain what impact their research has outside the academic field? The RAE was replaced by the Research Excellence Framework (REF) in 2014. The REF broadened the criteria for assessing research. Not only did the competing universities have to specify their research outputs in the form of journal articles, but they also were required to specify how their research had made a beneficial impact to society at large.

The government got what it wanted. The universities were used to the idea of competition for research funding, but now they had to compete for funding based on impact. When the REF was proposed, many academics were critical. I remember one head of a psychology department saying that impact would never catch on because there was so much criticism from other department heads. On the contrary, the next REF, conducted in 2022, had a higher weighting applied to the impact of research. University authorities (quite reasonably) are interested in funding. The result is that applied research – or at least the impact of research – has suddenly achieved a status it did not have previously in the UK university system.

Research versus teaching

One of the consequences of the RAE and REF was that staff were encouraged to do research. However, if time is spent doing research it is possible for less time to be spent teaching. Recently the government felt that teaching quality was sometimes being sacrificed for research, simply because universities were rewarded for the quality of research, not the quality of teaching. The government had found that competitions between universities work and developed a new competition, the Teaching Excellence Framework (TEF).

What is applied research impact and how is it achieved?

What is research impact? The guidance provided by the 2020 REF committee identifies two criteria, *reach* and *significance*. Reach equates to the number of people who are affected by the change in practice. Significance equates to the degree of change on those affected. An estimate of research impact is therefore assessed by some (intuitive) combination of the number of people affected and the degree to which they are affected by the change in practice. The guidelines make one further important requirement for impact: it must be based on research. There must be a research paper or papers that provide a justification or rationale for the change in practice.

According to these guidelines, neither William James nor Stanley Hall created impact. It is certainly true that they influenced practice and did so to a large degree. However, the change in practice was not based on research, but on observation-based theory. They developed theories based on observation of people around them but they did not test those theories with independent data. By contrast Münsterberg did carry out experiments, and his recommendations for practice were supported by the evidence of his experiments. Other psychologists (Witmer, Scott, Binet) developed methods of assessment that were used where the method of assessment was based on research methodology. If the criteria of impact are used, then applied psychology requires underpinning by research.

What kind of research leads to impact? Chapter 1 provided an account of two types of research and research programmes. In one, theory is developed inductively by collecting data relevant to a particular problem. This type of research is data-led. In the other, speculative theory is tested using deduction to provide tests of the theory. This type of research is theory-led. Data-led versus theory-led is a continuum rather than a binary classification, though for simplicity it is treated as such.

If research is data-led, then impact must come from research in an applied field. Research in clinical psychology, health psychology, educational psychology, occupational psychology, counselling psychology and forensic psychology needs to be conducted with, respectively, people with mental illness, people with somatic illness, children or students, workers, people with problems of varying kinds and perpetrators or staff involved in crime. Applied research in these different areas of application is well established with journals specific to each different type of application.

By contrast, if research is theory-led, then impact can come from a variety of sources. One of the arguments for those carrying out or supporting pure or non-applied research is that their research may have practical applications in the future. The history of science provides examples of how research that had no apparent use at first eventually turned out to have use. When quantum mechanics was first envisaged, none of the theoretical physicists thought that their invention would be used in mobile phones almost a century later. However, although mobile phones use quantum technology, other research was needed to translate the original theory and fundamental research into something practical. This 'other' research, research that develops an application from non-applied research, is called 'translational research.' So, although the argument that 'pure' research can lead in due to course to applications, those applications require the addition of another type of research, translational research. What happens in the laboratory may not happen in real life. Translational research is needed to confirm that the predictions deriving from non-applied research do occur in real life.

Some psychological research is carried out using undergraduates as participants. It may be that some psychological phenomena observed in undergraduates generalise to other populations, just as it may be that some phenomena observed with rats generalise to people (see Chapter 4). However, translational research is needed to confirm that theory and data obtained from undergraduate students apply in other settings. Some applied journals will not publish research that is carried out only on undergraduates. These journals have a policy that they will publish studies only if the participants belong to the target group of the applied journal.

Münsterberg defined applied psychology in terms of intention, the intention of trying to solve a practical problem. It is possible to distinguish three types of research intention in psychology. The aim of non-applied, also called pure, basic or fundamental research, is to understand psychological phenomena for the intrinsic goal of advancing knowledge. There is no intention that the research will lead to any extrinsic benefit. The aim of applied research is to find a solution to a practical problem. Although intrinsic knowledge may result from this research, the aim is extrinsic rather than intrinsic. The aim of translational research is to use research findings developed by those motivated by the intrinsic knowledge and provide evidence of extrinsic benefit. Most psychological research falls into the first two categories: research carried out with the intention of solving a practical problem and research carried out with the intention of furthering knowledge.

Theory and application

Kurt Lewin's famous dictum is "there is nothing so practical as a good theory" (Lewin, 1943a, p. 118). A good theory is practical. In Chapter 1, an account was provided of Lakatos' analysis that theory-led research programmes (progressive problem shift) were more effective than data-led research programmes (degenerating problem shift). The conclusion from Lakatos' analysis is that theory-led research is better both for solving practical problems as well as scientific advances.

Both applied and non-applied research have value. As a science develops and becomes more theoretical, the distinction becomes less important because there is nothing so practical as a good theory. However, the distinction remains important from a political perspective. If research is mostly funded, as it is in the UK, by taxpayers' money, then taxpayers expect their scientists to do something more useful than extract sunbeams from cucumbers!

Applied versus pure psychology and discrimination against women in psychology

You may have noticed that not a single woman has been mentioned in the history of psychology described so far. You may suppose that this simply a reflection of a historical bias against women and that psychologists were simply reflecting the bias of the time. Although this is partly true, it is not the full story.

In America there were two psychology organisations. One organisation was founded by Titchener in 1904 and supported the idea of the pure psychology proposed by Wundt. They called themselves 'The Experimental Psychologists,' later calling themselves the Society of Experimental Psychologists. The Experimental Psychologists are known in history of psychology textbooks as structuralists. The other organisation arose from the shift to functional psychology, and they formed the American Psychological Association (APA), where the focus was on behaviour and on applications of psychology. Behaviourists (see next chapter) also joined the APA. Attitudes to women differed between these two organisations.

The APA was formed in 1892 with Stanley Hall as the first president. In 1905 the fourteenth, and first female, president was Mary Calkins. Calkins had worked with Münsterberg who described her as the strongest student in his laboratory – though Calkins was not awarded a degree from Harvard University because Harvard did not accept women. The APA was less discriminatory towards women than Harvard, even though men far outnumber women as APA presidents up to 2000.

In the UK, there was one woman amongst the ten founders of the British Psychological Society in 1901. Beatrice Edgell was the first woman in the UK to receive a PhD for psychology and the first British professor of psychology. She was president of the British Psychological Society (BPS) between 1928 and 1932. The Australian Psychological society became independent from the BPS in 1966 and its first female president (Mary Nixon) was appointed in 1971.

The representation of women in the history of psychological organisations was very low, and this reflects the societal discrimination against women in earlier times. However, the discrimination by the experimentalists against women was more extreme. The reason is that they perceived the practice of science as a masculine occupation. The experimentalists were trying to join the masculine science club by conducting experiments consistent with the high status of pure science. The bias against women was explicit and referred to as the 'woman problem' – which was that women wanted to become psychologists. The Experimental Psychologists interpreted psychology as a kind of gentleman's club that excluded women. A detailed account of this prejudice is provided in an excellent paper by Rutherford (2015). The main facts are: women were excluded from the Society of Experimental Psychologists in America until 1928; in 1928 only two women were allowed to join, but in a subservient role; and no other woman was allowed to join for a further 21 years, when Eleanor Gibson was allowed to join. Eleanor Gibson was an eminent psychologist and should be known to undergraduates as the person who carried out research on the visual cliff with infants.

An account of the shared prejudice held by the experimentalists against both women and Jews is found in a statement from Edwin Boring (1886–1968). Boring was highly respected and influential in appointments in early twentieth-century

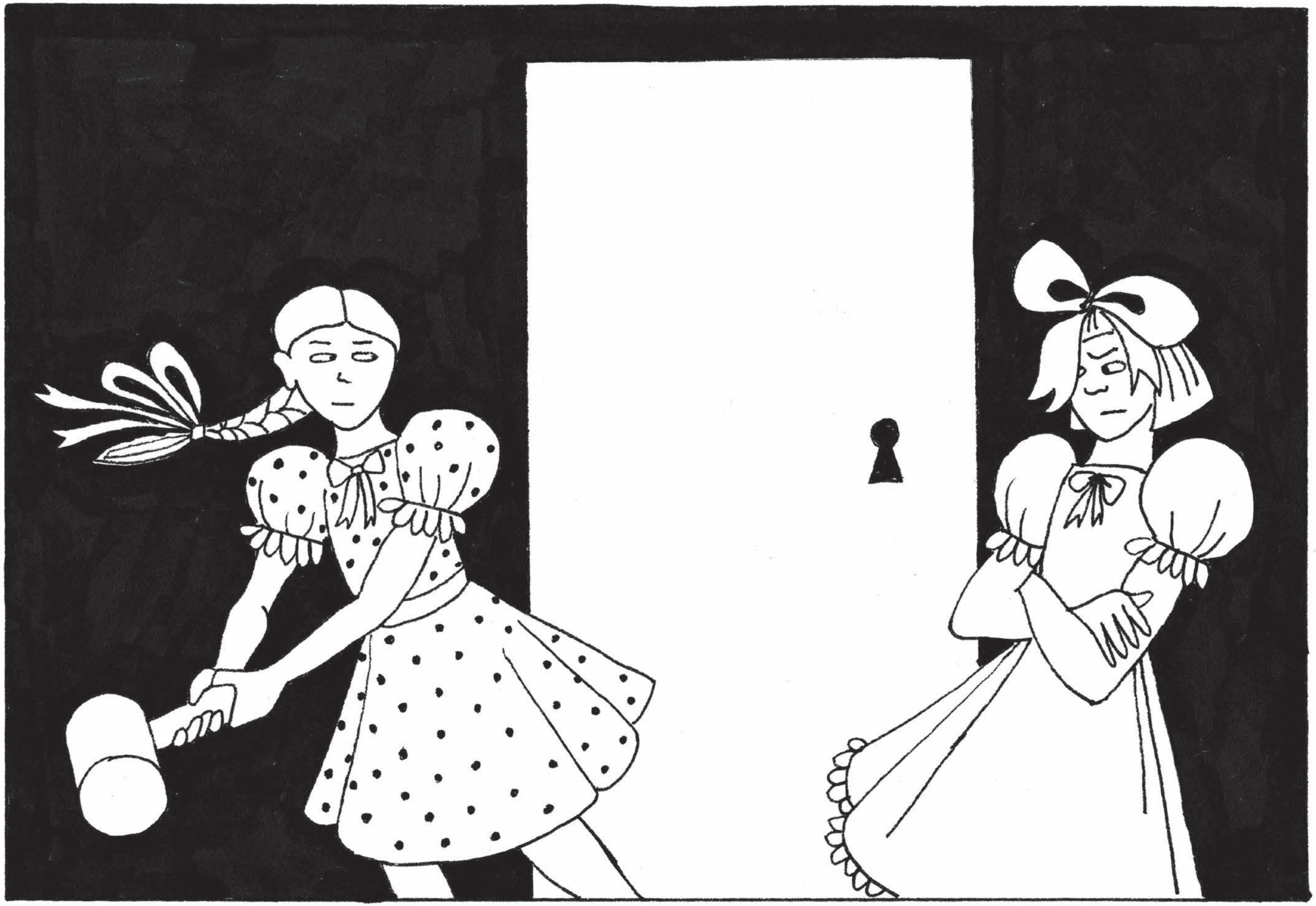

ILLUSTRATION 3.2 The experimentalists excluded women.

American psychology and took over the leadership of the experimentalists from Edward Titchener. When the first women were accepted in the Society of Experimental Psychologists, Boring noted with approval that they accepted their inferior status. In an oral history, Boring is reported to have said:

> the experimentalists in the development of psychology tells against women and against Jews because Jews are not good manipulators of apparatus. I swear there's something there. Again and again. It may be that they just love human beings so that they haven't time for brass instruments.
>
> (Rutherford, 2015, p. 57)

So, there we have it. Women were perceived as unsuited to science because, like Jews, they love humans. They don't like brass instruments. Boring presents the view, accepted by some in America as well as elsewhere, of the high status of 'pure' science. Science is masculine where men work hard without caring about others. Psychology is not a subject that should help people. Instead, it should be a rigorous science that has nothing to do with humanity.

The reason for the anti-feminism of the experimentalists was not only because of their liking for pure research, but because they were intellectual snobs. The modern equivalent of the experimentalists is the American Psychological Society (APS), formed in 1988 to give scientists the autonomy they felt they were lacking in the APA. There has never been any suggestion that the APS is anti-women. Gender is irrelevant to the pure versus applied psychology distinction. It was intellectual snobbery that fuelled the discrimination against women in psychology in the past. Nowadays, many more female than male students apply for psychology courses; female psychologists are often in the majority in professional roles. Psychology is a kinder discipline, and now recognises bias against minority groups and others.

In the wider context, discrimination against women based on intellectual snobbery still exists. There are countries in the world where custom and law requires women to have a role that is subordinate to men. This form of discrimination is supported by a belief that women are intellectually less able than men. What is the evidence for this belief? Because the relative intellectual ability of men and women has important consequences, there has been a good deal of research on gender differences in attainment in children. The findings can be summarised as follow. Girls are better than boys at maths at all ages except for kindergarten. Boys are better than girls at all ages for spatial skills. Girls are better than boys at all ages for literacy skills, and in overall grades girls have a small advantage over boys (Johnson et al., 2022; Voyer & Voyer, 2014). These findings are based on mean scores, but these means have large standard deviations so there is considerable overlap. In addition, there is a large effect of socioeconomic status on academic attainment, so sex should not be used as a criterion for any form of intellectual selection.

In sum, the idea that girls are not as bright as boys or make worse scientists or worse types of scientists is a prejudice that is contrary to the evidence. There is no place for discrimination against women in science or elsewhere, and the discrimination that still occurs in countries today is contrary to the evidence provided by scientific investigation. Chapter 1 provided an account of the way people can support beliefs that are contrary to the evidence. The opposite of prejudice is kindness, kindness to all fellow human beings. The prejudice against women like other forms of prejudice, whether based on race, religion or nationality, is an unkindness that stems from false beliefs. Kindness is the antidote to prejudice. In the first chapter of this book, I recommended the importance of tolerance as a human virtue. In this chapter I would add the importance of kindness, kindness to all humans.

Academic snobbery: prejudice by university

The nineteenth-century view that pure research in universities is superior to applied research has long gone, but academic snobbery remains. British universities compete for funding through the Research Excellence Framework (REF), but this competition also influences another metric: the university league tables. In most advanced countries there are league tables of universities, where universities have been ranked in terms of how good they are. The rankings are made available to the public but without the public understanding what exactly is meant by 'good.' There are also league tables of university rankings across the whole world. The rankings are based on a combination of different metrics of which research output is usually the most important. The rankings influence behaviour in terms of university leaders, lecturers and prospective students. In the UK the Russell group of universities and in the US the Ivy League universities are considered the most prestigious and have the highest rankings. The Russell group of universities consists of some of the older universities and they have higher entry requirements than the newer universities. Private universities in America, which include the Ivy League universities, charge higher fees than state universities.

It is certainly the case that staff at some universities publish more and do better research than those at other universities, but do they provide a better education? University leaders would certainly like to think so as it justifies spending on research (which provides status) in cases where a sizeable percentage of income comes from teaching. The idea that research supports teaching is referred to as the teaching-research nexus. The teaching-research nexus proposes that good researchers will know more about their subject and be more motivated about their subject – and therefore provide students with a better education. As ever, there is a question of evidence versus beliefs. The evidence does not support the hypothesis of the teaching-research nexus (McKenzie et al., 2018; Teichler et al., 2022) as several studies find little relationship between research and teaching skills. In fact, in some cases, better researchers receive worse ratings by students (Palali et al., 2018) and produce worse outcomes (Wolszczak-Derlacz, 2014). The conclusion you should draw is that it really doesn't matter whether you are at a high-ranking university or not in terms of the learning you achieve. Your experience at university will depend on what you make of it, the opportunities you make for yourself, plus random factors such as the people you happen to share accommodation with when you arrive. It is *you* that will determine how good the education is that you receive, not the status of your university.

University life is lot more than education. Some students enjoy the extra opportunities that university life gives; some do not. Students can be happy or unhappy at any university, irrespective of the status of their university in the league tables. Some students become very depressed. As described above, William James considered suicide and was very unhappy at times. Suicide rates are lower in university students than the age equivalent for young people outside higher education (Gunnell et al., 2020), but every suicide is a tragedy for the person, their family and other students. If you are very unhappy, please, please seek help and remember that there is a lot to enjoy outside university life. If you are unhappy, give it time and it will pass – I promise you. Just give it time and talk to someone. Think about William James who considered suicide on many occasions. He was depressed, suffered from fatigue and thought his work had little value. History has shown his self-doubt was wrong. Things will always seem worse when you are depressed.

Summary

Wundt presented psychology as a pure, non-applied subject to gain intellectual acceptance in European society where applied subjects were valued less. Psychologists developed psychology as an applied discipline in America. William James believed that the function of the mind was to control behaviour, a belief that led to the development of functionalism in contrast to structuralism. Functionalist psychologists used a wider range of methods of investigation compared to the earlier structuralist approach associated with Wundt. William James and Stanley Hall developed theories based on observation and used these theories to make recommendations in education but did not attempt to test their theories or the validity of their recommendations. Münsterberg made an explicit distinction between applied and non-applied psychology research, defining the former in terms of the intention of the researchers. Münsterberg carried out experiments in applied settings and his recommendations for forensic psychology were based on evidence, not only on theory. Other applied psychologists also made empirical contributions to their fields. Witmer developed the first clinical psychology clinics in America, focussing on measurement, and he also improved environmental conditions for the mentally ill. Scott pioneered organisational psychology, developing tests for personnel selection and advertisements based on psychological principles. In France, Binet developed the first intelligence tests, intelligence tests that exist with little modification today. The UK government has increased the status of applied research by introducing impact as a criterion for competitive university funding; and nowadays attitudes towards applied research are mostly positive both in the UK and elsewhere. Intellectual snobbery led to discrimination against women in psychology in the past and continues to support discrimination against women today contrary to the evidence. The university league tables provide an example of a form of intellectual snobbery that is tolerated today. Students have positive and negative experiences irrespective of the status of the university they attend.

Essay questions and discussion topics

1. How did Münsterberg define applied psychology and what was his contribution?
2. What advice did William James give teachers about education? Was it good advice?
3. How and why have attitudes towards pure and applied research changed over time?
4. Pure and applied research both have value. What proportion of funding do you think should be spent on pure versus applied research and why?
5. How should the contribution of applied research be assessed?
6. What examples of intellectual snobbery have you come across in your life? How have you and others reacted?
7. Should children be allocated to different schools based on their IQ?
8. How should you react when other people express social attitudes that you feel are wrong?
9. What should be done to support the mental health of students at university?
10. Which aspects of this lesson for life do you agree or disagree with, and can you explain why? Can you think of other lessons that might be drawn from this chapter?

> *Two things can be different without one being better than the other. Men and women are different, but both make equally good psychologists and scientists. Be aware of intellectual snobbery – it is one of the less attractive features of university life. Non-judgemental kindness is a virtue. Enjoy your life at university wherever you are – there is more to life than your psychology course. Keep an eye out for people who appear to be struggling and see if you can help.*

4

How do you explain and control behaviour?

The rise of behaviourism and its replacement by the cognitive paradigm

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This chapter covers several interrelated concepts: why introspection was rejected as a method by psychologists, the assumptions about and the different forms of behaviourism, why cognition replaced behaviourism as the dominant paradigm, and how the cognitive paradigm differs from or is related to the behaviourist paradigm.

From 1920 to 1950 many (though not all) psychologists working in university departments would have considered themselves behaviourists. Research psychologists wore white coats, and they worked in laboratories that contained cages of white rats. Psychology was the psychology of the white rat. Behaviourism did more than anything else to convert public opinion to the view that psychology was a science. When a member of the public evaluates whether something is a science, they seldom use Popper's criterion of falsifiability. If something looks like science – and scientists wear white coats – then it must be a science. Even by the 1960s, when the height of behaviourism had well and truly passed, rat psychology was still an important part of the student curriculum. When the author was an undergraduate in Bristol (1968–1971), the top floor of the three-storey psychology department (a converted Georgian house) was devoted entirely to animals – and students were expected to get used to handling rats. I still remember the smell of rat urine on sawdust that greeted you when entering the front door – entering a pet shop brings back memories of long ago.

Paradigms in psychology are based on assumptions, untested metatheoretical assumptions. Behaviourism was one of those paradigms. The metatheoretical assumptions of behaviourism are (a) that the mechanisms that cause behaviour are the same for rats and humans, and (b) that behaviour should be explained in a particular way. The way of explaining behaviour changed slightly as time went on, so although it is perfectly possible to write about 'behaviourism' as a single 'thing,' this chapter tells the story of a series of ideas that developed between the beginning of the twentieth century until about 1950 – the story from the time before behaviourism started, how it was challenged by the cognitive paradigm, and how the cognitive and behaviourist paradigms differ.

Behaviourism started as an explicit rejection of an earlier paradigm of psychology. That earlier paradigm was psychology based on introspection. Wilhelm Wundt and his students defined psychology as the study of the structure of the mind. William James and his students defined psychology as the study of the *function* of the mind, including what the mind could tell us about behaviour. Behaviour is important for any form of applied psychology so although functionalism replaced the pure science of the experimentalists and structuralists (see Chapter 3), the functionalists still used introspection as the dominant method of psychology as well as to explain behaviour. The problem was that introspection did not always provide the answers to the applied questions psychologists were trying to answer. Behaviourism arose as an explicit rejection of introspection. That rejection was based on evidence, not prejudice, and it led to a type of psychology that was different from before and different from the present day.

There were two problems in using introspection as a method of experimental psychology. One was that introspection as a method failed to explain certain types of psychological phenomena – in particular, behaviour. The second was that laboratories were coming to different conclusions using introspection and one of the characteristics of a science is that findings should be replicable. These two problems are described here before the description of behaviourism itself.

The failure of introspection

What introspection failed to explain

Wundt believed that the higher mental processes could not be studied through experimental psychology. One of his students, Oswald Külpe (1862–1915), disagreed, and when he set up his own laboratory in Würzburg he and others started using introspection to study higher mental processes.

One of the first studies of the Würzburg school was reported by Karl Marbe (1869–1953) in 1901 (Marbe, 1901). Marbe was interested in the way people form judgements of weight. He asked people to lift two weights, one after the other, and then say which was heavier. The task is simple enough. Marbe expected people to be aware of a residual mental sensation of the first weight that could then be used to compare with the second weight. However, he did not find this. He found that people could not really explain how they could judge one weight heavier than the other. They just did it.

The finding that people cannot introspect judgements is important because it suggests that introspection is not a useful tool in finding out how the mind causes behaviour. In fact, later cognitive psychologists studying reasoning have come to a similar conclusion – the reasons that we report for our actions are not necessarily the reasons that direct our behaviour (Kahneman, 2011).

Other research conducted at Würzburg confirmed Marbe's finding that introspection did not always provide an answer when trying to understand higher mental processes. H. J. Watt (1879–1925) investigated the way people name objects. Watt found that people produce the name of an object without conscious thought. It as though the name just appears in consciousness from nowhere (Watt, 1913).

Narziss Ach (1871–1946) studied something that at the time was known as 'the will' but is now known as motivation. Ach was interested in what happens in consciousness when people engage in intentional behaviour. Common sense tells us that before we engage in an action, we 'intend' doing that action. That common sense interpretation certainly does happen. For example, if you hold your arm out and think to yourself 'I intend to raise my arm' you will be aware of the intention before raising your arm. However, Ach found that sometimes goal-directed behaviour occurred without the need for prior thought, and he called this a *determining tendency* (Ach, 1910a, 1910b).

Has the following ever happened to you? You intend to go to one place – for example, to the shops – but you find you have gone somewhere else – for example, you have gone home. Most people have had an experience of this kind. It is an example of a determining tendency. A determining tendency is a tendency to achieve a particular goal but where there is no conscious awareness of the intention when the action is carried out.

Ach presented people with two numbers written on a piece of paper and asked them to say the first number that came into their head. Before showing the numbers, he presented them with one of four words: add, subtract, multiply and divide. The word presented before the task influenced the associated number without conscious awareness. For example, when Ach presented the numbers 6 and 2, if he had said 'add,' the associated number was invariably 8, whereas if he said 'divide' the associated number would be 3. People's behaviour was determined independently of introspection. Stage magicians sometimes use the same phenomenon when they perform magic tricks of mind reading.

In summary, although some behaviour is intentional and therefore linked to mental content, not all behaviour is. Some behaviour cannot be explained using introspection.

Introspection produced different results in different laboratories

The 'imageless thought' controversy was a controversy over whether it was possible to have thought without images. On one side of the argument were the German psychologist Bühler and the American psychologist Woodworth. They demonstrated in their laboratory that it was possible to have thought without any images – i.e., imageless thought. On the other side of the argument was Wundt in Germany and his student Titchener in America. They showed that images always accompanied thought.

Part of the argument concerned the methods used for introspection. Bühler and Woodworth argued that Wundt and Titchener's introspectioners were insufficiently skilled to detect imageless thought – despite the extensive training in introspection that Titchener (Titchener, 1912) insisted upon for his students (Schwitzgebel, 2004). Wundt and Titchener retorted that Bühler and Woodworth's reports of imageless thought were created by suggestion and were illusory. The controversy was never resolved. The problem is that if different laboratories produce different results using the same method, then it is difficult to see how that method can be described as scientific. The problems with introspection were fertile ground for a new type of psychology, one that rejected introspection altogether.

In summary, a second reason for the abandonment of the introspectionist paradigm was that it failed the criterion of providing a scientific psychology.

Precursors to behaviourism

Before the term *behaviourism* was coined, psychologists had started to do animal experiments. One of these psychologists was Edward Thorndike (1874–1949). For reasons that are not entirely clear, Thorndike wanted to study animal behaviour for his PhD at Harvard University – where William James was a professor. The only problem was that psychologists didn't study animals, and biologists didn't study behaviour. To overcome this problem James let Thorndike carry out experiments in the basement of James' house – James was a generous person.

Although Thorndike is remembered for his animal research (1899, 1905), he only spent a few years on it, as he soon "followed the path of least resistance" as he put it and turned to research in educational psychology (Thorndike, 1921, 1932). Educational psychology at the time was an important and respected field of psychology (see Chapter 3).

As part of his research, Thorndike set out to discover how kittens or young cats could open a 'puzzle box' (Burnham, 1972). There were various types of puzzle boxes, each requiring a different solution to how it was opened. For example, Thorndike would place a hungry cat in the box with food outside and then time how long the cat took to open the puzzle box. What he found was that, over repeated exposure to this situation, the length of time to escape decreased. That the animals appeared to learn gradually led to Thorndike formulating his famous laws.

Thorndike suggested two laws, the law of effect and the law of exercise. Thorndike defined the law of effect as follows:

> Of several responses made to the same situation, those which are accompanied or closely followed by satisfaction to the animal will, other things being equal, be more firmly connected with the situation, so that, when it recurs, they will be more likely to recur; those which are accompanied or closely followed by discomfort to the animal will, other things being equal, have their connections with that satiation weakened, so that, when it recurs, they will be less likely to recur.
>
> (Thorndike, 1911, p. 244)

He defined the law of exercise as follows:

> Any response to a situation will, other things being equal, be more strongly connected with the situation in proportion to the number of times it has been connected with that situation and to the average vigor and duration of the connections.
>
> (Thorndike, 1911, p. 244)

When students read these laws nowadays, common reactions are incomprehension and boredom. In fact, what they are saying is very simple. The law of effect means that animals do more of the things they enjoy and less of the things they find unpleasant. This is hardly a novel idea. However, what was novel was the quasi-scientific way in which this simple idea was expressed. Calling it ‘the law of effect’ meant psychology had its own laws, just as Newton had invented the laws of physics. Well, almost! The law of exercise is an equally unsurprising idea. The basic idea had already been expressed by William James in his analysis of habit. Put simply, the law of exercise says that animals tend to repeat behaviours that they have done before. Nevertheless, Thorndike’s laws are important in that he expressed ideas that are self-evident in humans if one focusses on consciousness but may not be self-evident in animals. At the same time, these laws must be contenders for the first prize for ‘The psychology of the bleedin’ obvious.’

Problem with Thorndike’s laws

Are Thorndike’s laws always correct? The answer is no. Although the term *law* sounds impressive, ancient Greek legend has it that whenever someone becomes overconfident, the gods find a way to take them down – the gods punish hubris (hubris = pride)! If a rat is placed in a T maze and always is reinforced for turning right, then according to Thorndike’s laws, the rat should always turn right. In fact, it doesn’t. At some point after turning right on several occasions, it turns left. This is called spontaneous alternation and is explained in the following way. Whenever an action is carried out, it generates ‘reactive inhibition’ to that action. Reactive inhibition accumulates and dissipates with time (Zeaman & House, 1951). When you start feeling bored with your revision, think on this. You are a big rat without a tail and your boredom is caused by reactive inhibition. The answer is simple. Don’t revise for long periods of time. Have a break and do something else.

Thorndike's law of effect has one other feature that is worth noting. Thorndike used the term *satisfaction* but without clearly defining what *satisfaction* is. In fact, Thorndike's approach to satisfaction was circular. If the probability of an action increases, this indicates that the action was satisfying; satisfaction is therefore defined in terms of its effect. However, the idea of 'satisfaction' does imply some form of motivation, and this motivational aspect was developed by later behaviourists.

The beginning of behaviourism: Watson and methodological behaviourism

John Broadus Watson (1878–1958) came from a family background that was rather different from those of other early American psychologists. His father was neither wealthy nor a minister of the church; he was a confirmed atheist who did little to help his family. Watson's mother, who kept the family together, was deeply religious and made Watson promise that he would become a Baptist minister – Watson's second name came from John Broadus, a well-known 'hell-fire' Baptist minister. This was not to be, as Watson decided to work in psychology, applying to the University of Chicago to do graduate work when his mother died. Watson's PhD and his subsequent work at Chicago involved rats – his dissertation (Watson, 1903) was published in 1903 with the title: *Animal education: the psychical development of the white rat*. Watson enjoyed studying rats. Later in life he said how he preferred working with animals to working with humans (Cohen, 1979).

Watson began to realise that the methods he used to study animals could be applied to humans. In other words, it was not necessary to use the method of introspection to be a psychologist. This rejection of introspection was not based only on his dislike of the technique. As shown earlier in this chapter, there were problems with the introspective method. Watson's solution to the problems of introspection was simple: don't use it. He viewed introspection as an unreliable and esoteric form of analysis that should have no place in a scientific psychology. Instead, Watson suggested that psychology should use the methods developed in animal psychology where introspection is not possible (Buckley, 1989). This type of behaviourism is called *methodological behaviourism* because its rationale is based on its method. Methodological behaviourism assumes that objective observation is a better method for understanding psychology than introspection.

Watson was happy at the University of Chicago, but he was employed at a low grade of pay. In 1908 he was offered and accepted the post of professor and director of the psychological laboratory at Johns Hopkins University. It was at Johns Hopkins that Watson made his mark (Watson, 1916, 1919a, 1919b).

The founding of behaviourism is often dated as 1913, the date that Watson published an article titled "Psychology as the Behaviorist Views It" in the journal, *Psychological Review*. The opening paragraph neatly sums up Watson's position:

> Psychology as the behaviorist views it is a purely objective experimental branch of natural science. Its theoretical goal is the prediction and control of behavior. Introspection forms no essential part of its methods, nor is the scientific value of its data dependent upon the readiness with which they lend themselves to interpretation in terms of consciousness."
>
> (Watson, 1913, p. 158)

Watson's behaviourist psychology changed the goal of psychology. Whereas Wundt and structuralists interpreted psychology as the study of the mind, and James and the functionalists interpreted psychology as the study of how the mind influenced behaviour, Watson rejected the mind completely. Watson introduced a psychology that was without the mind and dedicated to understanding and controlling behaviour (O'Donnell, 1987). Notice the emphasis on the control of behaviour also referred to in the quote from Watson above. One aim of applied psychology is to control behaviour, and the control of behaviour was an important consideration for the early behaviourists.

In 1914 Watson published a book *Behavior: An Introduction to Comparative Psychology*, which applied behaviourist principles of learning to animal behaviour. One of the developing assumptions of behaviourism was that it was possible to understand humans by understanding animals: there is no fundamental difference between animals and humans.

Humans are like other animals

The assumption that there is no 'dividing line' between animals and humans is an assumption that is shared by all the different versions of behaviourism. It is a defining feature of the paradigm – or paradigms – that make up behaviourism.

Watson's ideas developed over time, but central to his theory was the idea of the stimulus-response bond. The stimulus-response bond was responsible for habits. Habits developed over a lifetime were responsible for much behaviour. The idea of a stimulus-response bond has clear links with Thorndike's

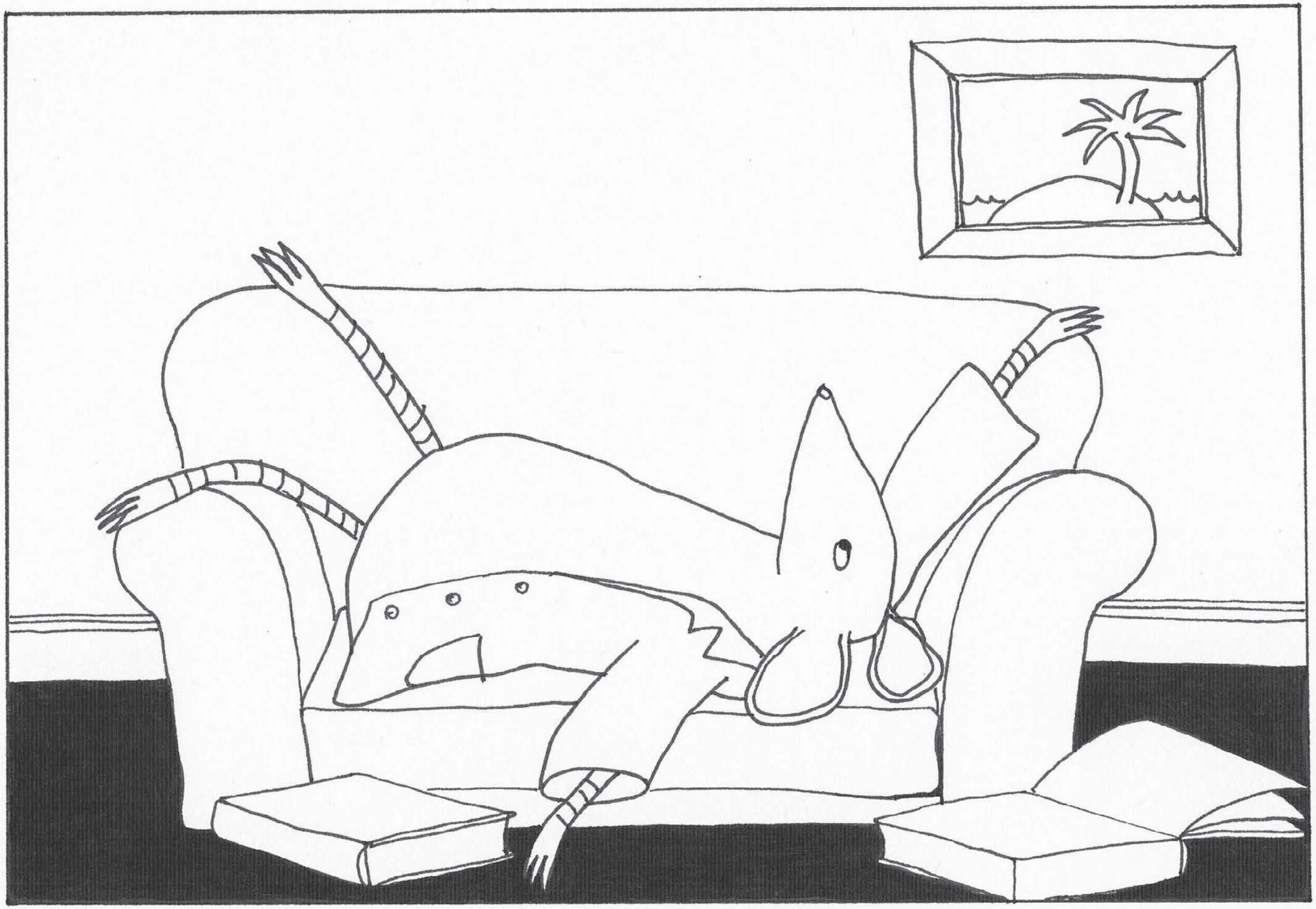

ILLUSTRATION 4.1 Student rat revising.

law of effect and James' concept of habit. However, Watson also linked his use of the term *habit* with the phenomenon of conditioning that had been discovered by Ivan Pavlov (1849–1936) in Russia. In his well-known studies of dogs, Pavlov showed that it was possible to form associations between stimuli – between an unconditioned stimulus (e.g., food) and a conditioned stimulus (e.g., a bell). Watson thought that habits could be conditioned by environmental circumstances, as these circumstances and consequent habits led either to a well-adjusted person or a neurotic person. His strong belief in the environmental determination of behaviour is summed up in his claim, made in 1924:

> Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select – a doctor, lawyer, artist, merchant-chief and, yes, even into beggarman and thief, regardless of his talents, penchants, tendencies, abilities, vocations and race of his ancestors.
>
> (Watson, 1924/1970, p. 10)

Why did Watson think this possible? Although he did not use this modern terminology, Watson thought that animals and humans were adaptive systems. That is, it would be possible to mould people into different types of specialists because they would adapt to the environmental characteristics of those specialists.

Watson gained psychiatric experience by working at the Hopkins' Phipps psychiatric clinic and it was there that he began to apply his ideas of conditioning to the development of neuroses. Watson demonstrated a conditioned fear response in a young child. Watson's study on the conditioning of fear was carried out with Rosalie Rayner and published in 1920 (Watson & Rayner, 1920) – the study would not obtain ethical approval these days – and it is referred to as 'the study of Little Albert.' Watson selected a "solid and unemotional" (his words) child for his experiment, Little Albert, who was about nine months old. Little Albert was afraid of a sudden loud noise, which is a normal fear response for children. Training started by placing a white rat in front of Little Albert, who showed no fear of the rat. Then, when Little Albert reached out to touch the rat, as soon as he touched the rat, the experimenters made a loud noise by striking a steel bar with a hammer. Little Albert jumped at the loud noise. This was then repeated. A week later, there were five more presentations of the rat and noise at which point Little Albert was clearly afraid of the rat and would cry and crawl away. Five days later, when the rat was presented and without the loud noise, Little Albert was still afraid of the rat. Watson believed that this showed that neurotic responses in patients were also caused by conditioning.

Who was Little Albert?

Detective work has led to two competing hypotheses, one that he was a sick child with hydrocephalus called Douglas Merritte (Beck, Levinson, & Irons, 2009), the other that he was a healthy child called Albert Barger (Digdon, Powell, & Harris, 2014). The difference is not trivial in that, if the former, then Watson's description of Little Albert as healthy would have been untrue and finding one falsehood in his study would add to other questions about the true reporting of this study.

The reporting of the Little Albert story became elaborated over time, like a game of Chinese whispers (British English) or game of telephone (American English). In fact, the conditioning effect was weak, and on subsequent occasions Watson had to "freshen up" (Watson & Rayner, 1920, p. 9) the original response by repeating the loud noise. Watson and Rayner were able to show that the fear could be generalised – for example, to a white rabbit, dog, fur coat, cotton wool and a Father Christmas (Watson & Watson 1921).

Watson's later accounts of his experiment feature objects that were not mentioned in his original paper. Watson (1928/72) mentions a rug, and others writing in textbooks have invented a furry glove and even a teddy bear (Harris, 1979). Harris (1979) suggests that these additions were probably invented to make the story more acceptable and believable to students and other readers, a topic he returns to with fresh insight 32 years later (Harris, 2011) with additional evidence of films taken by Watson which contradict the original reporting.

Watson and Rayner not only collaborated on research together, but they also were lovers. Watson's marriage had not been good for several years, and Watson found in Rayner (a psychology student at Johns Hopkins University) the romance that he was lacking at home. In 1920 he divorced his wife and married Rayner in December of the same year. Rosalie then took on his surname, becoming Rosalie Rayner Watson (R. R. Watson). Watson's actions and the publicity arising from it scandalised the authorities at Johns Hopkins University. Rosalie's family had given large sums of money to the university and her letters to Watson became public. Watson was dismissed from his post and his new wife did not get her degree. From then on Watson never obtained a good academic job, but he published in popular magazines and also published a highly influential book on child rearing based on his behaviourist principles (Watson 1928/1972).

Invented history: why was Watson sacked?

Those interested in Watson's personal life might like to note that Watson was, in 1919, voted the most attractive male professor by female students (Benjamin et al., 2007). There is an interesting postscript to Watson's story. It was suggested that the real reason he was sacked was not because of his affair with Rosalie Rayner, but because he was conducting experiments investigating the physiological effects of sexual intercourse – using himself and Rosalie as subjects. This story, however, has been shown to be nothing more than that – just a story (Benjamin et al., 2007), but the fact that the story is told shows how history is elaborated to fulfil the perceptions of the teller – perhaps more so for Watson than for others.

Out of academia, Watson developed a very successful career as a businessman working in the field of advertising (Buckley, 1982). His strategy was to apply behaviourist principles to advertising by using advertisements to elicit emotions in the population. For example, Watson created advertisements for Johnson and Johnson's baby powder that stressed the dangers of infection for babies and the 'purity' and 'cleanliness' of baby powder. In addition, Watson used basic conditioning principles to associate celebrities with a product. Queen Marie of Romania was shown endorsing Pond's cold cream. Similar techniques are used today.

With the arrival of two sons, J. B. Watson and Rosalie Watson applied behaviourist principles to their upbringing and advocated the same principles to others in magazines written for the public. Watson's book *Psychological Care of the Infant and Child* was published in 1928 and became a bestseller. This book was written with the help of his wife, Rosalie, and some citations show both Watsons as authors, but her name is not on the cover.

Watson's approach to child rearing assumed that children were simply mini-adults. Just as there was no fundamental difference in terms of conditioning principles between a rat and human, so there was no difference between adults and children. Many of Watson's recommendations for child rearing were consistent with views expressed by others at the time and not very different from modern practice. For example, he recommended that misbehaviour could be prevented by keeping children busy and using punishment only when this failed; he recommended the establishment of a regular daily routine; he recommended avoidance of fear-causing stimuli (Bigelow & Morris, 2001). The controversial element of his book – both then and now – was his recommendation that children should *not* be shown love (Bigelow & Morris, 2001). He advised parents not to hug or kiss children or let them sit on their laps. Watson believed that children should be encouraged to be independent and the demonstration of emotion by parents would make children over-dependent. He wrote in his 1928 book

> Mothers just don't know, when they kiss their children and pick them up and rock them, caress them and jiggle them upon their knee, that they are slowly building up a human being totally unable to cope with the world it must later live in.
>
> (Watson, 1928/1972, p. 44)

This harsh form of child rearing is now considered to be entirely wrong (Bowlby, 1982) as emotional attachment early in life contributes to later well-being. Both of Watson's children experienced depression in later life, both attempted suicide, one successfully. Both sons attributed their unhappiness to the way they were brought up as children.

Who was Rosalie Rayner?

The story of Rosalie Rayner Watson (1898–1935) is a tragedy. Rosalie came from a well-off American family. As a student she fell in love with a handsome married man twice her age, a respected university professor who preferred working with animals to humans and was convinced that his behaviourist principles were correct. She was devoted to him, respected his views and worked as his assistant, but she was conflicted by her feelings towards her own children as well as being conflicted between the roles of childcare and her career, a conflict that resonates today. Rosalie died at the early age of 35, from dysentery after eating contaminated fruit. Her early death spared her the grief of the death of one of her sons and their recriminations against the way they were brought up. J. B. Watson did not publish after her death. Reviews of Rosalie's life and work are described in detail by Duke et al. (1989) and Harris (2014).

It is common to think of Watson as the person who carried out the studies on Little Albert and forget about Rayner. We do not know whether it was Watson or Raynor who came up with the idea of the 'Little Albert' research, but it is possible it was Raynor not Watson. Rosalie Watson wrote two articles under sole authorship for popular magazines. The first one in 1930 had the title "I am the mother of a behaviorist's sons" (Watson, 1930). In this article she wrote

> In some respects I bow to the great wisdom of behaviorism, and in others I am rebellious … I am still somewhat on the side of the children.
>
> (Harris, 2014, p. 64)

Rosalie's ambivalence towards behaviourism should be viewed in terms of her husband's anti-emotional and misogynistic views. He had previously published an article in a popular magazine with the title "The weakness of women" (Watson 1927) where he berates women for showing affection to children. In her second sole-authored article with the title "What future has motherhood?" Rosalie Watson (Watson, 1932) supports institutional care of children as a way of allowing women to work.

In summary, Watson introduced a new type of psychology that entirely rejected the idea of introspection as a method. He researched the behaviour of animals, and applied ideas developed by Thorndike and Pavlov to show that behaviour could be controlled by stimulus-response associations that created habits. He is known for his recommendations about child rearing, only some of which are consistent with recommendations today. His legacy is controversial. Some considering him second in influence only to Freud, whereas others see him as just a footnote in the development of modern psychology (Weyant, 1968).

Skinner and radical behaviourism

Watson's methodological behaviourism was based on his rejection of the introspective method. B.F. Skinner's radical behaviourism (Schneider & Morris, 1987) was based on an idea from the philosophy of science: theoretical terms are redundant.

Explanatory fictions

The content of scientific explanations is made from two different types of term: observation terms and theoretical terms. Observation terms refer to things that can be seen (e.g., tables, chairs, dials, levers). Theoretical terms refer to things that cannot be seen (e.g., electrons, atoms). The purpose of scientific explanation (or one purpose of scientific explanation) is to predict cause and effect relationships between observation terms. After all, it is the observation terms that really matter in terms of everyday life; no one will worry if an electron is misplaced, but they do worry if their car won't start. For many explanations, theoretical terms *intervene* between observation terms. The intervening theoretical terms provide a rationale for the causal link between the observation terms:

Observation terms → Theoretical terms → Observation terms

or

A (observation) causes B (observation) because of C (a rationale based on a theoretical level of description).

In psychology, the first observation term is called a *stimulus* – S. The second observation term is called a *response* – R. And the theoretical term is called an *organism variable* – O.

So, in psychology, explanations have the form:

Stimulus → Organism variable → Response

or

S → O → R.

(Note: do not confuse 'organism variable' with 'observation term.')

The organism variable explains the link between the stimulus and the response. The crucial question is this. What is the organism variable? As far as the early functionalists were concerned, the organism or O variable was introspection. So, for example, a theory might be

Lion → Fear → Running away

However, the O variable does not necessarily have to be introspection. It could equally well be a physiological variable, for example

Lion → Cortical activation → Running away

The distinguishing factor of the organism variable is that it is some kind of theoretical term – i.e., it is not directly observable.

This idea of observation terms with intervening theoretical terms has been widespread in science and psychology. However, there are those who object to the use of theoretical terms. The objection is based on a simple argument called the paradox of theorising. This paradox was described by Hempel in 1958, and it goes something like this:

1 The purpose of theoretical terms is to form links between observation terms.
2 A successful theoretical term is one that links observation terms.
3 Once theoretical terms have formed those links, then these terms are redundant as the links can be made between the observation terms independently of those theoretical terms.

In terms of psychological theory, the argument goes like this:

1 An organism variable links stimulus to response.
2 Once the organism variable linking stimulus and response is known, then the organism variable becomes redundant because the stimulus and response can be connected directly.

That is, if a theory starts with the form

$$S \rightarrow O \rightarrow R$$

Then, once the connections between stimulus, organism variable and response are known, this relationship can be simplified to

$$S \rightarrow R$$

In other words, if the organism variable does what it is supposed to do, then it can be ignored.

Skinner argued that psychology should restrict itself to S-R links and ignore psychological theoretical terms *irrespective of their nature*. Thus, Skinner rejected physiological explanations just as he rejected mentalistic explanations in psychology.

Skinner's argument for a strict S-R psychology included a damning criticism of the way organism variables are used in psychology, a criticism that theoretical terms in psychology were 'explanatory fictions.'

To illustrate the case of an explanatory fiction, let us return to the example given previously:

Lion → Fear → Running away

Let us suppose that John sees a lion, becomes afraid, and so runs away. How do we know that John is afraid? Because he runs away. If John approached and stroked the lion, we wouldn't suppose that John was afraid. John's fear is *inferred* from his behaviour, the same behaviour which the fear is being used to *explain*.

To give a slightly more banal example, let us suppose that we observe John smiling. We infer from this that John is happy. Because John is happy, therefore he smiles. But we only know that he is happy *because* he smiles.

Skinner points out that the organism variable in psychology is an explanatory fiction. It masquerades as an explanation. It cons us into thinking that an explanation is provided when all it does is redescribe the behaviour. While Skinner's argument has merits, a later section in this chapter will explain what it takes to make an organism variable *not* an explanatory fiction.

Skinner's contribution

Burrhus Frederic Skinner, or B.F. Skinner (1904–1990) originally planned to be an author, but after reading works by Watson and Pavlov he enrolled in a graduate programme of psychology at Harvard in 1928 (Catania, 1992). His career as a behaviourist psychologist lasted six decades and included the publication not only of academic books and papers but also of many non-technical books written for the general population, so that his original aim of being an author was in fact realised (Bjork, 1993). Skinner's book *The Behavior of Organisms* (1938) was his major work. Although focussing on the behaviour of the white rat, Skinner believed that humans were organisms just as the rat was. By organism he meant a unified system of stimulus-response connections (Catania, 1992). Skinner investigated the rat's behaviour with an invention of his own, which is now known as *the Skinner box*. The Skinner box consists of a box in which the rat is placed with a lever on which the rat can press. The rat's lever presses are the responses – and various stimuli, such as food or electric shocks, can be applied by the researcher.

Skinner's main academic contribution to behaviourism was that he established the idea of *operant conditioning* in contrast to *respondent conditioning* – respondent conditioning was the form of conditioning studied by Pavlov, also called *classical conditioning*. Operant conditioning involved the shaping of behaviour through reinforcement, and this idea is directly linked to Thorndike's law of effect. That is, organisms tend to do more of an action that is reinforced (i.e., creates satisfaction) and less of one that does not. Behaviour is controlled by its consequences. The astute student may query whether the idea of satisfaction is an explanatory fiction. Skinner avoided this problem by simply identifying those conditions that were reinforcing – i.e., led to an increase of a particular behaviour. However, in contrast to Thorndike, Skinner believed that reinforcement was better able to shape behaviour than punishment and so advocated the use of encouragement rather than punishment for modifying human behaviour.

The two main assumptions of behaviourism

One assumption is that human behaviour can be predicted from observations made on animals. The second assumption is that behaviour is controlled by its consequences.

Skinner's contributions were not only in the academic sphere (e.g., Skinner, 1935, 1957, 1984a), he also made contributions in three other ways. First, he wrote several books and articles that provided a blueprint for a 'better way of life' based on behaviourist principles (Skinner, 1938, 1953, 1974). His novel *Walden Two*, published in 1948, describes a happy society based on principles of positive reinforcement (Skinner, 1948). Positive reinforcement means that you gain a positive experience. Negative reinforcement means you avoid a negative experience. A similar idea forms the basis of a book by Aldous Huxley, called *Brave New World*, except that Huxley's title is satirical as he wanted to expose the emptiness of a happy life that was controlled by others (Huxley, 1932). Skinner's book *Beyond Freedom and Dignity* (Skinner, 1971) suggests that these two emotions, freedom and dignity, are both illusions. This book was on the *New York Times* bestseller list for 26 weeks.

Skinner's argument about freedom

Beyond Freedom and Dignity presents the following kind of argument. You, the student, have chosen to do the essays and exams in your course and you do so out of your own free will. However, if someone were to say to you, "Write me an essay on a topic for which you have no interest, your essay won't count for anything but if you don't you will be beaten," then you would think that person was coercing you to write the essay. You would feel that you were not writing the essay out of your free choice. If you do things for positive reinforcement, you call it freedom. If you do things to avoid punishment or for reasons of negative reinforcement then you don't feel free, you feel controlled. However, either way your behaviour is being controlled, but if you feel that you are responding to positive reinforcement then you have the illusion that you are in control.

As a second practical contribution Skinner invented something called the 'baby tender' and later renamed the 'aircrib' (Epstein & Bailey, 1995; Joyce & Faye, 2010). The baby tender consisted of a box (about one metre, or three feet, long) with sound absorbing walls and a large picture window on the side. The box was at table height so adults could easily see inside. Heated, filtered and moistened air was pumped into the box, which had a tightly stretched canvas floor made from a long strip of canvas that could be cranked so that a fresh section could be easily put in place. The baby tender followed Skinner's principle of providing children with a pleasing environment. He designed it for his second child, Deborah, on observing his wife's difficulty in ensuring their first baby was neither too cold nor too hot in the harsh climate of Minnesota, USA. Deborah used the aircrib for her first two years and grew up to be a happy and successful adult. Skinner tried to sell his baby tenders, which were renamed as aircribs commercially. Although about a thousand aircribs were sold, with satisfied owners, the idea never really took off (Benjamin & Nielsen-Gammon, 1999). Skinner intended the aircrib to be viewed as kind of luxury crib. However, it was viewed negatively as a kind of baby cage. Subsequent research tracked down about 50 people who as babies had used the baby crib with no evidence of harm (Joyce & Faye, 2010).

As a third practical contribution, Skinner applied behavioural principles to education. After noticing that some children in a class completed work early and so waited, looking bored, whereas others were rushed, Skinner reasoned that the pace of learning should be adjusted to each individual student's rate of working. In addition, he reasoned that learning should involve immediate feedback about whether a solution to a problem was correct, rather than the child having to wait till the end of the lesson or some time in the future. Skinner applied these two principles (individualised rate of working and immediate feedback) to developing teaching machines. Although IBM and other American companies expressed interest in marketing these machines, negotiations came to nothing and in the end this educational innovation never materialised.

A final invention of Skinner's that has received little attention is that of the 'summator.' In essence, the summator was a kind of auditory inkblot – i.e., an auditory equivalent to a Rorschach inkblot. It consisted of barely audible sounds that Skinner assumed would be associated with verbal content that had meaning for the person. Hence, by describing what the sounds 'were saying,' the person provided a description of their latent behaviour. This idea was taken up initially by physicians (it was renamed the tautophone), but never really caught on (Rutherford, 2003).

Skinner was an unassuming man who kept his many honorary degrees in a box in his basement, and whenever he allowed himself to be interviewed it was not to promote himself but to promote behaviourism. He believed strongly that the application of behaviourist principles could increase human happiness by using positive reinforcement rather than negative reinforcement (Skinner, 1976; Wiener, 1996). People who knew him have told the author what a charming man he was.

In summary, Skinner's contributions were multifaceted. His contributions included a philosophical perspective on psychological theory, the application of psychological theory in the form of operant conditioning and several applications of behavioural principles to real-life situations. That these applications were not particularly successful was a great disappointment to Skinner. Why they were not successful is a matter of speculation and a useful topic for discussion. Despite his earlier popularity, by the 1960s popular opinion was moving away from a mechanistic view of people as mindless machines to one that was more in line with the liberalism of the time – where flower power and free love were the new idiom. Skinner's interpretation of psychology was criticised in the popular press (Rutherford, 2000). Nevertheless, he has had an immense influence on psychology with the central belief that people are the product of their environments. At the age of 86 he was still working on the final corrections of a paper entitled "Can Psychology Be a Science of Mind?" the evening before he died (Fowler, 1990).

Neobehaviourism: Hull and Tolman

Methodological behaviourism and radical behaviourism both rejected the use of theoretical terms or organism variables. Nevertheless, organism variables have a value despite the paradox of theorising and despite the problem of explanatory fictions. It is this value, the value of theoretical terms, that was responsible for the development of a type of behaviourism called neobehaviourism.

Imagine a rat placed in a maze. In this experimental situation, the stimulus is the maze and the response is how the rat runs in the maze. If naïve rats are placed in the maze – naïve in the sense that they have not had experience with mazes before – then they will engage in a variety of exploratory responses. The stimulus-response link can be represented as this:

Stimulus of maze → exploratory responses

Now, imagine what happens if non-naïve rats are used, rats who have learned where the goal box is. The non-naïve rat will run straight to the goal box where a reward of food is waiting. The prior history of the rat makes a difference. Equally, if a rat is hungry because it has not been fed, this rat will behave differently to one that is satiated because it has just been fed. Again, prior history makes a difference. It seems that any explanation of the behaviour of a rat must take prior history into account,

The radical behaviourist solution to the effect of history on present behaviour was to incorporate the historical stimuli into the explanation of stimulus and response. The stimulus-response links of the non-naïve rats on the occasions before the test period become part of the explanation.

The radical behaviourist solution retains the original objective of avoiding organism variables. However, the problem with this solution is that it is very cumbersome. A rat may have a long history of maze running, and so to describe the rat's behaviour it is necessary to describe a long list of prior stimuli and responses. Thus, although radical behaviourist solution 'works' it is not particularly practical: it is inconvenient. It was this problem of inconvenience that faced the neobehaviourists.

The neobehaviourist solution was simple. Allow in certain organism variables, but only those that had passed a test. The test the organism variable had to satisfy was that it was *operationally defined*. So, there are some 'good' organism variables you can use and some 'bad' ones you can't. An operationally defined organism variable is one that is defined in terms of its *operations*. Defining something in terms of operations means defining it in terms of observation terms – i.e., defining the organism variable in terms of what it does in terms of observable effects or what observable events cause it. Thus, operational definition means that the organism variable is defined in terms of objective observation. The type of operational definition differed between neobehaviourists, and two different ones will be considered here: the theories of Hull and of Tolman.

Hull's quantitative theory of animal behaviour

Clark Leonard Hull (1884–1952) is remembered as a behaviourist, but his earlier works had a wider focus, including the books *Aptitude Testing*, published in 1928, and *Hypnosis and Suggestibility*, published in 1933. These works appeared at the same time he was publishing learning theory (Hull, 1929, 1930, 1943, 1951, 1952). Hull is best known for his books *Principles of Behavior*, published in 1943, and *A Behavior System*, his final book, which was published in 1952, the year he died.

A distinctive feature of Hull's approach to psychology is that he proposed a quantitative theory – one that involved mathematical formulae. Hull's theory of behaviour 'grew' over time.

There are three organism variables in Hull's theory, each of which is *operationally defined*. The first is called *net reaction potential* and is given the expression:

$${}_{S}E_{R}$$

${}_{S}E_{R}$, or net reaction potential, is the potential to engage in a particular behaviour. The reaction potential is not exactly the same as the behaviour (for example, a rat may be prevented from engaging in the behaviour), but it can be treated as more or less equivalent to the behaviour. Thus, ${}_{S}E_{R}$ is defined operationally in terms of behaviour:

${}_{S}E_{R}$ is approximately equal to behaviour.

Mathematical psychology

Hull was one of few psychologists to introduce quantitative theory into psychology in a way that mimics the quantitative theories of physics and chemistry (but see also Weber's fraction and Fechner's law, Chapter 2). Although very few psychological theories are quantitative, the *Journal of Mathematical Psychology* was first published in 1964 and continues publishing articles to this day. Although some papers relate to reinforcement, others describe human behaviour. For example, Luce's choice axiom (Luce, 1977) provides quantitative predictions about choice. If, for example, the proportion of people choosing chicken over beef in a restaurant is X/Y, then, if pork is added to the menu, although the absolute number of people choosing chicken and beef reduces, the proportion, X/Y, remains the same. The theory is tested not with statistical hypothesis testing but by a quantitative estimate of the extent to which that proportion, X/Y, remains the same under different conditions of choice.

The second of Hull's organism variables is called drive, and given the expression:

$$D$$

D or drive is operationally defined, for example, in terms of the number of hours a rat has been without food. Hull thought that there was one central drive, D, that motivated all behaviour, and that when D was high a rat was more likely to engage in behaviour, any behaviour.

The third of Hull's organism variables is called habit, and given the expression:

$$H$$

H or habit is operationally defined, for example, in terms of the number of occasions a rat has performed that behaviour in the past.

Using these three organism variables, Hull then proposed the following theory

$$_{S}E_{R} = D \times H$$

or, net reaction potential equals drive multiplied by habit.

What this theory suggests is that rats are motivated to behave as a function of the level of drive (otherwise they just sit doing nothing), but the direction of behaviour (i.e., what they do) is determined by habit. That is, drive energises behaviour and habit directs behaviour.

Notice that Hull's three organism variables are operationally defined in terms of external observable variables. Drive is not some internal physiological state and habit is not a pathway in the brain. These concepts are *entirely* described in terms of objective external conditions. Notice that this form of description of organism variables is not very different from Skinner's proposal that there should be no organism variables at all. Because drive is *only* the number of hours without food, it would be possible to dispense with the concept of drive and rely only on the number of hours without food. That is, it would be possible to include the historical stimuli (number of hours without food) with the present stimulus of the maze to explain the rat's behaviour. Hull's organism variables are simply a convenient summary of the external objective stimulus. He does not make the error criticised by Skinner of creating an explanatory fiction by supposing that there is an internal state, called drive, that 'makes' the rat run. Drives are simply convenient summaries of the external objective data.

In a typical behaviourist experiment conducted by Hull, a rat would be placed at the beginning of a maze. There would be food in the goal box at the end of the maze. The behaviour of the rat would be observed. It was found that the rat ran faster if it was deprived of food before the experiment, and it would be more likely to go to the correct goal box if it had received food there in the past. However, over time, Hull found that other variables would also affect the rat's behaviour. For example, the attractiveness of the reward would make a difference, as well as the amount of effort needed by the rat to achieve the goal. These additional variables could not be explained by his initial theory of

$$_{S}E_{R} = D \times H$$

Because of these new findings, Hull introduced new concepts. New concepts began creeping into the theory. Initially there was the concept of incentive, given the letter K, and then the amount of work, given the letter W. Then other organism variables had to be added, so that the equation ended up looking very complex indeed. This gradual increase in organism variables was the inevitable consequence of how the theory developed. At first Hull was interested in a relatively limited laboratory set-up. Over time, that setup became more complex, with the consequence that he had to make the theory more complex. This additional complexity is the consequence of the very nature of Hull's theory. Hull assumed that behaviour could be explained atomistically. That is, the various determinants of ${}_{S}E_{R}$ are simply added together, and the whole is *not* more than the sum of its parts. The eventual outcome of this kind of theorising is that one ends up with an incredibly complex theory.

The reason a theory is useful is that it helps people make sense of the world in which we live by simplifying the complexity that people observe around them. However, as Hull's theory grew it became less good at simplifying and making sense. The more comprehensive the theory became – and Hull wanted to explain all behaviour – the more unwieldy it became. As a theory for explaining a limited number of events in a restricted set-up, the theory was very successful. But as a theory for all behaviour, Hull's approach failed to be successful.

There is a reason for focussing on Hull's theory. The historian Imre Lakatos observed that research programmes that are driven by data are less successful than those driven by theory (see Chapter 1). Lakatos used the term 'degenerating problem shift' to describe research where theory lags behind data. Lakatos did not refer to Hull's theory as an example of a degenerating problem shift, but it is an excellent example of what happens. Theoretical terms were introduced to explain behaviours of the rat that were observed and could not be explained by the existing theoretical terms. To be successful, a theory needs to be able to simplify behaviour, not just redescribe each behaviour using a different theoretical concept. Despite its influence in its day, nowadays Hull's mathematical theory is largely forgotten (Mills, 1978).

Tolman's purposive behaviourism

Edward Chace Tolman (1886–1959) was influenced by the work of gestalt psychologists, particularly Kurt Koffka and Kurt Lewin, and spent time working with Koffka. However, Tolman was also influenced by animal psychologists, and it is in this field that he made his name (Tolman, 1922, 1932, 1948, 1959), though the gestalt influence is evident throughout his work. The gestalt influence makes Tolman a transition figure between behaviourism and cognitive psychology.

One important difference between Hull and Tolman was that Tolman believed that behaviour should be treated as a molar event – hence the term *molar behaviourism* is sometimes used to describe Tolman's approach. Hull treated the rat's behaviour as a sequence of *actions*. For example, the rat would take two steps forward, then three to the left, then another four forwards and so on until the goal was reached. Each step was an action. The central argument of Hull and other behaviourists was that it is the *action* that is reinforced by the goal in the goal box. By contrast, Tolman refers to *acts* meaning that it is 'the arriving at the goal box' that is the act. Thus, Tolman describes behaviour in terms of a *larger* unit than that used by Hull (acts versus actions). However, there is an additional implication of the idea of an act. It is that an act is defined in terms of a goal or purpose. Tolman's behaviourism is referred to as purposive behaviourism.

Hull and Tolman had different views about the nature of learning. According to Hull's theory, learning was associative and incremental. That is, habits were gradually strengthened by repeated actions. By contrast, Tolman believed that learning could be 'all-or-nothing.' In all-or-nothing learning, the animal either knows or it does not know – there is no point in between. Tolman had worked with Koffka, and Koffka had worked with Köhler – who had demonstrated that apes could learn through insight learning (see Chapter 10). So, Tolman was maintaining the tradition started by the gestalt psychologists (see Chapter 10), whose theories focussed on wholes rather than on parts. By contrast, Hull was maintaining the tradition of associationism started by Wundt. In Hull's case, association is a gradual process. The all-or-nothing versus associative or gradual learning controversy was a major point of discussion at that time (Bruce, 1998).

The difference between Hull and Tolman with respect to incremental versus all-or-nothing learning lasted for many years. Each side found that 'their' rats performed in the way their theory predicted. When placed in a maze Tolman's rats looked around, formed a cognitive map of their environment (according to Tolman) and, once they had formed that cognitive map, they always went straight to the goal. According to Tolman, the rats made stimulus (S-S) bonds, which they were able to use in later behaviour. Note the *term cognitive map* – Tolman's theory anticipates cognitive psychology. By contrast, Hull's learned gradually, making progressively fewer and fewer errors. Hull suggested that rats make S-R bonds, not the S-S bonds suggested by Tolman. Just as the debate was becoming irrelevant (with the advent of cognitive psychology) a possible reason for these different results emerged. Hull and Tolman were using different strains of rats. Hull's rats had been selectively bred to be unemotional. Tolman's rats were more closely related to the emotional rats that are found in the wild. Tolman's rats were more afraid and more hesitant and so went to the goal box only when they had learned where they were (Jones, 2003).

The author's rat, Sheila

Rats are bred to be genetically consistent, but they do not behave in exactly the same way. As a student, the author was allocated a rat to study in his second year. The rat was a female, and the author called her Sheila. Sheila was not like the other rats. She was neurotic and didn't want to be handled. The author understood how Sheila felt and gradually got her used to a hand being placed close by. The technician who oversaw the students looked in and told the author he was far too slow, putting in his hand to pick up Sheila. Sheila bit the technician. The author is ashamed to admit that he felt a degree of smug satisfaction at this turn of events.

Like Hull, Tolman introduced organism variables, and these organism variables included expectancy, purpose, cognition, hypotheses and appetite. To illustrate what is meant by expectancy, Tolman suggested that when a response is rewarded, the rats develop an expectancy that the response is going to lead to another response. Although this idea of expectancy may appear to be mentalistic, in fact Tolman was careful to avoid treating organism variables in that way. At least he was careful to make sure his concepts, which he termed *intervening variables*, were operationally defined. However, in a final paper appearing in the year of his death (Tolman, 1959), Tolman reconsidered his own position and suggested that his concepts should be treated as hypothetical constructs rather than intervening variables – following a distinction that had been made some ten years earlier, see the next section. Some of the concepts used by Tolman were later used by cognitive psychologists. In retrospect, it is possible to see that Tolman was conflicted between the dominant paradigm and assumptions of behaviourism and the very different paradigm and assumptions of gestalt psychologists with whom he had worked when young.

In summary, Hull and Tolman produced competing views about how behaviour was controlled. Hull suggested that behaviour was controlled through the formation of stimulus-response bonds that were formed either through drive reduction or through habit. Tolman suggested that behaviour was controlled by stimulus-stimulus bonds (S-S bonds) that enabled a rat to form a cognitive map of the environment and therefore enabled molar behaviour.

Hypothetical constructs and intervening variables

Behaviourists allowed only certain sorts of organism variable into their theories, namely those that were operationally defined. The implication is that there are other organism variables, those that are not operationally defined, and of which, also by implication, the behaviourists disapproved. However, it was not until 1948 that this distinction was made formal, and this was done in a paper by MacCorquodale and Meehl published in *Psychological Review*. Their paper was titled "On a Distinction Between Hypothetical Constructs and Intervening Variables." MacCorquodale and Meehl proposed two things. First that two distinctly different kinds of organism variable were being used in psychology, and second that there should be a linguistic convention for describing these different kinds of organism variable.

MacCorquodale and Meehl's (1948) central argument is that if one accepts the operational definition of a term, then one also must accept that the term does not refer to an entity that has independent existence beyond its definition. This is not an easy concept for students to grasp, so the easiest way to explain it is to take an example. The example is the concept of intelligence. Intelligence can either be treated as an intervening variable or as a hypothetical construct.

Consider two statements:

1 Intelligence is what intelligence tests measure. (*Here intelligence is treated as an intervening variable*.)
2 Intelligence tests measure intelligence. (*Here intelligence is treated as a hypothetical construct*.)

Statement 1 is an example of an operational definition, because intelligence is defined in terms of its operations, namely, the way it is measured. That is, intelligence is *defined* by the intelligence test. Intelligence is nothing more than the information provided by the intelligence test – it does not exist independently of the intelligence test.

Statement 2 provides a description, not a definition, of how intelligence is measured. It is measured by an intelligence test. But if intelligence is measured by an intelligence test, then intelligence must exist independently of the intelligence test.

The key point made by MacCorquodale and Meehl is that, if there is nothing more to an organism variable than its procedures for measurement, then the organism variable should be treated as an intervening variable – i.e., a shorthand summary of that measurement procedure. However, if the organism variable has properties beyond that of measurement *because the organism variable is hypothesised to exist*, then the organism should be called a hypothetical construct. The crucial issue is the hypothesis that something exists independently of its measurement procedures. Hypothetical constructs are organism variables that are hypothesised to exist independently of measurement. They are there whether or not you measure them. Intervening variables are only there if you measure them. They exist only because of the measurement procedures.

Hypothetical constructs are assumed to exist as entities. The technical term is that hypothetical constructs have *ontological status* – there is something 'there.' What exactly it is can be disputed, but the assumption is that there is *something* there. By contrast, intervening variables do not require the assumption of an entity and they do not have ontological status – there is nothing there other than the measurement procedure.

There are two additional features that distinguish hypothetical constructs and intervening variables. First, the *description* of an intervening variable is precise in that it is defined exactly by its operations. There is nothing more to add than the operational description. Hypothetical constructs are not precisely defined by describing what they do. Hypothetical constructs have 'surplus meaning.' Surplus meaning refers to ways of describing the hypothetical construct without referring to what it does. So, for example, if we were to say that there is a motive, a hypothetical construct called *achievement motivation*, which motivates people to achieve, the implication is that achievement motivation does things other than motivate people to achieve – for example, it may make them more prone to write stories about achievement. The surplus of the hypothetical construct acts as a heuristic that guides future research and is a source of inspiration for developing new empirical predictions (Hyland, 1981, 1985).

There is yet one more difference between hypothetical constructs and intervening variables. The *measurement* of the intervening variable is precise; in the case of the hypothetical construct it is approximate. If it is said that intelligence is what intelligence tests measure, then the measure of intelligence tests provides an exact account of a person's level of intelligence, because that is exactly what intelligence is. There is no measurement error. However, if it is said that intelligence tests measure intelligence, then it is assumed that intelligence exists independently of the test, and the test will never be able to provide a perfect description of that independently existing entity of intelligence.

Why did the behaviourist paradigm fail and how did the cognitive paradigm replace it?

History is written by the winners. Behaviourism lost its status as a dominant paradigm. Several authors have suggested that N. Chomsky's criticism of Skinner's explanation of language was the catalyst for change (Virués-Ortega, 2006) though this is almost certainly an oversimplification.

The controversy between Skinner and Chomsky was over the explanation for the development of language. Skinner took an environmentalist position that all that was needed were principles of reinforcement and the right circumstances. Chomsky argued that there is a genetic difference between humans and animals, humans having a 'language acquisition device' that enabled the formation of language. Skinner's view was not as simplistic as it is often made out to be (Skinner, 1984a, 1984b), and he did provide a way of explaining language using behaviourist principles. The problem is that just because a theory

Skinner and Chomsky

Skinner published his book *Verbal Behavior* in 1957, in which he suggested that human language could be understood using the same behavioural principles that governed animal behaviour. The book, which is largely theoretical, was criticised by Noam Chomsky (1959). Chomsky believed that language developed due to an innate language acquisition device, and so could not be explained simply in terms of associative learning. Although Chomsky's criticisms were themselves widely criticised at the time, nevertheless his criticism of Skinner's book is widely believed to have heralded the demise of behaviourism (Virués-Ortega, 2006).

can explain something does not make that theory true (see Chapter 1). The difficulty Skinner's theory faced was not why humans had language but why other animals, when given all the advantages of language development that humans have (e.g., dogs reared in domestic households), do not develop language. The theory explains some but not all parts of the phenomenon of language.

Given the dominance of behaviourism, and given the ubiquity of psychology labs full of rats, it seems unlikely that the empire of behaviourism was demolished by one theoretical controversy. There are two other good reasons for the demise of behaviourism. One reason is that research simply ran out of steam. The other is that cultural factors led to a new to type of theory that explained a new type of phenomenon.

Running out of steam

Lakatos (see Chapter 1) distinguished research that was theory-led (advancing problem shift) from research that was data-led (degenerating problem shift). Behaviourism was data-driven, in part because of a belief that it was objective data that defined something as being scientific. There is precious little theory in behaviourism. The principal ideas are classical and operant conditioning, plus extensions of these two ideas. Once the behaviour of the rat had been fully explored in T-mazes and Skinner boxes, there was not a lot more to discover. The effects of associative learning and reinforcement on behaviour is as true now as it was then. However, there wasn't a lot more to say after several decades of research with white rats.

Cultural factors

Behaviourism developed at a particular time in Western history. It coincided with the introduction of production lines in factories. Workers in production lines made simple repetitive movements. Factory workers needed little cognitive input when working. If one is interested in simple repetitive movements, then the assumptions of behaviourist theories make sense. A modern and more familiar example of a simple repetitive movement is that of gambling with a slot machine. Research using rats shows that a variable reinforcement schedule produces the most amount of work without reinforcement. So, if a gambling machine is set up to pay out on a random basis, then this is more likely to produce compulsive gambling than one with a fixed reinforcement schedule. Gambling machines are based on reinforcement principles. Reinforcement does work. Furthermore, as the behaviourists found with rats, for humans reinforcement is a better way of controlling behaviour than punishment.

Computers were being developed in the 1950s and 1960s. Computers process information, information that cannot be represented in the form of stimulus-response bonds. A computer stores information that can then be combined with the input to make an output, an output that corresponds to a solution of a problem. The development of computers coincided with the development of cognitive psychology. The technological developments led to a new kind of question being asked. How do people process information? How do they remember things? How do they solve problems? The principles of association – the bedrock of behaviourist theory – could not explain information processing. The cognitive paradigm became dominant because it explained behaviours that behaviourism did not explain.

Behaviourist versus cognitive paradigms

The behaviourist and cognitive paradigms differ in two ways. One is the type of question that is being asked. The other is the type of answer that is being provided. The Skinner-Chomsky debate was a rare case where both were explaining the same phenomenon. The rise of cognitive psychology was not that it was a universally better way of explaining things – it was based on a new type of question.

Behaviourist versus cognitive paradigms

The behaviourist paradigm (a) explains behaviours humans share with rats and (b) explains behaviour either without theory or with intervening variables. The cognitive paradigm (a) explains behaviours many of which are not shared with rats and (b) explains those behaviours with hypothetical constructs. The term *hypothetical construct* was later called a *person variable*. Person variables are assumed to exist in some sense in a person. They are not merely a summary of external observations. In the cognitive paradigm the *stimulus* becomes the *situation* or *environment*, and the *response* becomes *behaviour*. So, the neobehaviourist formula of

$$S \rightarrow O \rightarrow R$$

becomes

Situation or Environment → Person → Behaviour

The attentive student will have noticed that McCorquodale and Meehl published their paper distinguishing hypothetical constructs from intervening variables in 1948, so hypothetical constructs must have been proposed before that date. Just as there were antecedents to behaviourism in the form of animal learning studies, so there were antecedents to the cognitive paradigm.

The behaviourists used the term *drive*, which was the result of deprivation of food or water. Murray (1938) used the term *need*. Murray suggested there were biological needs, such as hunger and thirst, as well as social needs, including the need for achievement and the need for affiliation – needs that would then be part of later motivational research. Needs exist as person variables. They exist as entities with a person. Spearman (1927) introduced the idea of general intelligence. General intelligence was assumed to exist as an entity that then influenced behaviour. In the case of both needs and intelligence, the person variables influence a number of different behaviours. Whereas the behaviourists were trying to explain a defined response, other psychologists were trying to explain a much broader picture of human behaviour.

The cognitive paradigm today consists of a wide range of different types of theory, all of which share the feature of person variables that explain behaviour. These different theories are taught in the different courses that make up a psychology degree, including cognitive psychology, social psychology, developmental psychology, clinical psychology, health psychology, environmental psychology, etc. Each of these topics or courses has a history of its own, but it is the developments in cognitive psychology and the idea of information that created the widespread adoption and acceptance of developments elsewhere in psychology.

Development of cognitive psychology

Donald Broadbent's book *Perception and Communication* (Broadbent, 1958) was written before the Skinner-Chomsky debate about language, which goes some way to show that the debate was not as important as sometimes thought. The titles of Broadbent's chapters will be recognised as relevant to a modern psychology course in cognitive psychology – e.g., Chapter 2 "Selective listening to speech," Chapter 9 "Immediate memory and the shifting of attention," and Chapter 10 "The selective nature of learning." Broadbent makes explicit reference to computers in this book showing how ideas developed and how information processing in computers can be applied to humans.

> **Memory versus learning**
>
> As an undergraduate I remember being puzzled by two courses with similar names. The course labelled 'learning' taught us about animal learning, and the effect of different reinforcement schedules. The course labelled 'memory' taught us about the difference between long-term and short-term memory in humans. What I did not realise at the time was that one course provided an answer to the question 'How does an animal adapt to its environment?' The other answered the question 'How is information retained?'

Cognitive psychology arose from an attempt to try to understand the mechanisms that were responsible for information processing. The new breed of psychologists speculated about mechanisms. The idea of using mechanisms or technology for explanations in psychology predates Broadbent's (1958) publication by 15 years. Kenneth Craik (1943) provided an elegant argument, which goes like this. The brain controls behaviour, but it is difficult to understand what is happening in the brain. The brain is able to manipulate structures in the outside world through its effect on behaviour. Because events in the brain parallel those external structures, it should be possible to use the structures themselves as the elements of a theory without having to understand the minute details of what is happening in the brain. Broadbent adopts Craik's argument in his book *Perception and Communication* but citing Craik (1948) only in relation to Craik's description of a self-correcting or control system.

Control systems

The idea of a control system is a good example of the application of a mechanical concept to psychology. The feedback loop, the basis of a common thermostat, has been used in several different ways, including: motor control (Powers, 1976; Todorov & Jordan, 2002); social, personality and health psychology (Carver & Scheier, 1982, 1990); and depression (Hyland, 1987). The set point on the thermostat corresponds to a person's goal. The thermometer in the thermostat corresponds to the sensory input. The central heating boiler corresponds to behaviour, and the room temperature to the environment (see Figure 4.1).

Unlike behaviourists, the new cognitive psychologists were comfortable with terms that were not operationally defined, and which MacCorquodale and Meehl (1948) would have classified as hypothetical constructs but were later referred to as 'person variables' (Hyland, 1985). The hypothesis of, for example, working memory assumes that people really do have working memories. Working

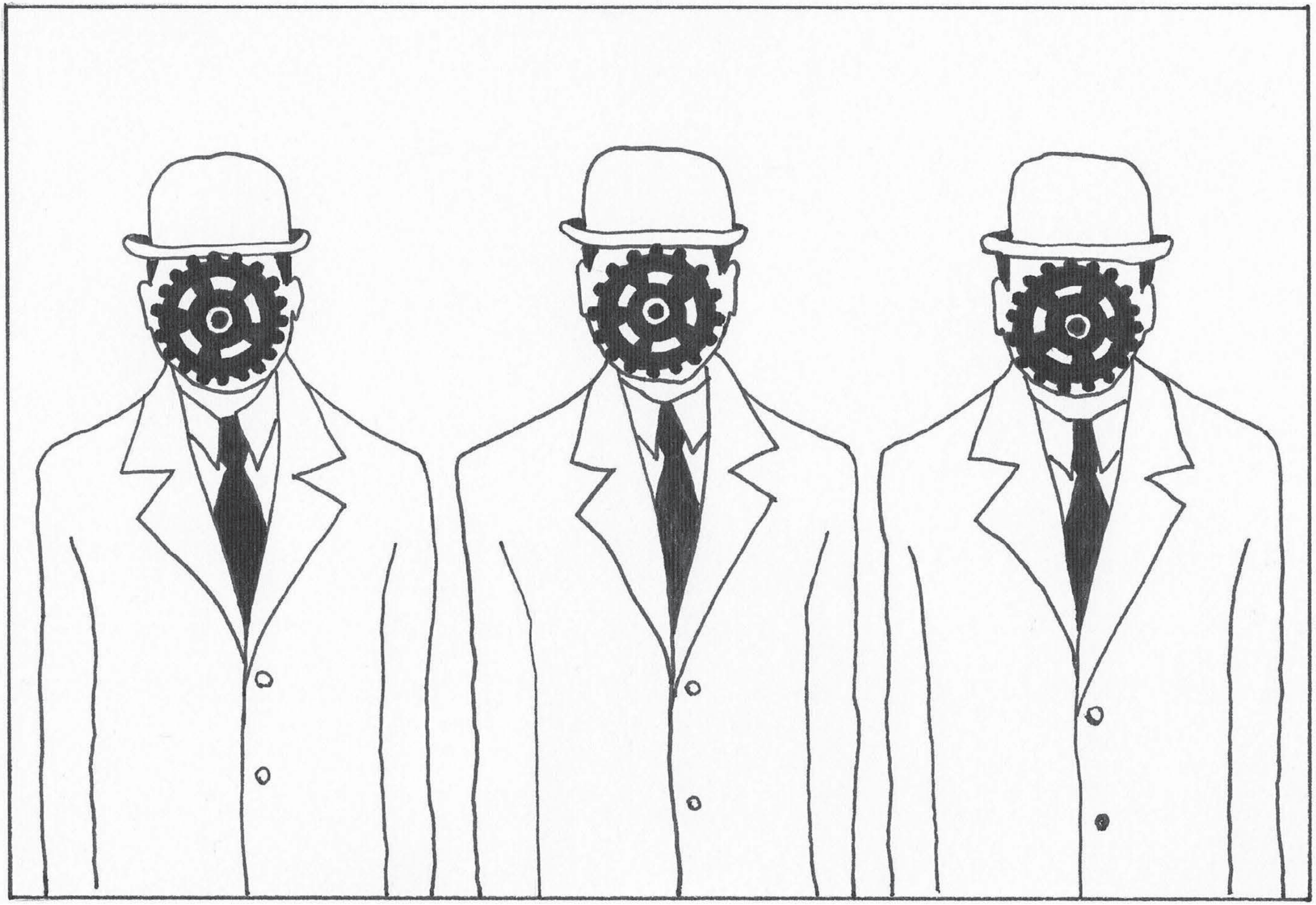

ILLUSTRATION 4.2 People as problem-solving machines.

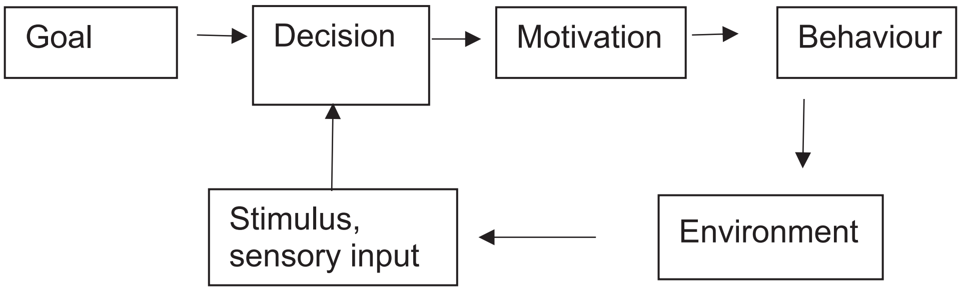

FIGURE 4.1 Psychological concepts can be 'modelled' onto the form of a control system.

memory is real: it has ontological status. It is an idea that is derived from computers which are also real and have ontological status. The acceptance of person variables soon spread to the rest of psychology. Personality theorists assume that personality constructs really do exist. The term *personality construct* derives from the word *hypothetical construct*. One of the authors in the MacCorquodale and Meehl (1948) paper provided an early definition of construct validity (Cronbach & Meehl, 1955). The theoretical terms that come after the behaviourist era are not just a description of data; they provide an explanation in terms of a hypothesised mechanism.

Models

The introduction of the new hypothetical constructs used by cognitive psychologists coincided with the introduction of a new term, *psychological model*, a term rarely used before 1950. What does the term *psychological model* mean?

A model car has four wheels, like a proper car. The relationship between the four wheels is the same as on a proper car, as is the relationship of the wheels to the rest of the car. Almost everything in the model car looks the same as a proper car, except that the model car is smaller. The relationship between the parts remains the same but the parts themselves are different.

The word *model* is used as a synonym for theory, when the theory is 'modelled' on something else, such as a physical structure. The cognitive theory has the same *form* as the physical technology (i.e., the same relationship between the parts), but different *content* (i.e., the parts are different). The term *psychological model* therefore refers to the similarity in form between the psychological theory and something else. In the case of the control theory examples, the psychological theories have the same form as a thermostatic control system, but the content of the theories is different because they refer to the control of psychological phenomena rather than the control of temperature. The hallmark of the cognitive paradigm and the new theories that replaced behaviourism was that they used technology as a heuristic for understanding human behaviour (i.e., for modelling theories) and, specifically, information processing (Miller et al., 1960).

The wider cognitive paradigm

The word 'cognition' comes from the Latin words *cogitare* meaning to think and *cognoscere* meaning to know or learn. At first, the term *cognitive psychology* was associated with the analysis of thought, of memory, reasoning and decision making. However, as time went on the term *cognitive* began to be used more broadly in the context of any explanation that used hypothetical constructs or person variables that were linked in some way to thought. Piaget's work predates computers in general use, but is now interpreted as cognitive. Theories in developmental, social and clinical psychology are commonly described as cognitive. The wider use of the term cognitive has provided a way of reintroducing the mind into psychology. Beliefs, attitudes and expectancies are thoughts. They are types of mental content but can be treated as components in an information processing system. Cognitive psychology made mental content respectable again.

Members of the Würzburg school had shown that although some behaviour is controlled by conscious intention, not all is (see the early part of this chapter). The lack of relationship between mind and behaviour is not a problem within the cognitive paradigm, because behaviour is not only controlled by mental content. The argument goes as follows. Beliefs and attitudes are conscious and introspectable. Beliefs and attitudes are person variables that influence behaviour. However, because beliefs and attitudes are defined in terms of information it is also possible to have implicit beliefs and implicit attitudes that influence behaviour but are not available to consciousness. The cognitive paradigm therefore gets the best of both worlds. It acknowledges the importance of consciousness and the effects of thoughts on behaviour. However, it also allows for other influences that are not available to consciousness. The cognitive paradigm therefore provides a way of representing 'mechanistic' person variables (Hyland, 1985) or functional description (Fodor, 1968) in a wide variety of different psychological contexts – social, developmental, clinical, etc.

Ideas in psychology often link across disparate areas. Behaviourism has links with later developments in cognitive psychology. The original work on learned helplessness theory was conducted with animals (Seligman & Maier, 1967; Seligman, 1968). Subsequent research with humans showed that learned helplessness altered attributions, that is, a person variable, and that a person variable (learned helplessness) affects mood and behaviour (Abramson et al., 1978). The idea of classical conditioning and rate of conditioning has been used in personality theory (Eysenck, 1955) and even today people talk about 'positive reinforcement' but using the term more broadly than used by the behaviourists to mean any form of positive experience. Social psychologists write about the use of eye gaze and non-verbal behaviour as a way of 'positively reinforcing' the behaviour of others.

The cognition paradigm replaced the behaviourist paradigm as the dominant paradigm in psychology, but that is not the end of the story. The term cognitive neuroscience represents the link between the cognitive concepts and biology and will be described in Chapter 6. Cognitive neuroscience is the paradigm with the highest status today, but there are other paradigms that co-exist with cognitive neuroscience. One paradigm based on artificial intelligence will be described in Chapter 10. The assumptions of psychologists concerned with the uniqueness of people will be described in Chapter 8 and those supporting qualitative methods in Chapter 9. No paradigm in psychology has ever been so dominant that it has excluded everything else.

Free will

You may think that your behaviour is not controlled, and that you are free to make the choices you do. The question of free will is outside the remit of this book. However, to explain a behaviour, that explanation must include the factors that are responsible for that behaviour. It is for this reason that psychologists typically don't address the topic of free will, and the implication, therefore, is as Skinner suggested: freedom is an illusion. Science assumes determinism, and psychology shares this assumption. The methodology of science is one of determinism. The existence of free will is unfalsifiable and therefore outside the realm of science (Kirsch & Hyland, 2017). Do you think you have free will?

Final thoughts

Behaviourism is part of the story of psychology. Behaviourism revealed mechanisms that are shared between animals and humans and remain relevant for understanding and controlling human behaviour today. As part of this story, mental content was rejected by Watson, and theoretical terms were rejected by Skinner, for entirely plausible reasons. However, theoretical content is needed for explanation and the lack of theory prevented this largely atheoretical approach from progressing. Behaviourism ran out of steam as a research program but was never 'proved wrong' – only shown to be irrelevant to some important questions in psychology. Cognitive psychology introduced new types of theoretical concept that are relevant to understanding and controlling behaviour through information, and that includes but is not limited to mental content. Cognitive psychology builds on rather than supplants behaviourism.

To end this chapter here is a quotation from Tolman. Students should interpret it as they wish.

> Rats live in cages; they do not go on binges the night before one has planned an experiment; they do not kill each other off in wars; they do not invent engines of destruction, and, if they did, they would not be so inept about controlling such engines; they do not go in for either class conflicts or race conflicts; they avoid politics, economics, and papers on psychology. They are marvelous, pure, and delightful. And, as soon as I possibly can, I am going to climb back again out on that good old philogenetic limb and sit there, this time right side up and unashamed, wiggling my whiskers at all the silly, yet at the same time far too complicated, specimens of homo sapiens whom I shall see strutting and fighting and messing things up, down there on the ground below me.
>
> (Tolman, 1945, p. 166)

Summary

Behaviourism arose because of a failure of the introspective method to explain behaviour, whereas researchers such as Pavlov and Thorndike were carrying out studies and explaining the behaviour of animals. Behaviourists shared the common assumption that animal and human behaviour had the same causes, and so the study of rats could be used to develop explanations of human behaviour. Psychology became the study of the white rat. Methodological behaviourism, radical behaviourism and neobehaviourism are based on different assumptions. For methodological behaviourism, promoted by Watson, the reason for the abandonment of introspection was methodological – introspection didn't work. For radical behaviourism, promoted by Skinner, all theoretical terms including introspections and biological terms should be avoided and instead behaviour explained in terms of observables. The neobehaviourists Hull and Tolman introduced theoretical terms so long as they were operationally defined, but these two psychologists developed very different types of theory. Hull's theory was atomistic and based on the gradual reinforcement and repetition of S-R bonds. Tolman's theory anticipated cognitive psychology and proposed that learning could be 'all-or-none' and that learning involved the association of S-S bonds. The neobehaviourists accepted theoretical terms so long as they were operationally defined, and later described as intervening variables. Other psychologists accepted theoretical terms that had ontological status (existed independently of data) and described as hypothetical constructs. Whereas the behaviourist paradigm coincided with the first industrial production lines, the development of the cognitive paradigm coincided with the development of computers and the information age. The concepts developed in cognitive science were often modelled on technology, including concepts used in computer science. Cognitive psychology reintroduced mental content into psychology, but only mental content associated with a metatheory of mechanism and information processing. Behaviourism declined, not because it was wrong, but because it failed to explain behaviours that were present in humans but not rats. The term *cognitive* is now used to describe a wide range of psychological theories that explain behaviour.

Essay questions and discussion topics

1. What problems arise when trying to explain behaviour by mental content?
2. Why did Skinner reject theoretical terms? What were the advantages and disadvantages of doing so?
3. Compare and contrast methodological behaviourism, radical behaviourism and neobehaviourism.
4. What is the difference between hypothetical constructs and intervening variables? Explain how intelligence can be treated either as a hypothetical construct or intervening variable.
5. What is the meaning of the word ‘theoretical model’?
6. Why did cognitive psychology arise, and in what ways is it different from behaviourism?
7. In what ways are principles of reinforcement relevant to modern life?
8. How do others control your behaviour?
9. Would you be happy to live in a world where everyone was happy and there was no crime or antisocial behaviour because everyone’s behaviour (including your own) was controlled by principles of positive reinforcement? Note: prior reading of Huxley’s *Brave New World* (1932) would be useful but not essential for discussing this question.
10. Which aspects of this lesson for life do you agree or disagree with, and can you explain why? Can you think of other lessons that might be drawn from this chapter?

> *Governments and commercial organisations try to control your behaviour, sometimes for your own good, but sometimes for their own benefit, doing so through reinforcement and by manipulating your cognitions. Be aware of the intentions of others. Choose friends who will influence you in ways that you approve. Positive reinforcement is the best strategy for influencing others.*

5

Why does talking help?

From psychoanalysis to the contextual model of psychotherapy

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Saul Rosenzweig (1907–2004) was a friend and classmate of B. F. Skinner (see Chapter 4). In 1936 he published a paper with the title "Some Implicit Common Factors in Diverse Methods of Psychotherapy" (Rosenzweig, 1936). The paper starts with a quotation "At Last the Dodo Said, 'Everybody Has Won, and All Must Have Prizes.'" Rosenzweig was quoting from the children's story *Alice in Wonderland* to illustrate the conclusion of his paper: all the different psychotherapies were equally effective. Rosenzweig reviewed only those psychotherapies that were those available at the time: some forms of psychoanalysis. The different types of psychoanalysis had different theoretical assumptions and different forms of practice but produced equivalent results, and Rosenzweig suggested that this was because of factors common to all of them. This chapter describes the psychoanalytic approaches of four people: Sigmund Freud, Carl Jung, Melanie Klein and Anna Freud. The chapter ends with a modern explanation of why different types of therapy, including those of today, are equally effective. This modern explanation develops Rosenzweig's idea of common factors.

Paradigms of medicine

To many members of the public, Freud is the most famous psychologist of all time. Yet, Freud was not a psychologist, and some academic psychologists have a low opinion of him. Freud's significance in the history of science is that he initiated a paradigm shift. It was a paradigm shift within the discipline of medicine, not within psychology. Freud trained as a medical doctor: He received no training in psychology. To understand what this paradigm shift was and why it was so significant, it is necessary to know about the medical paradigm that Freud rejected.

The paradigm of modern Western medicine assumes that the body is a kind of biological machine. Like any other machine, the body develops faults, and these faults can be corrected by doctors. The faults are referred to as *pathophysiology*. Diseases are defined by different types of faults, each disease having its own unique and specific pathophysiology. The theories of medicine are biological theories, each theory showing how different parts of the body can go wrong to create disease.

The paradigm of modern Western medicine developed gradually, starting in the seventeenth century. Early support for the paradigm came from the observation that there were anatomical differences between people who were healthy and those with disease. Later, tissue differences and eventually, with the development of powerful microscopes, cellular differences were discovered between those with and without disease.

Before the twentieth century, the main alternative to modern Western medicine was Hippocratic medicine. Hippocratic medicine assumed that to be healthy it was necessary to balance the four bodily humours, black bile, yellow bile, phlegm and blood, and that the same imbalance can create many different diseases. Hippocratic medicine had lost favour by the end of the nineteenth century when Freud was working. The pathologist Rudolf Virchow (1821–1902) was famous for his declaration that there was no such thing as non-specific illness (the basis for Hippocratic medicine). All illness is specific (the basis of modern Western medicine).

Nearly all diseases known today had been identified by the end of the nineteenth century. However, there was a group of diseases where, despite best endeavours, there was no evidence of pathophysiology. This group of diseases was given the collective name of 'nervous diseases' because it was assumed that they were diseases of the nervous system. Nervous diseases included melancholia (i.e., depression), mania, hysterical paralysis and lunacy. Only one nervous disease had its pathophysiology identified – the one named after its discoverer, Alois Alzheimer – and that discovery was published in 1906, a short while after Freud had presented his new ideas (Alzheimer, 1906).

Doing more harm than good

Homeopathy was another contender for a paradigm of medicine in the nineteenth century. In fact, homeopathy was particularly successful in treating typhoid. The reason was this. Those working in general hospitals noticed that people sweated a lot when they had typhoid. They reasoned that the bodies of people with typhoid had too much water, and so treatment involved depriving the patient of drink. Homeopaths did not deprive patients of water but gave treatments that were ultra-diluted and therefore did no harm (they may even have done good via the placebo effect). Much of medical treatment in the nineteenth century did more harm than good. This example illustrates an important principle (also relevant to Freud): just because the paradigm is a good one, it does not follow that the theory is correct.

Freud's new paradigm

Sigmund Freud (1856–1939) studied medicine at the University of Vienna, receiving his MD in 1881. As a student, Freud had worked on the structure of nerves, but would have been aware that no pathophysiology had been discovered for nervous diseases. In 1893 Freud formed a friendship with a Viennese physician, Josef Breuer (1842–1925) who had been treating patients with neuroses with a 'talking cure' and learned how Breuer had treated Anna O. In 1895–1896 Freud was awarded a research grant that enabled him to visit J. M. Charcot (1825–1893) in France who had been treating symptoms of hysteria with hypnosis. Charcot, however, assumed a purely biological cause – his research included detailed photographs of his (largely women) patients, because he felt the physical appearance of the patients held a clue to their illness (De Marneffe, 1991). As a young man, Freud had been exposed to two worlds, one where nervous diseases were treated as faulty nerves, and one where non-biological treatments had benefit.

In 1895 Freud completed two works, one based on the existing paradigm and the one for which he was to become famous. In his *Project for Scientific Psychology* (Freud, 1895/1955, published posthumously), Freud predicts that the brain would provide the answer to 'psychical' phenomena – and therefore nervous diseases. This work presents the standard medical paradigm (Lothane, 1998). However, he also published a book with Breuer, a book with the title *Studies in Hysteria* (Breuer was the first author – Breuer & Freud, 1895/1955), where several case histories were explored, each being successfully cured by the 'talking cure,' and where Freud presented ideas about a new way of understanding nervous diseases.

The paradigm shift initiated by Freud was simple. Instead of assuming that symptoms were caused by a biological abnormality, the abnormality should instead be described in terms of psychology: that a psychological abnormality (for example, repressed memories) was a result from events in the patient's life. The abnormality could be corrected by talking about those events. Freud was aware that the two paradigms were competing ways of explaining and treating nervous diseases. Notice that the new psychological paradigm was consistent with the biological paradigm of modern Western medicine in defining disease with a specific abnormality associated with symptoms – in contrast to Hippocratic medicine where the imbalance was non-specific. So, although Freud's paradigm was new, it shared something with the old – the idea of a fault.

Hippocratic medicine

According to those working in the Hippocratic tradition of the early nineteenth century, madness was caused by excessive phlegm. So were respiratory problems. Madness and respiratory problems were treated by the same 'cure,' the vomiting cure, where the patient was made to vomit. If someone was made to vomit every time they exhibited mad behaviour, it is not too surprising that this 'cure' sometimes worked. As for respiratory complaints, there is no possible reason why vomiting could help.

Historians have speculated as to why Freud rejected a biological interpretation of what came to be known as mental illness, and instead adopted a psychological one. They are just speculations, but here are two of them.

The first is that Freud was aware of the very harmful effects of those who were using biological interventions. At least, he would have become aware from his association with Wilhelm Fliess (1858–1928), a nose and throat specialist in Berlin. Fliess attended one of Freud's lectures and struck up a friendship. Fliess believed that all manner of problems were caused by the nose – he even operated on Freud's nose. It wasn't long before Fliess convinced Freud that nervous diseases had their origin in the nose. Freud sent Fliess one of his patients, Anna Eckstein, whom Freud had diagnosed with hysteria. Fliess operated, but within a month Anna was at the point of death due to a botched operation – some gauze was left in her nose. The relationship between Freud and Fliess cooled. Fliess accused Freud of stealing his theories, and Freud asked for all correspondence between them to be destroyed (which wasn't possible as Fliess had sold them). Perhaps, because of this, Freud was aware of the danger of biological treatments for nervous diseases (Zucker & Wiegand, 1988).

A second possible reason that could have motivated Freud to reject a biological explanation was that biological explanations were strongly connected to the view that mental illness was hereditary (see Chapter 7). At that time, there was a widespread view in Vienna that Jews were degenerate, and that they suffered from mental illness because of their poor heredity. Hitler did not invent anti-Semitism. Hitler visited Vienna in 1908 and was impressed by the mayor's strongly expressed anti-Semitic views. Freud was Jewish – though non-practising – and he was aware of anti-Semitism and this negative view of Jewish heredity. Explaining mental illness in terms of events, not heredity, therefore provided a counterargument to the view that Jews tended towards mental defectiveness.

Freud introduced a new paradigm where mental illness was explained in terms of psychological theory, but he also introduced a theory within that paradigm. It is that theory that is controversial. Later psychologists used the same paradigm of a psychological fault, but with different theories and different types of faults. For example, cognitive psychologists explained mental illness in terms of erroneous cognitions. It is possible that even if Freud had not developed his theory and paradigm, later psychologists would have developed their theories of mental illness anyway. It is impossible to tell. An environmental approach to treating mental illness was developed in the USA in the early twentieth century independently of Freud (see Chapter 3), but there was no specific treatment other than the idea of an improved environment. The early American clinical psychologists measured but did not treat patients.

Although Freud was not a psychologist, his reputation became such that he was invited to visit the psychologists at Clark University in the USA in 1909. The invitation was given by Stanley Hall, the American who founded the American Psychological Association (see Chapter 3). The invitation included one of Freud's students, Carl Jung, who was also becoming well known. Psychoanalysis soon became part of the content of psychology courses, so it comes as no surprise that Freud was and is perceived as a psychologist by the public. By the

1920s Freud's and Jung's theories featured in standard textbooks in psychology, such as Tansley's *The New Psychology* (Tansley, 1920) and McDougall's *Outline of Psychology* (McDougall, 1923).

Freud and the unconscious

In addition to suggesting that mental illness had a psychological cause, Freud also proposed the idea of the unconscious. To what extent was this idea novel? Psychologists working within the Würzburg school had already established that some voluntary action and some kinds of problem solving were carried out without conscious awareness (see Chapter 4). The idea that people were not able to introspect some psychological processes was already established, though it is unlikely that Freud would have been aware of this research. If the term *unconscious* is equated with *non-introspectable* then the concept is uncontroversial and consistent with ideas in current psychology. For example, Kahneman (2011) showed that there are two ways in which people make judgements, one is non-introspectable, fast and 'automatic,' called System 1; and one is slow and deliberate in the sense that the process can be introspected and reported, called System 2. Non-introspectable intuitive processes are also a feature of connectionist psychology (Greenwald, 1992). The idea of implicit attitudes and the implicit attitude test (IAT) are based on a theory that people have attitudes that are not introspectable, or, at least, that they do not report accurately. These later authors did not derive their ideas from Freudian theory, but the parallel with Freud is obvious.

The idea that some mental processes are unconscious or non-introspectable is only part of Freud's concept of the unconscious. Not only did Freud suggest that people had unconscious desires, but he also suggested that these desires conflicted with other desires. One novel feature of Freud's theory of the unconscious was that it was a theory of mental conflict, a conflict that occurs at an unconscious level. The idea of conflict between desires is not specific to Freud. Ethologists after Freud noted that animals exhibited 'approach-avoidance conflict' when a goal has both positive and negative consequences; and psychological conflicts, whether conscious or not, also feature in modern psychotherapeutic approaches. The uniqueness of Freud's contribution was not in the existence of the unconscious, nor in the existence of conflict, but it is in the specifics of each of these.

In summary, Freud not only presented the idea of the unconscious, but also the idea of particular mechanisms occurring at an unconscious level. The idea of mechanisms occurring at an unconscious level is not only plausible but supported by evidence. The autonomic nervous system is complex and functions without the help of conscious awareness. However, the unconscious mechanisms used in later theories are very different from the mechanisms proposed by Freud. It is Freud's mechanisms in the unconscious, not the concept of the unconscious or non-introspectability, that are controversial.

Freud, sex, and the seduction hypothesis

It cannot have escaped the notice of even the most inattentive student that Freud's theory has a strong emphasis on sex. Why is this and where did it come from? To understand the sexual element of Freud's theory, it is necessary to know something about Viennese society at the end of the nineteenth century. Freud lived in Vienna.

Nineteenth-century Vienna was a mix of two societies. The first was the establishment made up of people whose parents, grandparents, and great-grandparents lived in Vienna. The establishment was bourgeois in the sense that it was respectable and comfortable with its respectability. The Hapsburg court was at the top of the establishment and presented itself as very respectable. Sex before marriage was not considered respectable. It was a society of 'high moral fibre.' The second society was made up of immigrants from the East. These immigrants, mainly Poles and Jews, came to Vienna for the same reasons immigrants travel today: a mix of economic opportunity and escaping from danger. In the nineteenth century, it was more dangerous to be Jewish in the East than in Vienna (in Russia, Jews were massacred through pogroms). Freud was born in Czechoslovakia and his family arrived in Vienna when Freud was four years old. The immigrants brought with them new energy and creative ideas in art. These immigrants included Gustav Klimt and his student Egon Schiele. Klimt shocked Viennese society with his art, which was modern and sexually explicit in a way that had not been seen before. Schiele also painted pictures that were at the time considered pornographic.

There was therefore a mix of two societies in nineteenth-century Vienna. One respectable, rule-following, and sexually inhibited, and the other rule-breaking and sexually liberated. It will immediately strike the student of psychology that there is a parallel between this society and Freud's concepts of the id and superego. The conflict between sexual energy and repression was all around him. There is also an interesting development in Freud's concept of the id. The id is a kind of instinct: it makes you want to do things. Freud originally thought there was one desire called the libido. The libido is the sexual instinct. Later (after 1921) Freud thought there were two instincts, Eros and Thanatos. Eros is like the libido in that it drives people to sexual activity. Thanatos is the death instinct – it drives people to kill others. Thanatos as a concept arose after the First World War, a war when people killed each other but in greater numbers than before. It seems that Freud's theories mirrored his experience of society.

Later authors working within the psychoanalytic tradition accepted the idea that there was a 'bad' element to people but did not assume the overarching connection with sex. For example, Jung proposed that each person had a 'shadow.' The shadow was bad in the sense that it encouraged bad desires that were not necessarily sexual. Jung proposed that recognition of these desires ('confronting the shadow') is important for well-being.

Where Freud got his concept of the id from is unclear. A similar idea had been proposed shortly before by the philosopher Arthur Schopenhauer (1788–1860), though Freud reported that he had not read Schopenhauer. However, the idea of 'the bad within all of us' is repeated many times in literature and philosophy. In Book 9 of Plato's *Republic* (380 BCE approximately) (Plato, 380 BCE/1935) there is a description of desires that occur when people dream.

> When the rest of the soul, the reasoning, gentle and ruling part of it is asleep, then the bestial and savage part … begins to leap about, pushes sleep aside, and tries to go and gratify its instincts … It does not shrink from attempting incestual intercourse in its dream, with a mother or with any man or god or beast. It is ready for any deed of blood, and there is no unhallowed food it will not eat.
>
> (Plato, 380 BCE/1935, Book IX)

The relationship with the Oedipus complex is clear from this quote, and Freud reported that he based his concept of sexuality on Plato's concept of Eros – though there are clear differences (Sandford, 2006). The idea of the 'bad within' is also a feature of Buddhist philosophy, which presents the idea that people have bad desires and that controlling these desires is important to happiness. Buddha taught that 'the root of all suffering is desire' (Rahula, 1959).

In addition to philosophers who recognise that people have a 'dark side,' this idea appears in literature. The short novel *The Strange Case of Dr Jekyll and Mr Hyde* was published by Robert Louis Stevenson in 1886 (Stevenson, 1886) and anticipates Freud's ideas by a few years. The story tells of a good man, Dr Jekyll, who, with a mysterious medicine, is transformed into a very bad man, Mr Hyde. The assumption that humans are basically bad assumes a degree of genetic determinism that may not (or may) be entirely justified, but the idea of a bad part of the psyche, which is a characteristic of both Freud and Jung, has a long history.

It is easy to dismiss Freud's preoccupation with sex as a reflection on his own life and society, but the evidence suggests that Freud did find references to sex in his sessions with patients. Among the more controversial of these references was that young women would report sexual contact with adults when they were children. Freud interpreted this child-adult sexual contact as damaging to the child, and the idea became referred to as the seduction hypothesis. Freud later changed his mind, suggesting that women imagined sexual abuse rather than experiencing it.

Historians have disagreed as to why Freud changed his mind. Masson (1984), in a book entitled *The Assault on Truth: Freud's Suppression of the Seduction Theory*, argues that Freud abandoned the idea because of social pressure from his colleagues who were unwilling to countenance the possibility of sexual exploitation of children. Freud certainly refers to negative reactions in some of his letters. More recently Esterson (2002a, 2002b) argued that child sexual exploitation was recognised at the time, but that Freud's colleagues rejected it as a cause of mental illness. According to Esterson, Freud's change of mind reflected Freud's own conviction that his original interpretation was wrong. Whatever the reason, Freud changed his mind on this point, but the association between sexual abuse of children and mental health problems had become public. In the novel written by F. Scott Fitzgerald, *Tender Is the Night*, published in 1934, part of the story concerns a young psychiatrist who treats a young woman who has been sexually molested by her father with resulting mental illness. Thus, although Freud may have retracted his theory, he drew attention to something that is recognised as true today and reflected in current understanding of the damaging effects of child abuse.

What was the talking cure?

Freud influenced others through his books and other forms of writing. Like health professionals who write books for the public today, some of those books included accounts of 'patients I have treated and cured.' It is these case studies that provide insight into how Freud treated his patients.

When Freud referred to his patients, he gave them pseudonyms to protect their identity. Later historians have been able to track down who these people really were and find out more about their history – and whether Freud really cured them. The following are a selection of case studies published at different times in Freud's career.

The case of Anna O

The case of Anna O is one of the best known of Freud's case studies and is the first case where he describes the success of the talking cure. Anna O was treated initially by Breuer and described in Breuer and Freud's 1893 and 1895 publications (Breuer & Freud, 1893/1955, 1895/1955).

Anna O was really Bertha Pappenheim, a young Jewish woman who developed symptoms that included a nervous cough while caring for her seriously ill father. Because of her cough, Bertha was prevented from caring for her father. She first visited Breuer in 1880. Her symptoms progressed, including paralysis and mood fluctuation, deteriorating still further, including anorexia, when her father died in 1881. Breuer introduced Bertha to Freud in 1883 but had stopped treating her in June 1882. Breuer stopped treating Bertha because the amount of time he devoted to Bertha (who was an attractive young women) had come to the notice of his wife. Also, Bertha felt an emotional bond with Breuer. Correspondence between Freud and Breuer's wife shows how Freud first noticed what he later called *transference* and *countertransference*, something that Freud was to develop in his later work. These terms refer to the observation that patients can transfer their affections to the therapist, and the therapist can reciprocate with feelings towards patients, both of which can create considerable problems. The evidence from correspondence shows that Breuer behaved professionally throughout but felt guilty about the situation (Forrester, 1986).

Breuer and Freud wrote in their ‘preliminary communication’ published in 1893:

> For we found to our great surprise at first, that each individual hysterical symptom immediately and permanently disappeared when we had succeeded in bringing clearly to light the memory of the event by which it was provoked and in arousing the companying affect, and when the patient had described that event in the greatest possible detail and had put the affect into words.
>
> (Breuer and Freud, 1893/1955, pp. 6–7)

Ellenberger (1972) suggests that although some symptoms did subside, the overall treatment of Bertha by Breuer was not successful. There are three factors that led to this conclusion. First, although notes were taken during consultation, the case was written up many years after Breuer and Freud had stopped treating Bertha. Second, Bertha was prescribed morphine and chloral hydrate (probably by Breuer), and she was maintained on these drugs till she recovered. Third, despite starting treatment with Breuer in 1880, she was hospitalised in 1881 – her name appears in the register of patients in a hospital in Vienna. It was only in 1882 when she was in hospital that any attempt was made to wean her off the drugs – which may have been contributing to the worsening of her symptoms in the first place.

De Paula Ramos (2003) says

> After a review of Bertha’s clinical picture, it is clear that the vast majority of her symptoms … are compatible with dependence on a nonbarbiturate sedative and narcotics.”
>
> (p. 46)

Despite later evidence that Bertha’s treatment was not as successful as Breuer had suggested, this early case provided the impetus for Freud to develop his later theories and treatment. It is significant, however, that Breuer writes in this case study that “the element of sexuality was astonishingly undeveloped.” The emphasis on sexuality, which forms an important part of Freud’s later case studies, is missing in this first case study.

The case of Dora

The case study of Dora (real name Ida Bauer) was published by Freud in 1905 (Freud, 1905/1955). It is in this publication that Freud suggests that dreams represent repressed desires and that hysterical symptoms are the result of repressed desires. Dora – or Ida – fitted the description of a hysterical girl. She was 18 years old, depressed and had episodes when she would lose her voice. By all accounts, her family life was chaotic – including that her father was having an affair with the wife of the couple for whom she babysat, and that the husband of that couple propositioned her when she was aged 14. Ida first visited Freud in 1898.

Freud analysed Ida's dreams and interpreted her problems as being due to repressed desire for her father, and both members of the couple for whom she babysat. Ida rejected this interpretation and ceased analysis. However, her father encouraged her to return in 1900. After further analysis of her dreams, combined with Freud's interpretation, her symptoms reduced and Freud reports that she felt there was some truth in what Freud had said. Others have suggested that this case illustrates that Ida got better when she matured sufficiently to stand up to Freud and the group of dysfunctional characters who made up her life (Decker, 1991). This case is often cited because Freud emphasises a sexual element that at first the patient rejects and then comes to accept.

The case of the wolf man

Freud published the case of the 'wolf man' in 1918 (Freud, 1918/1955). The wolf man was Sergei Pankejeff, a Russian aristocrat. Sergei came to Freud because he was very depressed and constipated. Both Sergei's father and sister had committed suicide due to depression, and, when young, Sergei had a fear of animals. The label 'wolf man' comes from a repeating dream reported by Sergei where he saw six or seven white wolves outside his bedroom window. Each time this occurred, he was afraid of being eaten by the wolves, screamed and woke up. Freud's interpretation was that the source of Sergei's problems was his relationship with his father, who Sergei admired because he believed him to be a perfect gentleman. Freud believed that Sergei suffered from castration anxiety and was frightened of his father. Freud interpreted this dream as being caused by Sergei seeing his parents having sexual intercourse – though he later suggested that Sergei might have witnessed copulation between animals that then generalised to his parents.

Sergei was not impressed by Freud's interpretation. After all, young children in well-off families did not sleep in the room of their parents but with a nanny. Freud treated Sergei over a period of four years (1910–1914) and claimed to have cured him, but the evidence suggests that Sergei was in and out of treatment throughout his long life – he lived until he was 92 years old (May, 1990).

The case of Little Hans

Little Hans (in fact Herbert Graf) was a four-year-old boy who developed a fear of horses. Freud treated Herbert primarily using the father as an intermediary, and published his analysis in 1909 (Freud, 1909/1955). Freud was convinced that this fear of horses stemmed from hostility towards the father and an unresolved Oedipal conflict. Herbert had pointed out to his mother that horses have 'widdlers' and that his mother did not have one – i.e., he was aware of sexual differences. His mother had previously told Herbert not to play with his widdler – "If you play with your widdler, Dr A will cut if off and then what will you have to widdle with?" This admonition by his mother led to an association of castration anxiety and horses. Freud believed that Herbert associated horses with his father as Herbert told him he particularly didn't like horses with black bits in their mouths – which Freud assumed was a symbolic representation of his father's moustache. According to Freud's interpretation, whenever Herbert saw a horse, he was reminded of his hostility towards his father, his love for his mother, and this produced fear of castration. The very long and detailed case history provides lengthy descriptions of statements by Herbert and his interest in widdlers, and who did or did not have them. Herbert is unlikely to be the first young boy who, when presented with a younger sister, was surprised to find she had no widdler – or as Herbert put it, "it is very small, but it would grow."

An entirely different explanation might be that Herbert saw a horse and cart fall in the street and became afraid simply due to associative learning (compare with Watson's account of Little Albert, Chapter 4: children are afraid of loud noises). Students can make up their own minds as to whether the Freudian or behaviourist explanations of Little Hans is more likely.

There is a rather nice postscript to the Little Hans story, as most people reading it would have assumed that Little Hans would grow up to be a big Hans with lots of psychological problems. Herbert Graf visited Freud in 1922 at the age of 19 and told him that he was Little Hans – Freud having lost contact for at least 10 years. Herbert Graf (or big Hans) was a perfectly happy and well-adjusted young man. So, if a child of yours develops an interest in his widdler, there is nothing to worry about.

Freud concludes his case study with this postscript that was added to the original case study:

> One piece of information given me by little Hans struck me as particularly remarkable; nor do I venture to give any explanation of it. When he read his case history, he told me, the whole of it came to him as something unknown; he did not recognize himself.
>
> (Freud, 1909/1955, p. 148)

Whereas Freud interpreted this as amnesia associated with the case, students might like to come to their own conclusion.

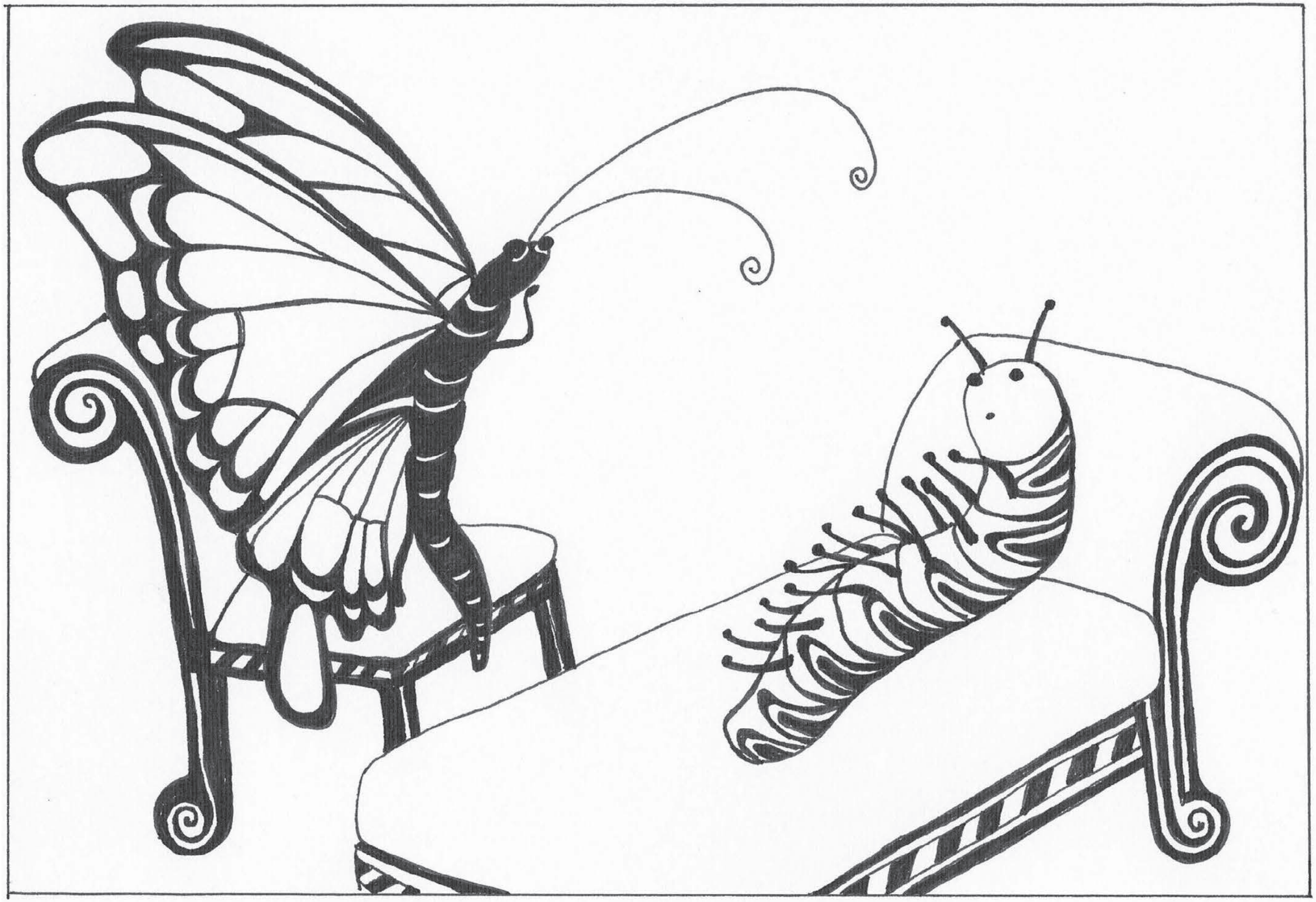

ILLUSTRATION 5.1 The talking cure.

What was Freud's talking cure like?

Despite doubts over some of Freud's case studies, Freud was undoubtedly successful in treating patients. He was nominated for the Nobel prize 13 times between 1915 and 1938, though was never awarded it (Stolt, 2001). His reputation would not have occurred without success as a therapist. Freud described his psychoanalysis as a form of archaeology. He tried to find out what had happened in the past to the patient, partly by using dream analysis, partly by examining descriptions provided by the patient, and partly by word association tasks. Freud would present a word and ask the patient to describe the word that immediately came to mind. Freud's interpretation was based not on the word reported by the patient but the delay in time between Freud uttering the word and the patient replying. Freud believed that long delays indicated that the patient wanted to say something unacceptable to the superego, so there was a pause while an alternative word was found. Note: a similar technique of examining the delay in response was used by Münsterberg (see Chapter 3) as a form of lie detector. There is no evidence that Freud and Münsterberg were aware of each other's work.

Word association

I used to explain Freud's ideas of word association in my lectures and then illustrate it with an example. I told the class of students to shout out the first word that came into their minds. It went something like this:

Me: Table.
Students: Chair.
Me: Up.
Students: Down.
Me: Knife.
Students: Fork.
Me: Sex.
Students: Pause … Laughter.

Freud provided therapy by asking his patients to talk while lying on a couch while Freud sat behind the patient out of the patient's view. Freud would listen to the patient, encourage recall of past events and then provide an interpretation. It was the interpretation provided by Freud that Freud believed was therapeutic. By understanding what had gone wrong, the patient would simply get better. The relationship between Freud and patient was that of an expert and novice. Freud was the person in charge, an approach that differed from that of Carl Jung.

One lasting contribution of Freud was the concept of transference and countertransference (see the case of Anna O). Modern psychotherapists and counsellors are taught to recognise that patients can develop feelings towards their therapists, and that therapists can develop feelings towards their clients. Freud's recognition of this phenomenon – and the need to manage it – provides evidence that he had insight into the therapeutic process and an ability to recognise something that may not always be comfortable to recognise.

Scientific status of Freud's theories

Freud was writing books before Karl Popper proposed the criterion of falsifiability as a criterion for science. When Freud was writing, the assumed scientific model was one of induction. Theories should be inducted from data. This point needs to be borne in mind when evaluating the scientific status of Freud's work.

Freud's theories have been criticised in two different ways. One criticism is that the theories are unfalsifiable and therefore unscientific. The other is that the theories are false – i.e., that there is evidence that is inconsistent with the theory and therefore falsifies it. At first sight both criticisms cannot be true. If something is false, then it has been falsified, so it cannot be unfalsifiable. However, both criticisms could be true because Freud presents a number of different ideas.

Freud's ideas are based on assumptions. Some of these assumptions are the same, albeit with different theories, as those of modern psychology. There is an assumption that mental illness can be explained with non-biological or psychological concepts, and that events in a person's life can predict mental illness. There is an assumption that psychological processes can occur without conscious awareness. There is an assumption that talking therapies are effective for mental illness. These metatheoretical assumptions are comparatively uncontroversial because they are accepted today, though alongside other theories. It is the specifics of the theories themselves that create problems in terms of scientific evaluation.

Some of Freud's ideas can be inferred from his case studies where he interprets symptoms in terms of a narrative, a narrative that typically involves sexuality. These interpretations are unfalsifiable. The statement 'some swans are green' is unfalsifiable because there may be green swans on planet Zog (see Chapter 1), and so is the statement 'sex is sometimes an important factor in a patient's symptoms.' Also, Freud asserts that the psychoanalyst has superior insight into the patient's mind, so whatever the psychoanalyst says is true. The psychoanalyst's conclusion is unfalsifiable. If tonight you dream of a pen, it may be that the pen is a phallic symbol. Alternatively, it may that a pen is simply a pen. There is no independent criterion for establishing whether either statement is false. If you call me a grumpy old man, and I tell you that you are projecting your own faults on me, there is no criterion for you to argue that my criticism of you is false. Their unfalsifiability makes Freudian statements of this kind difficult to counter.

Freud's theory is not so much a theory as a narrative that is used to interpret observation. Much of it corresponds to what Royce and Powell (1983) call 'philosophic speculation' (see Chapter 1). To put it another way, there is not much theory in Freud's theory.

Freud's idea of psychic energy is based on the concept of catharsis. Freud suggested that psychic energy accumulated, that this energy required a release in some form or another, and failure to release this energy created symptoms. Sublimation is an acceptable way of releasing energy. For example, playing football is a way of 'sublimating' the aggressive energy of the id. The prediction from catharsis theory is that people should be less aggressive after playing football. Despite considerable cultural support for the idea of catharsis, experimental research has found the reverse to be the case (Bushman, 2002; Bushman, Baumeister, & Stack, 1999). The theory of catharsis as part of Freud's theory is false, even though talking about traumatic events can be helpful.

History of catharsis

The idea of catharsis stems from the days of ancient Rome. The rulers of Rome believed that the common people were happy fighting wars and if there were no wars, the people would become restless. The assumption of the Roman Games was that if the common people saw something aggressive happening, then they would be less likely to be restless and aggressive. Seeing Christians thrown to the lions would make the common people more docile and more easily managed by their rulers. The Romans never tested their assumptions much to the disadvantage of those being thrown to the lions.

Much of Freud's theory of personality is unfalsifiable. Freud proposed that oral, anal and phallic personalities form due to either under- or overstimulation at each of the 'stages' of the erogenous zones. So, for example, the oral personality (needy, dependent on others, always pleading for help) is the result of either too little or too much oral stimulation below the age of two years, the anal personality from too harsh or too lenient potty training, and the phallic personality from failure to resolve the Oedipus conflict. It should be apparent that determining over- or understimulation is more or less impossible. This aspect of the theory is so weak (see Chapter 1) that it amounts to being unfalsifiable. Additionally, Freud's theory of personality suggests that certain personality traits go together. So, for example, tidiness, meanness and obstinacy are the features of the anal personality – also referred to as the 'anal triad.' If these three traits are found to coincide, then the conclusion drawn is that the person is the anal type, but if they are not found to coincide, then the conclusion is that the person is not the anal type. Whatever is found is consistent with the theory and so this aspect of the theory is also unfalsifiable.

A possible conclusion about the scientific status of Freud's ideas is that some of them are true, some of them are untrue, and some of them are unfalsifiable. Freud did not test his ideas with independent data, but he was writing at a time before the scientific criterion of falsifiability was proposed and accepted. Freud followed the science of the time in making observations and then providing a theory that was consistent with those observations. The need to test that theory, the hallmark of modern science, came later. With the hindsight of history, it is possible to say that Freud was a good scientist in developing speculative theory. His failure was in assuming that his theory was correct. It is the ability to speculate, to test, to find that speculation lacking and then to start again that makes a good scientist.

Jung

Carl Gustav Jung (1875–1961) studied medicine at the University of Basel, obtained his degree in 1900, and became a lecturer in psychiatry at the same university in 1905. Jung read Freud's book *Interpretation of Dreams* in 1900, and the two men began corresponding in 1906, with Jung meeting Freud for the first time a year later. The two set up an immediate friendship. Together the two men were invited to attend a conference organised at Clark University by Stanley Hall in 1909 – but with the recognition by Hall that Freud was the more eminent of the two (Evans & Koelsch, 1985). During the trip across the Atlantic, the relationship between Freud and Jung began to break down. According to Jung, this was due to Freud's refusal to be analysed by Jung. Jung had been analysed by Freud, but Freud said that the reverse was unacceptable as it was not right for the pupil to analyse the master. There were several other reasons for the breakdown between the two men, including personal issues – Jung felt Freud's addiction to smoking was bad and Jung disagreed with Freud's emphasis on sexuality.

The relationship between Jung and Freud was to break down fully in 1912. In a letter to Freud (18 December 1912), Jung wrote

> If ever you should rid yourself entirely of your complexes and stop playing the father to your sons, and instead of aiming continually at their weak spots take a good look at your own for a change, then I will mend my ways and at one stroke uproot the vice of being in two minds about you.
>
> (Freud & Jung, 1974)

Jung's background and interests differed from those of Freud, though both accepted the idea of the unconscious. Jung's interests included ideas from Eastern philosophy and religions. He wrote a commentary on the *Tibetan Book of the Dead* (see Rinpoche et al., 2007), a book that is normally read aloud during Tibetan Buddhist funerals (Jung, 1935). He wrote a commentary on the Book of Job in the Old Testament of the Bible, a book still in press (Jung, 1954/2013). Jung's interest in different cultures led him to observe similarities in images, from which he hypothesised the existence of a 'collective unconscious.' The idea of the collective unconscious is that there are certain unconscious ideas shared by all people in contrast to the unconscious ideas that differ between people, which he called the 'personal unconscious.' The collective unconscious is responsible for symbols that are universal to all people, symbols such as a snake or a triangle. The idea of a collective unconscious is dismissed by most psychologists today, though a minority claim empirical evidence in support of the concept (e.g., Ivonin et al., 2015; Rosen et al., 1991).

Jung, like Freud, used dream analysis and word association, but used them differently. In word association, Jung was interested in what the words meant. Dreams, according to Jung, were a way in which the unconscious revealed itself to the conscious and so particular attention was paid to the content of dreams. Jung believed that the unconscious was trying to communicate with the conscious, that dreams were one way of doing this, and that therapeutic benefit would result from interpreting what the unconscious was trying to say and acting on it. Patients were asked to write down their dreams on waking, and the dream would then be analysed during the therapy session. Jung used the term 'individuation' to refer to the harmonious working of the conscious and unconscious together.

Jung's concept of 'the shadow' is like Freud's id, though lacking the sexual emphasis. Jung recognised there was something bad in everyone but recognised other motives that energised behaviour. These 'archetypes' that energised behaviour included a search for spiritual meaning. Unlike Freud, Jung's therapy sessions treated the patient as an equal, where both the therapist and patient were trying to work on what the unconscious was revealing. The correct interpretation would be found only if the patient agreed with what, together, they concluded that the unconscious was revealing to the patient's conscious.

Jung's reputation was tarnished by his collaboration with the Nazis in 1933, though the extent to which he collaborated or believed in Nazi beliefs is debatable (Burston, 2021; Schoenl & Peck, 2012).

Psychoanalysis and theories of personality

Freud and Jung both developed theories of personality that were in some ways similar and some ways very different. Both theories were *type* theories. Both were inventions by their respective authors based on their personal experiences, but without independent data. Freud's types were the oral type, the anal type and the phallic type (see earlier section). Type theories can be contrasted with trait theories. Modern theories of personality are trait theories. In a type theory, a person is either a type or not that type – it is a binary classification. For example, a person either has the oral personality or doesn't have the oral personality but they cannot be somewhere in between. In the case of modern personality theories (e.g., the Big Five personality theory, where a person varies along a dimension such as extraversion-introversion). Type theories reflect a medical tradition of diagnosis, whereby a person either has a disease or does not have a disease. In fact, for some diseases (e.g., asthma) it is possible to have 'a little of the disease' (because inflammation in the lung varies along a continuum) whereas others are binary (e.g., Type 1 diabetes) because the pathology is either present or not (insulin-producing cells have been destroyed or not). Nevertheless, the medical tradition is one that puts people into categories. Where there is a physiological continuum (as in the case of asthma) medical doctors apply a cut-off point to determine whether the person has the disease.

Jung's personality types are different from Freud's in that there is no attempt to explain them in terms of developmental stages. Jung distinguishes four types of mental function, *Thought* (i.e., rational judgement, true or false), the opposite of which is *Feeling* (i.e., emotional judgement, nice or nasty), and *Sensation* (i.e., understanding the detail of things), the opposite of which is *Intuition* (i.e., understanding the inner potential of things).

Jung suggested that whatever function occurs in the conscious, the opposite occurs in the unconscious. The personality type of a person who is dreaming is different from the personality type of a person when awake. In addition to his four psychological functions, Jung proposed two mental attitudes (again, these are types not traits). The mental attitudes were extraversion (i.e., a tendency to respond positively in uncertainty) versus introversion (i.e., a tendency to respond negatively in uncertainty).

Freud's theory of personality is not used in personality assessment today, but Jung's theory of personality is. The Myers-Briggs personality inventory is a personality questionnaire widely used in industry. Few of those using this questionnaire realise that it is based on the theories of Jung.

The Myers-Briggs personality inventory

The Myers-Briggs personality inventory was developed by Katharine Briggs (1875–1968) and her daughter Isabel Myers (1897–1980). Neither were educated as psychologists and neither had faculty positions. Katharine Briggs' interest in personality developed on meeting her future son-in-law (nicknamed 'Chief') in 1917, who was so different from other members of her family. She began developing a personality theory of her own but realised, on reading Jung's account of personality types, that his theory was more extensive and better than hers.

Katharine Briggs' work on personality development was extended by her daughter, Isabel (who by now had married her 'Chief'). Isabel Myers, who also wrote two novels, gained experience working in a personnel department of a large bank and became aware of test theory and test development from the perspective of personnel management (see Chapter 3 and the development of occupational psychology). The original Briggs-Myers scale was published in 1942 with the name changed to Myers-Briggs in 1956. The Myers-Briggs Type Inventory (Myers, 1962) is based largely on Jung's ideas of types and extraversion-introversion and four functions, but with a development of Jung's ideas to produce 16 different personality types, with names such as the giver, the provider, the visionary, the supervisor, the idealist and the mastermind. What is particularly interesting about the scale is the way people have responded to it.

The Myers-Briggs type inventory categorises people into types – you are either one thing or another. Almost universally, psychologists have been rather negative about the Myers-Briggs scale, both in terms of concept (type versus trait) and theory. For example, McCrae and Costa (1989) conducted factor analysis on the Myers-Briggs questionnaire and showed that this analysis produced a five-factor structure similar to that of the Big Five personality theory. Although McCrae concluded that the underlying theory used by Myers and Briggs is wrong, an alternative interpretation is that trait theories of personality and motive theories of personality, such as Jung's and the Myers-Briggs, are fundamentally different, so it is unfair to judge one by the other (Winter et al., 1998).

Despite the negative reaction from many academic psychologists, the Myers-Briggs Type Indicator, as it is known, is one of the most widely used personality scales in the world – possibly *the* most widely used, as some claim. It is used in personnel management and selection by a wide variety of well-known companies all over the world. Why is the Myers-Briggs scale so popular?

There are several possible reasons for the popularity of the Myers-Briggs Type Indicator. One is that laypeople and users of the scale (who are typically not psychologists by training) find typologies easier to understand. A trait describes how much you are of something. In the case of measures of the Big Five traits, everyone is somewhere on a dimension of neuroticism, extraversion, agreeableness, conscientiousness and openness. Many people fall in the middle of these dimensions – for example, being a little neurotic or a little extravert, with the result that differences between people and descriptions of people are complex. In the case of the Myers-Briggs, everyone is only one of the 16 types, and this produces a much simpler way of understanding differences between people. Types are easier to describe and understand than traits, even though it is implausible that personality differences are binary.

A second plausible reason for the popularity of the Myers-Briggs Type Indicator is that all types are positive in nature. With the Big Five, a person can be neurotic, disagreeable or un-conscientious. In Freudian theory, being described as oral, anal or phallic is not a compliment. No such negativity exists with the Myers-Briggs, which has been likened by some critics to a Chinese fortune cookie. All 16 types of the Myers-Briggs Type Indicator are positive. Whichever type a person is, the scale provides information that is nice and sufficiently vague to appeal to everyone.

Students should try to decide for themselves why the Myers-Briggs Type Indicator has been so popular (a copy of the questionnaire can be found and completed online for free through the Myers-Briggs company, search MBTIonline). Perhaps you don't need to be correct to be successful! Alternatively, the questionnaire may reflect a more useful motivational approach to personality that is lacking in trait theories (Winter et al., 1998). Jung never actively supported Briggs or Myers or their scale, even though Myers wrote to him about it. Although Jungian therapists exist to this day, in terms of overall impact, Jung's greatest influence on the world today is through the Myers-Briggs scale, something Jung never supported.

Melanie Klein and Anna Freud

Melanie Klein (1882–1960) and Anna Freud (1895–1982) (the youngest daughter of Sigmund Freud) had much in common. They were both Austrians living in Vienna, they both moved to England and became British citizens. They were both child psychoanalysts, they both used play as part of their psychoanalysis and they both founded psychoanalytic institutes in the UK that bear their names today. However, there were differences in their interpretation and practice of psychoanalysis that were made public through what they wrote (Viner, 1996).

Melanie Klein theory of psychoanalysis differed from Sigmund Freud in two ways. First, Sigmund Freud focused on the years 4 to 6, the time

ILLUSTRATION 5.2 Early childhood bonding.

associated with the Oedipus complex and the child's relationship with the father. Melanie Klein focused on the first 4 to 6 months and the relationship of the child with the mother. Klein was the originator of object relations theory, the idea that the child's early relationship with the mother influenced adult relationships. In other respects, Klein was similar to Sigmund Freud. Klein believed that childhood neuroses were due to an over-strong superego that was punishing the child, an interpretation consistent with Sigmund Freud's analysis of Little Hans – the first child analysis. In the case of Little Hans (see above) the strong superego threatened Little Hans with castration because of his sexual desire for his mother. Melanie Klein believed, like Sigmund Freud, that therapy resulted from explaining to the child what was happening in the child's unconscious and therefore the child was suited to psychoanalysis like the adult.

Anna Freud, like Melanie Klein, believed in the importance of the child's relationship with the mother, but believed that childhood neuroses were caused by an unformed and weak superego and therefore children were not suited to adult psychoanalysis. Instead, Anna Freud developed ego psychoanalysis where the emphasis was on the ego – the rational part of the mind. Ego psychoanalysis anticipated the rational emphasis found in the later cognitive behaviour therapy (see Chapter 4). In addition, Anna Freud believed the relationship between the therapist and the child was important to therapeutic outcome and saw play as a way of strengthening the 'alliance' between the child and the therapist. Whereas Melanie Klein used play to find out more about the child's psychological history, Anna Freud used play as a way of strengthening the bond with the child. Anna Freud believed that by strengthening the alliance between the child and the therapist, the therapist would take the role of mother and provide the weak superego with the support it needed. Anna Freud's idea of the importance of the alliance between therapist and patients anticipates the contextual model of psychotherapy (see next section) and the work of Carl Rogers (see Chapter 8).

Scientific status of psychoanalysis

The scientific status of Freud's theory was discussed in an earlier section, but it is worth reflecting on this question again in the light of the other three psychoanalysts described in this chapter. There were clear differences of opinion about the nature of the psyche, the nature of the unconscious and the best way of going about therapy. Each of these four psychoanalysts believed they were correct, but that is not logically possible. The psychoanalysts believed they were correct because their patients provided positive feedback and reported benefit. However, as shown in Chapter 1, finding evidence in support of a theory does not prove it is true, because the same evidence can always be explained by another theory.

Other therapeutic approaches

Almost all talking therapies between the 1920s and 1940s were based on some kind of psychoanalytic theory. Psychoanalysis was associated primarily but not exclusively with psychiatrists rather than psychologists. In psychology the dominant paradigm of the time was behaviourism. Behaviourist approaches to therapy did not involve talking. Behaviourists used various forms of conditioning, including systematic desensitisation for phobias, which is still used today, and the now controversial therapy of aversion therapy for those with non-standard sexual orientation. However, by the 1950s humanistic psychology was beginning to provide an alternative form of talking therapy and by the 1960s talking therapy began to be based on cognitive theories. Both humanistic and cognitive psychological approaches to therapy included talking but with different theoretical rationales and practice. Both approaches rejected the idea that the mind has no value in explaining behaviour. Any form of mental experience was relevant to humanistic psychologists. In the case of cognitive approaches, the types of mental experiences that were considered acceptable were limited to those that fell within the information paradigm, and these included cognitions or beliefs. Beck's (1967) highly influential theory assumed that mental illness was caused by erroneous cognitions. Cognitions should be interpreted as conscious beliefs. People who are depressed believe, incorrectly, that circumstances are worse than they are in reality. Correction of those erroneous cognitions, either by talking or by behaviour inconsistent with those erroneous beliefs causes remission of symptoms. Beck's theory led to the adoption of cognitive behaviour therapy as the dominant therapeutic approach today. However, the theory is not without its critics. Beck's theory assumes that the problem is with the cognitions rather than the cause of those cognitions. In a paper entitled "Beck Never Lived in Birmingham: Why CBT May Be a Less Useful Treatment for Psychological Distress than is Often Supposed," Moloney and Kelly (2004) pointed out that many of their clients' circumstances in the city of Birmingham, England, were very challenging and that their clients' cognitions were therefore realistic rather than erroneous. Despite being criticised, cognitive behaviour therapy has become the dominant form of therapy, in part because it is consistent with the dominant psychology paradigm of today, cognitive neuroscience (see Chapter 6).

Why psychotherapy works

This chapter started with a paper published in 1936 with the title "Some Implicit Common Factors in Divers Methods of Psychotherapy." The paper starts with the quotation, "At Last the Dodo Said, 'Everybody Has Won, and All Must Have Prizes.'" This paper claimed to show that the different types of psychoanalysis were equally effective. What is now called the 'dodo bird effect' has been replicated many times (Wampold & Imel, 2015). It applies not only to psychoanalysis but *all* psychotherapies. Despite the invention of newer therapies, the results have remained the same: recent reviews and meta-analyses come to the same conclusion and the dodo bird effect remains alive and well today (Wampold & Imel, 2015).

You may have read the claim that cognitive behaviour therapy is the type of therapy that has the most supporting evidence and that it is most validated of all types of psychotherapy. This is perfectly true. There are more studies showing that cognitive behaviour therapy is better than no therapy compared to any other therapies. The reason is that there are more studies on the effectiveness of cognitive behaviour therapy compared to other therapies. However, when cognitive behaviour therapy is compared with other bona fide psychotherapies the results show that on average there is very little if any difference between them (Wampold et al., 2017). Additionally, the type or length of training makes no difference to outcome, nor does the gender of the therapist (Wampold & Imel, 2015). All therapies work, and any differences between the effectiveness of different therapies, *on average*, is small. The explanation for the dodo bird effect is that the effectiveness of psychotherapy depends on factors that are common to all psychotherapies. This explanation was called the common factor model and, more recently, the contextual model.

What are the common factors of psychotherapy? These have been identified (Frank & Frank, 1991) as:

1 An emotionally charged, confiding relationship with a helping person.
2 A setting where the patient believes they are being helped and therefore expects to get better.
3 A rationale, conceptual scheme, or myth that provides a plausible explanation for the patient's symptoms and prescribes a ritual or procedure for resolving them.
4 A ritual or procedure that requires the active participation of both patient and therapist and that is believed by both to be the means of restoring the patient's health.

Frank and Frank (1991) argue that the narrative or conceptual scheme does not have to be true. It must only be accepted as true by the patients. Frank and Frank believed that adverse circumstances demoralised people and that the therapist remoralised them with a ritual, supported by a powerful and helpful therapist. All four of the psychoanalysts described above provide a conceptual scheme that acts as an explanation for symptoms, as do therapies originating from humanistic psychology and cognitive psychology. In all cases there is a therapeutic relationship and setting where the patient expects to get better.

Therapeutic rituals are not unique to psychotherapy. They occur in all therapeutic encounters. Chapter 1 provided an account of the placebo benefits of antidepressant medication. Complementary and alternative medicines also benefit from therapeutic rituals and the support of the therapist. It has been suggested that complementary and alternative therapies are effective treatments for mental illness through the same common factors route as psychotherapy (Hyland, 2005). Kirsch (2005) argues that placebos act in the same way as psychotherapy, by providing an expectation of benefit.

The common factors of psychotherapy provided by Frank and Frank (1991) includes an emotionally charged, confiding relationship. Rogers presents the idea that the relationship is a key contributor to recovery (Rogers, 1942, 1951). Rogers is considered the father of counselling psychology and his work will be discussed in Chapter 8 under the heading of treating people uniquely. Relationships between people differ. Evidence shows that some therapists consistently getting better results than others (Okiishi et al., 2003), though these differences have been difficult to explain. Although some relationships between therapist personality and outcome have been documented, they are small and not consistent across different psychotherapeutic techniques. (Delgadillo et al., 2020). The finding that, despite identical training, psychotherapists are not equally effective is challenging for the assumption that psychology is a science and will be discussed in Chapter 9 under the heading of hermeneutical psychology.

Sigmund Freud's place in history is important because he started the talking therapy, despite doubts about some aspects of his explanation for benefit. Freud undoubtedly helped patients with his talking cure and, at the very least, spared them some of the more harmful forms of biological therapy – vomiting therapy, nasal operations, strong psychoactive substances, etc. – that came from a biological explanation of nervous diseases. Talking therapies are now an accepted part of treatment for people with mental illness, but exactly *why* talking helps is a matter of debate.

There is one final twist to the story of the unconscious: the central concept of psychoanalysis. Cognitive behaviour therapy is predicated on the assumption that erroneous cognitions are responsible for the symptoms of depression and anxiety. Cognitions are conscious beliefs. By contrast, implicit beliefs are not available to the consciousness, they are unconscious beliefs. Implicit beliefs form part of several different types of explanation used in cognitive psychology and are an accepted part of the dominant cognitive paradigm of psychology (see Chapter 4). One version of the contextual model (Hyland, 2020) suggests that it is implicit beliefs, not cognitions, that are responsible for depression and anxiety. The negative implicit beliefs are correct: they reflect the difficult psychological circumstances people find themselves in, no matter what their financial circumstances. There may be place, after all, for the unconscious when treating patients within a cognitive framework, but it is implicit beliefs not unconscious motives that should be considered; and it is behaviour and circumstances that need to change, not the interpretation of those circumstances.

Summary

Mental illnesses were called nervous diseases during the nineteenth century, and the assumed cause was faulty nerves. Sigmund Freud qualified as a Doctor of Medicine and initially accepted this medical paradigm of 'nervous diseases.' His experience led him to develop an alternative paradigm, hypothesising that mental illness could be explained in terms of psychological pathology. Freud was the originator of the talking therapy, and his method was based on the concept of the unconscious. Some of Freud's ideas are true, some are false, and some are unfalsifiable, but he was the instigator of the psychoanalytic movement where patients were treated with talking therapy. Other psychoanalysts accepted the idea of the unconscious but had other differences in terms of both theory and therapeutic approach compared to Freud. These others included Jung who proposed that there is a personal and collective unconscious and whose theory of personality forms the basis of the modern Myers-Briggs inventory. Melanie Klein and Anna Freud developed psychoanalysis for children but had differences in theory and approach to therapy, as well as having differences with the original approach suggested by Sigmund Freud. Their legacy continues in institutes today that bear their name. Research at the time and more recently shows that the average benefit of different forms of psychotherapy are similar (called the dodo bird effect), but there are consistent differences in the effectiveness of different therapists. The common factors or contextual model explains the how these very different therapeutic approaches help despite being so different. According to this model, the reason psychotherapy is effective is due to factors that are common to all psychotherapies, the relationship, the setting, the expectancy of benefit and the ritual.

Essay questions and discussion topics

1. How did Freud's personal experience shape the theory he proposed?
2. Is Freudian theory falsifiable?
3. What are the differences and similarities between the theories and therapies of Sigmund Freud and Carl Jung?

4. What are the differences and similarities between the theories and therapies of Melanie Klein and Anna Freud?
5. Why is the talking therapy effective?
6. Do you believe that everyone has the potential for evil?
7. Are people always aware of their motives for doing things?
8. What is being done at your university, and what more can be done, to support the mental health of students?
9. For one week write down your dreams immediately on waking – do it straight away as dreams are quickly forgotten. Can you find any Freudian or Jungian interpretations in your dreams? Can you find any other explanations for your dreams?
10. Which aspects of this lesson for life do you agree or disagree with, and can you explain why? Can you think of other lessons that might be drawn from this chapter?

> *Just because you want to do bad things doesn't make you a bad person. You are a bad person only when you do the bad things you want to do. It is the ability to control undesirable desires that makes humans special. Talking is good. Listen to others if they need or want to talk to you. Be aware that you can help someone just by listening. Mental health can be helped in many different ways.*

6

What is the relationship between psychology and physiology?

Minds and bodies in theory and in practice

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The term 'mental illness' appeared at the end of the nineteenth century (see Chapter 5), and the distinction between mental and physical illness is now an accepted part of everyday speech. Depression and schizophrenia are examples of mental illness. Cancer and asthma are examples of physical illness. The mental versus physical illness distinction is consistent with Descartes' philosophy of dualism (see Chapter 1). To circumvent the authority of the Church over matters of science, Descartes proposed that the mind existed independently of the material world. The consequence of Descartes' philosophy of dualism is that, because mind and body are separate, they can be ill in different ways: mental illness and physical illness are different. The only problem is that modern science assumes that only the material world exists. If only the material world exists (i.e., monism rather than dualism) then this creates a logical problem when mental illness is contrasted with physical illness. The logical problem can be illustrated by two questions.

Question:	Have you seen any minds without bodies?
Answer:	No.
Conclusion:	Then it is not possible to have a mental illness that is not also a physical illness. Mental and physical illness are not separate.
Question:	Have you seen any living bodies without minds?
Answer:	No.
Conclusion:	Then it is not possible to have a physical illness that is not also a mental illness. Mental and physical illness are not separate.

The terms 'physical illness' versus 'mental illness' produce a confusion between three types of distinction: the nature of the illness, the treatment of the illness and the explanation of the illness. All modern sciences assume the philosophy of materialism, that is, that the only thing that exists is the material world. The only things that exist are the fundamental particles, atoms and molecules that make up all of us and everything in the universe. Psychology and physiology provide different types of descriptions of the material world.

A better way of interpreting the term 'mental illness' is not as a type of cause or type of treatment but as a way of expressing a type of symptom, irrespective of causal factors. Many people with cancer and severe asthma experience fatigue, depression or anxiety and have psychological symptoms with varying degrees of severity. Some meet the diagnostic criteria for mental illness. The term mental illness is best used only as a synonym for psychological symptoms, i.e., symptoms that are not linked to any part of the body. The term physical illness is best avoided because all illness has a physical basis. The terms somatic illness and somatic symptoms are better descriptors of non-psychological illness, i.e., illness where symptoms are associated with parts of the body (e.g., pain, diarrhoea, breathlessness). The distinction of psychological symptoms versus somatic symptoms corresponds to Wundt's distinction between sensations and feelings (see Chapter 1), Sensations are always associated with a sensory modality and therefore with a part of the body. Feelings are not associated with any sensory modality. Both must have a physiological basis.

History of mind and body in psychology

Wilhelm Wundt was trained in physiology, had a medical degree and wanted his new psychology to be a science. He therefore presented psychology within the philosophy of materialism (see Chapter 2). He suggested that mental content was the result of the body's physiology but could not be *described* in terms of physiology. For example, the image of a chair is represented somewhere in the brain, but that biological representation does not describe what a chair looks like. Wundt's approach to the mind-body problem is referred to as *psychophysical parallelism*. Mental events occur in parallel with physiological events. Psychophysical parallelism is a philosophy of science based on materialism (also called physicalism), a philosophy that assumes that only the physical world exists. Although mental events occur in parallel with physiological events, the material world is the only 'stuff' that exists. There is no 'mind stuff.' The experience of the mind is a consequence of the physical world.

Materialism is not the only philosophy of science. The philosopher Descartes had suggested some years before that mind stuff and body stuff both exist, and that the mind – or soul – exists after the body is dead (see Chapter 2). Although several of the early psychologists were sympathetic to the idea of an independent soul, this hypothesis will not be explored here, though most religions assume some form of independence of the soul or mind from the body. If the soul exists independently of the body (and can exist after death) then theories about the body will not be able to explain the phenomena associated with the soul. Although religious views and dualism are accepted as true by many people, the examination of how psychology relates to physiology in this chapter is limited and based on one simple assumption: minds do not exist without bodies.

Like Wundt, Sigmund Freud had a degree in medicine and was trained in physiology. Freud initially assumed, like everyone else, that nervous diseases as they were then called were the result of nerves. Because no abnormality of nerves could be discovered, Freud adopted a psychological *explanation* for nervous diseases (see Chapter 5). The psychological explanation led to a new way of thinking about and describing symptoms. The term and concept of mental illness replaced the earlier term and concept of nervous diseases.

Alternatives to materialism in science

Materialism is the dominant assumption of science, but it is not the only possible assumption. A minority of scientists believe that mind is not secondary to the physical world but has some independent effects, albeit in a non-regular fashion, possibly linked to quantum mechanics. Those supporting this alternative paradigm cite anomalies including reports of near-death experiences, children's reports of past lives, and other parapsychological phenomena in support of their theories (Walach, 2020; Walach et al., 2020). Those operating within the dominant materialist paradigm believe such anomalies are artefacts and therefore not real. As ever, scientists interpret the world according to their assumptions. The application of quantum theory to psychology is an interesting theoretical idea but expressing a view that is opposed to the dominant paradigm, particularly one as fundamental as this, can be unhelpful for academic careers.

The first effective psychoactive drugs were developed in the 1950s, providing clear evidence that mental illness (nervous diseases) was indeed due to something wrong with the nerves. One might imagine, therefore, that if mental illness is due to something wrong with the nerves – as it must be if one assumes materialism – then mental illness should be treatable through biology and one can forget about talking therapies. This has not happened. Will it happen in the future? These and other questions are explored in this chapter.

A brief history of physiology and psychology

The relationship between psychology and physiology can be approached from several different perspectives, and different words have been used to describe these perspectives. They are psychophysiology, physiological psychology, psychoneuroimmunology and neuroscience. Terminology has changed over the years and the term *neuroscience* has replaced many of the older terms and is sometimes used as a generic term for any relationship between psychology and physiology. The following sections are organised in terms of the original meanings of psychophysiology, physiological psychology and psychoneuroimmunology.

Psychophysiology: electroencephalography (EEG) and functional magnetic resonance imagery (fMRI)

The aim of psychophysiology is to measure the activity of the brain, and match that activity with psychological events, typically using non-invasive technology. Electroencephalography (or EEG) measures the minute electrical currents that are generated by the brain and detected by electrodes placed on the scalp. The Scottish physiologist Richard Caton (1842–1926) was the first person to notice that the brain generated spontaneous electrical activity. He discovered this using two electrodes placed on either side of the heads of dogs and monkeys and found that the electrical current increased or decreased depending on whether the animal was awake or asleep – and disappeared when the animal died. His work was published in the *British Medical Journal* in 1875 (Caton, 1875). However, the discovery of the EEG is attributed to Hans Berger (1873–1941), a German psychiatrist. Unlike Caton, Berger measured the EEG of humans in 1924, but delayed publication until 1929 when he published the first EEG trace – the trace was taken from his young son (Brazier, 1961). Since then, there has been a steady stream of research using the EEG. There are two limitations of this research. The first is that an EEG trace is very complex, and information often needs to be extracted by complex statistical procedures. The second is that although the positions of the electrodes give some information about the activity of different parts of the brain, it is not a perfectly accurate measure of the localisation of function because of the way electrical signals travel through the brain and scalp (Haas, 2003).

In 1990 a new technique for investigating the brain was published, called functional magnetic resonance imaging, or fMRI. This technique enables researchers to measure blood flow through the brain, which is possible because the water molecules in the brain act as very weak magnets. By briefly disturbing the magnetic field in the brain, the water molecules shift, and the energy released is detected as they regain their original position. fMRI can be used to generate pictures of brain activity and can provide accurate localisation of function. fMRI gives a time-based picture of the activity of different parts of the brain.

What do EEG and fMRI tell us? They tell us where things are happening in the brain when certain sorts of mental activity are taking place. Knowing the position of a book in a library catalogue will give some information about the content of a book. For example, if the book is in the poetry section, then it is likely to contain poems. However, the location of a book in a library does not provide information about the detailed contents of the book (it does not tell what poems are in the book or whether they are beautiful). The same can be said about the EEG and fMRI. They provide information about which parts of the brain are active, but they do not provide the fine detail of description, nor do

ILLUSTRATION 6.1 EEG measurement during a cognitive task.

they provide the kind of psychological account that Wundt believed psychology was able to provide.

There are two reasons why psychophysiology is important, despite its limitations. The first is that the demonstration that brain and psychological phenomena are correlated has had a substantial impact on the perception of psychology by the public. The reader will recall from earlier chapters that the history of psychology is one where psychologists have felt the need to present what they are doing as a science. The demonstration that there are correlates between mental events and physiology shows that psychological phenomena are 'real' in the minds of those who confuse reality with the description of that reality – which is the mistake made by those who question whether psychology is a science. Of course, students will be aware that there *must* be correlates of physiological events with psychological events. Minds do not occur without bodies. So, the impact of what is now referred to as 'neuroscience' on how psychology is perceived by the public may seem surprising. However, it would be wrong to underestimate the social impact neuroscience has had on the perception by the public of psychology as a 'proper' science. Psychologists are sometimes described as 'cognitive neuroscientists' when they do not even take physiological measurements.

The second reason why psychophysiology – or neuroscience – is important is that measurement techniques are improving. As techniques improve, more and more detail is provided about what happens in the brain when people have thoughts or engage in tasks. Knowing where something happens in the brain is like knowing where a book is in a library. However, as the detail gets finer and finer, the position of the book gets more and more accurate so that not only do we know that a book is in the poetry section, but which poet it is, and eventually which poem it is. Some believe that eventually, with increasing accuracy of measurement, it should be possible to associate particular thoughts with particular events in the brain so that thoughts and indeed the whole of psychology can be explained by physiology. The contribution of psychophysiology to psychology, and whether it is possible in practice or in principle to replace psychology with physiology, will be examined later in this chapter. There is a separate issue of whether the brain is organised in the way that a library is organised – something referred to as modularity – and this will be discussed with its alternative, connectionism, in the final chapter. If the brain acts as a connectionist network, then this limits the usefulness of psychophysiology.

Physiological psychology: the development of psychoactive drugs

The author was at a conference on placebos where there was a presentation on the neurological changes that take place when a placebo is given. The results showed that when a person took a placebo, there were changes in the brain that mimicked the effects of the active drug. The audience welcomed these findings. The research showed that placebos were ‘real’ because they produced biological effects. But placebos *must* have a biological effect. Minds do not occur without bodies. The author was sitting next to a friend who remarked drily “Where else would you expect a placebo to create a physiological effect? In a person’s toe?”

Physiological psychology versus psychophysiology

The aim of physiological psychology is *either* to alter the physiology of the brain through chemicals (drugs) or other means and then measure the psychological consequences, *or* to measure chemicals in the brain and relate those chemicals to psychological phenomena. Whereas psychophysiology uses primarily non-invasive measurement, psychophysiology is interventionist. Techniques of altering the brain include electrodes that are inserted in the brain, transcranial magnetic stimulation (TMS) (Walsh & Cowey, 2000) and, perhaps most important in terms of impact, the use of drugs.

The mind-altering effects of certain drugs have been known for thousands of years. The effects of alcohol and the opium poppy did not wait for discovery by scientists, and these and other mind-altering substances were used to treat nervous disease from the nineteenth century onwards. Up to the middle of the twentieth century, patients with mental health problems were treated with a variety of chemicals, most of which did more harm than good. This unfortunate situation arose because there was no credible biological explanation for what were then called nervous diseases (see Chapter 5). Chemical treatment was based on spurious theories or chance experimentation.

Around 1950 there was a ‘pharmacological revolution’ when three chemicals were discovered that were effective as antipsychotics. These chemicals were lithium salts, chlorpromazine, and reserpine. There was still no biological explanation for psychosis, and the antipsychotic effects of these drugs were discovered by accident. For example, chlorpromazine comes from a class of drugs originally developed for the dyeing industry. These dyes were used to stain specimens that were examined under a microscope. Evidence from the specimens seemed to indicate that the stains also had antimicrobial effects, though this was later confirmed as not being the case. So, chlorpromazine had biological effects, but it was a drug looking for a treatment. Experimentation showed it had antipsychotic effects (López-Muñoz et al., 2005).

Reserpine was another drug that was discovered as part of that pharmacological revolution, and again its discovery occurred without any theoretical rationale as to why it should have antipsychotic effects. The chemical property of reserpine is such that it depletes monoamines, and this was known by chemists at the time. Because the experimental use of reserpine for psychosis also seemed to cause depression – though the depressive effect of reserpine has been questioned (Baumeister et al., 2003) – a theory was proposed that depression was caused by lack of serotonin and dopamine. This hypothesis, called the serotoninergic theory, led to the first serotonin-enhancing drugs for treating depression in the 1960s. New types of serotonin-enhancing drugs were developed over the years. So, unlike antipsychotics, antidepressants were developed based on a theory of a biological cause of depression (Hillhouse & Porter, 2015).

Serotonin-enhancing antidepressants are widely used today. Is the serotoninergic theory of depression correct? Undergraduate students are often taught that it is correct. However, the authors of a review of the serotoninergic hypothesis conclude that studies "provide no consistent evidence of there being an association between serotonin and depression, and no support for the hypothesis that depression is caused by lowered serotonin activity or concentrations" (Moncrieff et al., 2022, p. 1). Research shows that at least 80% of the effectiveness of antidepressants is due to the placebo effect (Kirsch et al., 2002; Kirsch, 2014) and that only 15% of people treated with antidepressants have a substantial antidepressant effect beyond placebo (Stone et al., 2022). Perhaps if depression were *just* a lack of serotonin, depression would be less of a problem than it is today (see Chapter 1). So, taking an antidepressant is likely to affect the mind, but the reason and underlying theory remains less secure than many believe.

Treating depression

Drug therapy is not the only biological treatment for depression. Exercise has beneficial effects (Knapen et al., 2015) without the side effects of antidepressants, as does a Mediterranean diet supplemented by fish oil (Parletta et al., 2019). Coupled with psychological treatments there are many lifestyle changes that can help without the need for pharmacological intervention despite the undoubted benefit of the placebo effect when taking an antidepressant.

Since the 1950s many different pharmacological agents have been developed that alter the chemistry of the brain and hence alter a person's psychology – including new recreational drugs. What does this demonstrate? It shows that psychological phenomena have a biological basis. This demonstration is hardly new. The biological basis of mental phenomena was assumed by Wundt. Despite continuing problems, the fact that drugs do have effects on mental life leads to two possibilities. One is that mental illness could one day be treated successfully with drugs. The alternative possibility is that another type of therapy is needed because of the failure to determine the chemical basis of many types of mental illness and limited therapeutic benefit that drugs provide. That other type of therapy could include both non-drug-based biological interventions (exercise, nutrition) as well as psychological interventions (therapy, lifestyle change).

Psychoneuroimmunology

The term *psychoimmunology* was coined by the psychiatrist George Solomon (Shubla et al., 1979), but the term soon changed to *psychoneuroimmunology* – a change that reflects the status given to the term *neuro* but also because the link between the brain and immune system was now included in investigations. Whereas physiological psychology examined the effects of drugs on the brain – and the effect of behaviour on chemicals in the brain – psychoneuroimmunology examined the relationship between the mind, the brain and the immune system. Among other things, the research shows the effect of stress on the immune system and the effects of the immune system on the psychological state. Research shows, for example, that stress increases inflammation by increasing the level of pro-inflammatory cytokines (Segerstrom & Miller, 2004). Cytokines are the messengers in the immune system that tell other parts of the immune system that there is infection. The inflammatory effects of pro-inflammatory cytokines exacerbate a number of disease processes, (e.g., cancer, heart disease, asthma, multiple sclerosis) with the result that there is now a well-established relationship between stress and disease (Cohen et al., 2007).

Stress → Inflammation → Disease

The pro-inflammatory cytokines affect the brain and hence psychological state, causing, amongst other things, fatigue and depression. One might imagine that there should be a one-to-one relationship between particular cytokines and particular mental states, but this has not been found to be the case. It is not possible to say, for example, that depression is caused by one pro-inflammatory cytokine and fatigue with another. What seems to happen is that all pro-inflammatory cytokines increase with fatigue and depression, but in a way that is not consistent across people. As with physiological psychology, there is a relationship between physiology and psychology, but not one that is very precise, and certainly not one that allows a one-to-one linking of psychology with physiology.

Psychoneuroimmunology has played an important role in the story of physiology of psychology and has influenced the way psychology is viewed by those outside the discipline of psychology. It showed that psychology was relevant to the causes and mechanisms of a wide range of diseases, including somatic illness, not only mental illness. Whereas psychophysiology and physiological psychology focussed on the relation between the brain and psychology, psychoneuroimmunology showed that the immune system was also part of the equation when trying to understand the physiology that underpins psychology. The relevance of psychology to the body therefore increased. Clinical psychology as a sub-discipline dates from the early twentieth century. The sub-discipline of health psychology is a comparatively new kid on the block and developed in the 1980s.

Psychoneuroimmunology added the immune system to the psychology-physiological relationship. Yet later, research focussed on other parts of the body, such as the gut. The gut has been described as the ‘second brain’ as the gut contains more nerves than the spinal cord, and the gut is also the primary site of immune learning. A happy gut makes a happy mind and vice versa. Because the health of the gut is associated with the gut biome (the gut microflora), the gut biome of bacteria and viruses also influences the psychological state (Ridaura & Belkaid, 2015). Traditionally the focus of healthy eating has been on the nutrients of the food eaten. The modern perspective, based on an understanding of gut microflora, focusses on diet, contrasting the distinction between healthy and unhealthy foods. The gut microflora are ‘happiest’ when fed a varied diet, including many different vegetables. Diet affects well-being, mediated through the gut microflora. The nervous system, the immune system, the gut and the gut microflora are causally connected, and together they influence the psychological state.

Cognitive neuroscience

The cognitive paradigm (see Chapter 4) uses theoretical terms that link the situation with behaviour. These cognitive concepts are modelled on the functional description of mechanisms (Fodor, 1968; Hyland 1985). Cognitive neuroscience is the association between these cognitive concepts and physiology, involving any type of cognitive concept and any type of physiological description. For example, processing speed is a physiological measure obtained through EEG assessment and calculated by the event-related potential. Speed of processing has been shown to be related to intelligence and other cognitive abilities (Schubert et al., 2022). These results provide evidence of a physiological basis for the concept of general intelligence, a concept derived from measurement of psychological tests (see Chapter 3).

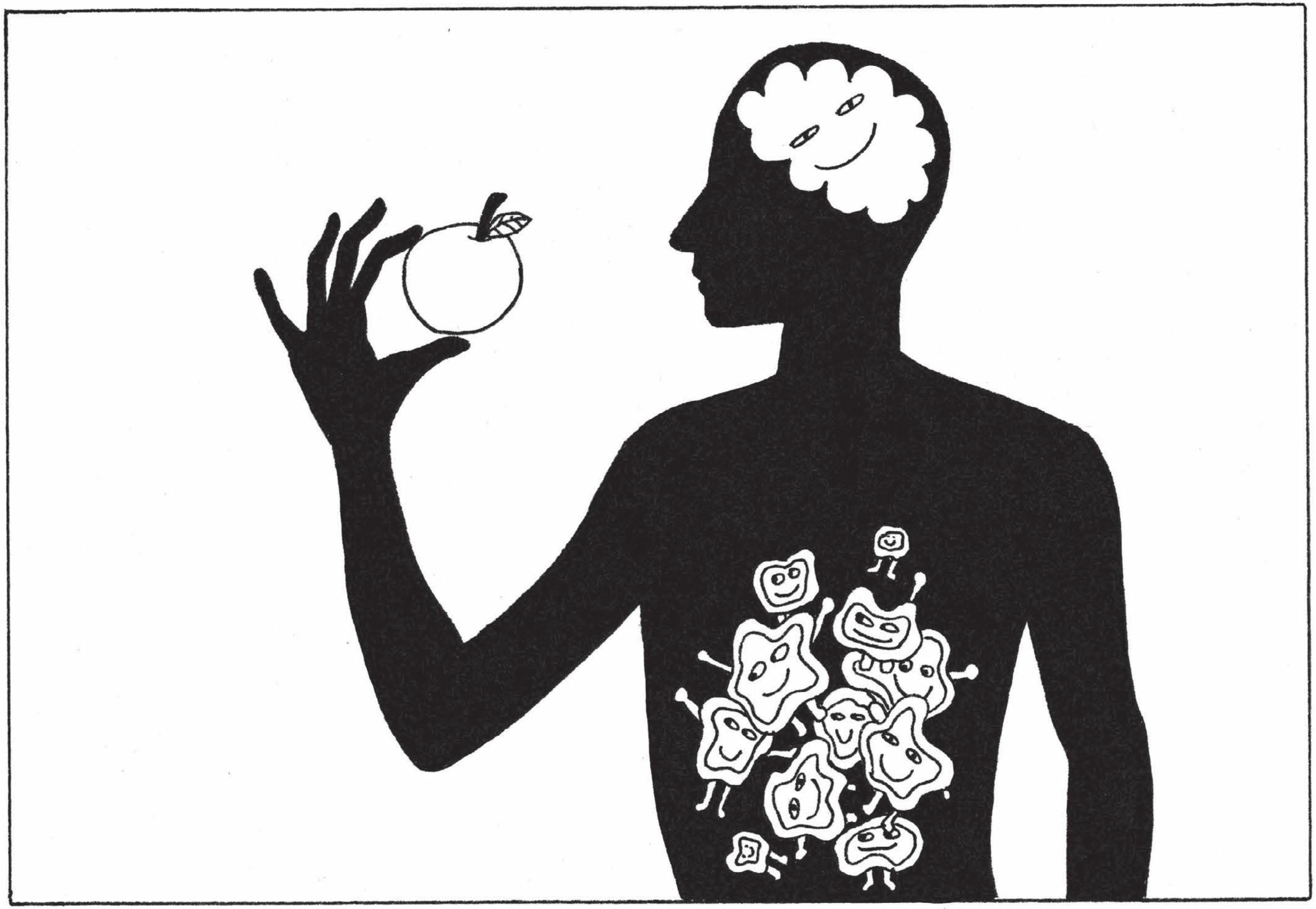

ILLUSTRATION 6.2 Happy gut microflora.

Unity of science and reductionism

Psychology and physiology are both scientific disciplines. So are biology, chemistry, physics and sociology. What is the relationship between them? The unity of science hypothesis concerns the relationship between the different sciences understood as descriptions of reality at different levels: atomic physics, chemistry, biology, psychology, sociology. Just to make life complicated, there are different versions of the unity of science hypothesis, a strong version and several weak versions. The strong version is that, in principle, each science at a higher level can be 'reduced' to the science at the lower level (Kemeny & Oppenheim, 1956; Oppenheim, & Putnam, 1958). Humans are simply machines made from bundles of atoms and everything we do is due to the way those atoms interact. Everything in psychology can be explained by physiology and ultimately the behaviour of subatomic particles.

Reductionism is a type of relationship between two sciences. The most accepted definition of reductionism is that provided by Nagel:

> A reduction is effected when the experimental laws of the secondary science (and if it has an adequate theory, its theory as well) are shown to be the logical consequences of the theoretical assumptions (inclusive of the coordinating definitions) of the primary science.
>
> (Nagel, 1961, p. 352)

In practical terms, this means that reductionism is not about finding correlations between physiological and psychological events. It is not about finding that drugs have psychological effects. Reductionism concerns the relationship between *theories* from two different disciplines, what Nagel refers to as the primary and secondary sciences. Finding that a particular part of the brain lights up when a person has a particular thought does not constitute reductionism. However, if *all* the theories of psychology can be shown to be *the logical consequences* of theories of physiology, with the addition of some 'bridging theories,' then psychology can be reduced to physiology. Note that the requirement for reduction is not that psychological theories should be the logical consequence of physiological theories, but rather that they should be the logical consequence with the addition of some additional theories that link them together. For reduction to occur psychological theories must be capable of *deduction* from physiological theories with the addition of those few extra bridging theories (Nagel, 1998).

There are three possible responses to the unity of science hypothesis. The first is that if humans are simply a bundle of atoms that obey the laws of physics, then psychology should be replaced by physiology, and physiology should be replaced by chemistry, and chemistry by physics. The resulting implication is that psychology should be replaced by physics. Psychology will eventually be reduced to physics, not yet perhaps, but some time in the future. That is the implication of the strong version of the unity of science hypothesis

The second argument is that even if reduction is possible in principle, it is not possible in practice. This argument is put forward by Hilary Putnam (1973), who compares macro and micro accounts of the same phenomenon. Imagine a board with a square hole and a round hole and a square peg that fits into the square hole but not the round hole. We can explain why the peg fits into the square hole. The reason is that the peg is also square. Now imagine, that this phenomenon is reduced to the atomic level. There are three clouds of atoms whose shape is determined by forces of varying kinds, the round and square holes and the peg. A full understanding of the forces between atoms at the micro level will enable us to know what the shapes of the atomic clouds are, and therefore be able to deduce the shapes the clouds will take, and therefore that the square-shaped cloud will go into the square-shaped hole but not into the round-shaped hole. The macro level can be logically deduced from the micro level. The micro-level account explains why the square peg behaves as it does but does not add anything more than is provided by the macro level. Putnam's argument is that even if reduction occurs, it may be better to *explain* things at a macro level, even though the same things can be *deduced* from the micro level. The conclusion from Putnam's argument is that although the laws of psychology can be deduced in principle from the laws of physics, in practice such deduction is not possible and so psychology as a discipline should remain.

The third argument is that reduction is neither possible in principle nor in practice. There are three linked arguments against reductionism in principle between psychology and physiology: (a) complementarity, (b) functional versus structural description, and (c) emergentism. Each of these three positions is considered in the next section.

Arguments against reductionism in principle

Complementarity

Complementarity is a philosophical principle that owes its origins to quantum mechanics. The basic idea is that *it is the nature of reality* that phenomena can be explained only by using more than one *incompatible* theory (see Chapter 1). This principle has been demonstrated in quantum mechanics in several ways that need not concern us, but one that can be accepted as true. It is also possible to apply the same principle of complementarity to the relationship between psychology and physiology – even though neither are quantum theories. Methodological complementarity was proposed by Kirsch and Hyland (1987) as a way of understanding the relationship between biological and psychological theories.

Methodological complementarity is based on the following argument. When discussing reductionism, what matters is the relationship between the two types of theory. The exact nature of consciousness and of physical reality can be put on one side. Psychological theories and biological theories describe different types of entities, entities that have a different ontological status. 'Ontological status' refers to the way something exists. So, mind states and physiological states exist in different ways.

Multiple uses of the same word can lead to confusion. The word *cause* is used in more than one way. When used informally, the word cause simply refers to the temporal sequence of events. If A is always preceded by B, then it is possible to say that B causes A. This informal sense is used when events are described rather than explained (as in inductive generalisations, see Chapter 1). By contrast, if *cause* is used in an explanatory sense (i.e., in terms of a theoretical mechanism that explains the observed events), then the term cause also has the requirement of connectivity. Connectivity means that there is some sort of connection that links the two events. For example, if ball A hits ball B so that ball B rolls away, then it is the physical contact between the two balls that is the connection. In the case of mental events, ideas can be connected in content when one idea leads to another. So, both physiological and psychological mechanisms involve connectivity, though each has a different kind of connectivity. When used as part of an explanatory mechanism, causal relationships can exist only between entities that have the same ontological status – because causality requires some form of connection between the causally connected events.

The conclusion from this is that, if the term *cause* is used in a formal explanatory sense, then minds do not cause bodies nor bodies cause minds. Although mind states and physiological states exist in different ways and cannot cause each other, they can be *identified* with each other. That is, whenever there is a mind state there is a unique and corresponding body state (note the opposite does not always occur – variation in physiology does not require variation in psychology). The statement that stress causes inflammation which then causes disease (as suggested earlier) is a description of a causal sequence, not an explanation. From a formal, explanatory perspective, psychological stress is identified with a biological state that causes biological illness. The authors of methodological complementarity argue that although 'mind causing body' and vice versa statements are commonplace, they confuse two different ways of using the word *cause* – cause used in the informal and formal senses.

Methodological complementarity paints a picture of the relationship between psychology and physiology that is very similar to Wundt's idea of psychophysical parallelism. Psychological events and physiological events occur in parallel. Methodological complementarity adds the idea of identity relations that occur from time to time in the mutual causal sequence of events. Every psychological event must, in principle, be identified with a physiological event as otherwise the assumption of materialism is broken. However, there may be physiological events that are not represented psychologically, so not every physiological event is identified with a psychological event (see Figure 6.1).

$$
\begin{array}{lccccccccc}
\text{Psychological level:} & X1 & & \rightarrow & & X3 & & \rightarrow & & X5 \\
& | & & & & | & & & & | \\
\text{Physiological level:} & Y1 & \rightarrow & Y2 & \rightarrow & Y3 & \rightarrow & Y4 & \rightarrow & Y5
\end{array}
$$

FIGURE 6.1 Methodological complementarity. A causal sequence of five physiological states showing identity relations with a causal sequence of three psychological states. Every psychological state must be identified with a physiological state, but not vice versa, and some physiological states may be unknown.

Methodological complementarity (Kirsch & Hyland, 1987) was a simplified version of an earlier proposal of complementarity (Hyland, 1985) where there were three parallel levels of explanation: physiological, mentalistic and mechanistic. The mentalistic and mechanistic levels provide a distinction between two types of psychological explanation. The mechanistic level corresponds to the type of constructs used in cognitive psychology (see Chapter 4), whereas the mentalistic constructs are those used in humanistic psychology (see Chapter 8). Methodological complementarity focussed on the mentalistic and physiological relationship rather than considering the mechanistic concepts that were proposed originally by Craik (1943).

Kirsch and Hyland (1987) argue that psychological description (i.e., mentalistic description) cannot be reduced to physiological description, even if there is a one-to-one relationship between psychological events and physiological events. The reason is that a one-to-one relationship requires a bridging theory. A reduction is effected if the theories of the secondary science can be deduced from the primary science *with the addition of bridging theories*. Although one cannot know what bridging theories are going to be discovered in the future, there are several possible reasons why bridging theories can never provide a logical (i.e., one-to-one) link between concepts in psychology and physiology. Two of these reasons are described in the next section.

Fodor's functional description

Fodor's argument is based on a difference between structure and function (Fodor, 1968). Physiology provides a description of the structure of the nervous system; psychology provides a description of its function. Physiologists might object to this characterisation, arguing that physiology describes the function of the nervous system whereas anatomy provides a description of its function, so Fodor's argument needs a little refinement: Psychology provides a description of the function of the nervous system in terms of behaviour.

Fodor states that although structure and function are linked, they are not logically related. As an example, consider the term *mousetrap*. A mousetrap is an object described in terms of its function: catching mice. There are several different types of mousetraps with different structures. There is the widely used 'little nipper' that kills the mouse with a metal bar. There is a 'humane mousetrap' that catches the mouse alive and allows the human to release it away from the house (at least that is the theory). There are other designs of mousetrap – an online search of images of mousetraps will illustrate how many there are. It is not possible to know the exact structure of a mousetrap by the functional word, *mousetrap*. What about working in the other direction? Is it possible to look at the structure of a mousetrap and know, logically, that its function is to trap mice? The answer, again, is no. Looking at examples of mousetraps viewed online, I am struck by their beauty. Why not have a mousetrap as a work of art? Or use a mousetrap as a paper weight? After all, there is no accounting for human taste, and someone somewhere might well use a mousetrap for something other than trapping mice.

Fodor (1968) argues that the brain has structures, and these structures have functions. In a later work (Fodor, 1983), Fodor suggests how these functions can be represented as modules. Fodor developed his theory of the modularity of the mind to resolve two different approaches to perception. In one approach the stimulus has a direct link to perception; in the other approach perception depends on prior knowledge. Fodor's idea of a module is best expressed in his own words:

> One can conceptualize a module as a special purpose computer with a proprietary database, under the conditions that: (a) the operations that it performs have access only to the information in its database (together, of course, with specifications of currently impinging proximal stimulations); and (b) at least some information that is available to at least some cognitive process is not available to the module. It is a main thesis of *Modularity* that perceptual integrations are typically performed by computational systems that are informationally encapsulated in this sense.
>
> (Fodor, 1985, p. 3)

The word *computer* is revealing in this quote. The modularity approach to the mind is one that treats humans as a kind of information-processing system. Computers are information-processing systems. The underlying assumption of the modularity approach is that an understanding of the function of a computer aids the understanding of human cognitive function. It is not unusual for new theories to be influenced by new technology. Desktop computers started appearing in universities in the late 1970s and early 1980s, just at the time that Fodor developed his theory of modularity. Fodor's theory is influenced by the structure and function of a computer. A computer's hardware is related to its software, but the hardware of a computer is not logically related to its software. If physiology is equated with the hardware of a computer, psychology can be equated with its software.

The importance of computers in the emergence of the cognitive paradigm psychology was described in Chapter 4. The cognitive paradigm uses mechanistic person variables, that is, variables that are linked to the function of mechanisms. The cognitive paradigm uses functional description, that is, description that is modelled on (i.e., derives from) the way information-processing machines function.

The concepts of complementarity and functional description are linked. Functional and structural descriptions are complementary descriptions. They are different ways of describing the whole. However, the concept of complementarity is broader than functional description as it allows other forms of psychological description to be included, such as that deriving from qualitative methods.

Sperry's theory of emergentism

Roger Sperry (1913–1994) received a Nobel Prize in 1981 for his work on split brains, that is, brains where the corpus callosum joining the two hemispheres of the brain have been cut. Sperry examined the effect of 'splitting the brain' on consciousness, and it was these observations that led him to formulate a theory of consciousness.

The central idea of Sperry's theory of consciousness is that mind and body are at different levels of organisation. Note that the term *level* is not used in the sense of 'bigger or smaller than.' The mind isn't 'bigger' or smaller than the body. It does not correspond to the idea of levels as described in the unity of science hypothesis. When he suggests that mind and body are at different levels, Sperry suggests that consciousness is an emergent property of a lower level of organisation, that of physiology or 'bodies.' That is, the central idea is that mind 'emerges' from bodies.

There are two important features to note about Sperry's theory of emergentism. The first is that the theory preserves the assumption that there is nothing in the world other than the material world. There is no 'mental substance' floating around. Sperry's theory adopts a materialist position (see previous sections). The second feature is that Sperry's theory means that the emergent properties at the 'higher' level will always mean that the higher level cannot be reduced to the lower level.

What are emergent properties and why do they occur? This topic will be returned to in the last chapter: The idea of emergent properties has a wider application than between psychology and physiology. Sperry, however, has a slightly different take on emergentism. A conventional view is that the emergent property at the higher level emerges from the lower-level system, but that emergent property does not have a 'downward' effect on the properties of the lower-level system. Sperry argued that emergent properties do have a downward effect. The consequence was that mind could cause the body, even though the mind is not independent from the body.

Sperry illustrates this argument with the case of a wheel. A wheel has several parts – there are the spokes, the hub and the rim. When all these parts are assembled in the correct way, then the wheel can roll along the ground. The property of 'rolling' is an emergent property of the parts of the wheel that is achieved only when the parts are in the right places. However, when the wheel rolls along, the positions of the individual spokes are determined by the emergent property of rolling. The position of the parts is determined by the whole.

Sperry argues that emergent properties such as the mind can have a downward effect on the physiology of the brain. Sperry's argument seems to make sense. If people engage in positive mental activities, such as meditation, then this leads to positive physiological changes, such as a reduction in stress. However, it could also be argued that the intention to meditate is also identified with a physiological event. The beneficial physiological effect of meditation is therefore caused by the physiological events identified with the intention to meditate.

Sperry's argument that the mind causes the body is inconsistent with the argument presented in methodological complementarity (see earlier) that, to avoid confusion, the term *cause* should be used in only in the formal sense, the sense where there is connectivity between events. In Sperry's example of a wheel, if the term *cause* is used in the formal sense, then the spokes of the wheel are caused to move by their two attachment points. In methodological complementarity, the idea that 'mind causes brain' is represented as identity relations, and this form of representation can easily accommodate the idea of emergent properties. The brain has emergent properties that are identified with psychological states. The state of the brain that generates those emergent properties has a causal effect within the brain. In summary, there is a compelling argument for treating emergent states at different levels as causally independent but connected by identity relations, even though the state at the lower level creates the emergent property that may defy description.

Unity of science and connectionism again

The strong version of the unity of science hypothesis is now unpopular and is replaced by the view that science is pluralist (Tahko, 2021). It is sometimes possible to show that a theory at a higher level can be deduced from the assumptions of a theory at a lower level, but this is not always the case (an example will be given in Chapter 10). The different levels and disciplines of science form a unity of knowledge in the sense that each provides information about the world in which we live. The pluralistic view of science is consistent with the principle of complementarity introduced by the physicist, Niels Bohr, an idea introduced in Chapter 1. Complementarity is a beautiful concept. When applied to the different sciences one concludes that each of the different sciences – physics, chemistry, biology, psychology and sociology – provides different truths about the world. None of the sciences is superior to any other in principle. They merely provide different kinds of information. Tolerance of understanding by one type of scientist to another science is preferable to disinterest or intellectual snobbery between one type of science and another.

Although sciences are equal but different, it is possible to argue that, because it has existed for longer, the science of physics is more advanced in its stage of development because it provides quantitative predictions. There is, however, a reason why psychology is particularly challenging as a science. The reason is that each person is unique, and that uniqueness creates problems of understanding that are described in the next chapter. There is joke psychologists like to make: "When God was giving the sciences their problems to solve, he gave the psychologists the difficult ones."

What can neuroscience add to psychology?

If one assumes, as most do today, that the strong unity of science hypothesis is incorrect, it still leaves the question how does physiology in the form of modern neuroscience contribute to psychology? Before answering this question, here is a reminder of the meaning of *explanation*.

Explanation explained

There is a difference between description and explanation (see Chapter 1). A description of events is provided when an account of those events is given *only* by observation terms and words describing how those observations are related. Description simply means describing what is observed and reporting on that observation. Explanation will always require description of those observations, but it includes something else. Explanation provides an account of *why* the observable events happen in terms of some kind of 'other' event. These other events are described in terms of non-observables, i.e., by using theoretical terms. The explanation therefore provides an account of what is happening using the theoretical terms, plus observation terms, plus the terms connecting them. The explanation provides a story using theoretical terms.

Psychology, physiology, and explanation

When someone asks you to explain something, a possible reply is "What kind of explanation would you find acceptable?" The reason is that there are different kinds of explanations. Explanations consist of theoretical terms, observation terms and the words connecting them, and together they provide a kind of story. Explanations can be considered a type of story, a story of how something happens using an additional narrative that is not found in the observation terms themselves.

Novelists sometimes write a novel using a format where each chapter tells the story from the perspective of a different person. The novel therefore becomes a series of stories about the same events, each story being valid in its own way, but each story being different because it comes from a different perspective. The same can happen with explanations. There can be different stories, using different sorts of theoretical terms. There are (at least) two kinds of story to explain behaviour, one type of story being psychological and the other biological.

There is sometimes a popular view that biological explanations have precedence over psychological explanations in terms of 'goodness' of explanation. That is, if a psychological explanation and a biological explanation were both offered, then the biological one appears to be better. The biological is the better story because it is based on something tangible, namely biology. Is this true? Research does show that, whatever the truth of the matter, people prefer biological explanations. In a paper entitled "Superfluous Neuroscience Information Makes Explanations of Psychological Phenomena More Appealing," the researchers demonstrated exactly what is described in the title of the paper. Adding irrelevant neuroscience into a story helps the psychological story seem real to ordinary people (Fernandez-Duque et al., 2015). The concept of general intelligence was proposed by Spearman (1927), but the finding that it is related to processing speed (Schubert et al., 2022) makes the concept of general intelligence more real.

The bias towards biological explanation is a psychological phenomenon. It has no basis in logic. One theory is better than another only if it is more useful than the other – for example, by making more powerful or more useful theories. That is an empirical question.

If biology provides a better kind of explanation than psychology, then it must be able to provide superior predictions. As psychology cannot be reduced to biology, a working hypothesis is that neither psychological nor biological explanations are intrinsically better than the other one. Instead, they provide different types of explanation – stories from different perspectives – and their usefulness depends on the context in which they are used. The question that needs addressing is this: how do biological explanations add to psychological ones? What does the paradigm of cognitive neuroscience add to the cognitive paradigm?

There are several ways in which biology can be useful to psychological understanding. Here are three examples.

Example 1. Although there is no logical relationship between structure and function, they are statistically related. Suppose that psychologists are interested in determining what psychological mechanisms are responsible for two cognitive tasks. If different parts of the brain are active for the different tasks, then it is reasonable to infer that the tasks involve different psychological mechanisms. On the other hand, if the same part of the brain is active for the two tasks, then this leads to the possibility that the same psychological mechanism is responsible for both tasks. An example of this is found in research demonstrating the independence of short-term and long-term memory using neuroimaging techniques (Jonides et al., 2008).

Example 2. Psychological interventions can be assessed with physiological outcome measures. When a psychological therapy is used to reduce distress, it may be that people report less distress because of the demand characteristics of the intervention. A biological assessment of stress can provide greater certainty that the intervention was effective. An example of this type of research is the considerable evidence that meditation can reduce the shortening of telomeres that are associated with ageing (Le Nguyen et al. 2019), a finding that shows the biological advantages of a psychological technique.

Example 3. More controversially, neuroscience can aid judgements when combined with non-biological evidence. Research shows that people who commit crimes have biological features that differ, on average, from those who do not commit crimes, with an estimate of up to 60% of criminal and antisocial behaviour being heritable (Fox, 2017) – but caution about this kind of estimation is needed, as discussed in Chapter 7. Although crime-disposing biological features may be used as part of the evidence in criminal cases, the use of evidence in this way is controversial (Greely & Farahany, 2019; Vincent, 2010).

Skinner's radical behaviourism (see Chapter 4) assumes that theoretical terms, including physiological descriptions, are explanatory fictions. Physiological correlates of psychological variables will be explanatory fictions unless they add something either by confirming an uncertain hypothesis or by providing additional testable predictions. This is the challenge for neuroscience. Unless it has explanatory value, neuroscience only adds the impression that psychological phenomena are real. That should never be in doubt.

Public attitudes to mental and physical illness

At the beginning of this chapter, I suggested that the terms *mental illness* and *physical illness* should not be used to distinguish different types of cause, because minds do not occur without bodies. However, the mental versus physical distinction maps onto the distinction between psychological and somatic symptoms and so it is reasonable to use mental and physical as descriptions of different types of symptoms.

Mental illness or mental symptoms are often perceived by the public to be less real or less important than physical illness and somatic symptoms. In an earlier section, I showed how the demonstration of a physiological basis for psychological phenomena provides spurious validity for those psychological phenomena. Uncertainty in the underlying physiology of psychological symptoms contributes to this misperception. Although there are biological treatments for affective disorders and psychoses, the biological basis of these symptoms is poorly understood. Antipsychotic treatments do not cure psychosis; they control symptoms and have been likened to a chemical cosh as their side effects are considerable, sometimes leading to poor adherence. There is only one class of psychological symptoms where the underlying physiology is well understood: Alzheimer's disease and other dementias can be explained in terms of pathological changes in the brain, though this understanding has produced very limited treatment benefit.

Most physical symptoms are caused by diseases. Diseases are defined by a specific pathophysiology (i.e., a physiological error that is specific to any disease). Modern medicine has been far more effective in treating diseases, doing so by correcting the underlying pathophysiology. The inventions of antibiotics and steroids have saved millions of lives. Vaccination has saved many more. However, not all physical symptoms can be explained by a disease. The pathophysiology of somatic symptoms known as 'somatic syndromes' is uncertain. Examples of somatic syndromes include irritable bowel syndrome, chronic fatigue syndrome and fibromyalgia. Somatic syndromes are the Cinderellas of modern medicine – poor understanding, limited treatment options and poor outcome. The need for a paradigm shift was recognised more than 20 years ago (Sharpe & Carson, 2001). The public confusion between mental and physical creates real problems for treating somatic syndromes, where lifestyle change rather than biological interventions have often been found to be more successful. To the public, lifestyle change is often equated with 'psychological,' and patients resent the idea that their illness should be labelled as 'psychological' (Stone et al., 2002) as this somehow implies their symptoms are less real than the same symptoms caused by a disease. All symptoms are distressing, and psychological symptoms are no less distressing than somatic symptoms. All symptoms are real and have a biological basis, even though that biological basis may not be known.

Biopsychosocial interactionism

The term *biopsychosocial* was introduced by George Engel in 1978 (Engel, 1978). Engel's use of the term was purely practical and was aimed at medical education. Medical doctors are trained in biomedicine – also referred to as the medical model. Disease is understood and treated in terms of pathophysiology. Engel worked within that medical model but wanted to alert physicians and surgeons to the psychological needs of patients. Put simply, his message was this: think also about patients as people and think about their psychological and social circumstances. Engel suggested several levels that were relevant to treating the patient – levels that are different from but bear some relation to the levels cited in the unity of science hypothesis. Engel's levels were community, family, two-person, person, nervous system, organ system, tissue, cell and molecule.

Psychological care has always featured in good treatment by doctors and nurses, but its recognition was certainly stimulated by Engel's use of a catchy word. After Engel, the term *biopsychosocial interactionism* has been used to describe a theory where psychosocial and biological elements are included. Several biopsychosocial theories have been proposed, and in each case the end state, typically some form of health variable, is affected by both biological and psychological variables.

This idea of applying different types of theory to the same context is not new. It is an application of the idea of methodological complementarity described earlier in this chapter. According to this approach, there are two separate types of theory, one biological and one psychological, and each provides information about the treatment of the patient. One of the criticisms of biopsychosocial interactionism is that it is *not* a theory (Pilgrim, 2015). It does not integrate biology and psychology at a theoretical level. However, it is certainly possible to combine biological and psychological theories using the ideas of complementarity (see Figure 6.1 above), where psychological events are identified with an underlying known or unknown biological substrate (Hyland, 2017).

The concept of biopsychosocial interactionism was introduced as guide to clinical practice and the importance of treating the body holistically. The body is changed by psychological events, by exercise, by food, and by pharmacological interventions with drugs. Furthermore, drugs are effective only if a person takes them. Research shows that adherence to medication can be poor (Osman & Hyland, 2005). Multimodal input by health professionals from different backgrounds is often found to be the best approach to treating people who are ill and is now common in clinical practice. A literature search of the term ‘multimodal treatment’ in the title of journal articles reveals almost two thousand papers. Diseases such as cancer, heart disease and chronic obstructive pulmonary disease all benefit from treatments that in addition to pharmacological intervention benefit from support of multi-disciplinary teams that provide advice about exercise (supported by physiotherapists), diet (supported by dieticians) and psychological well-being (supported by psychologists). In addition to multi-disciplinary input, health and well-being are also supported by *interdisciplinary* interventions such as the combination of a positive mental state provided by dance (Quiroga Murcia et al., 2020) and tai chi (Wang et al., 2010, 2018), and the combination of mental relaxation and food provided by mindful eating (Cherpak, 2019). The biopsychosocial interactionist approach supports both multi-disciplinary and interdisciplinary approaches to health, well-being and the treatment of disease.

Looking forward

A central thesis of this chapter is that psychological phenomena are emergent properties of a biological system. The question that has *not* been answered in this chapter is: why does this emergent property occur? What is it exactly that makes the lump of matter of a living organism capable of thinking? The answer to this question is complex and deserves a chapter on its own. The current view is that emergent property of mind is a consequence of the network structure of the brain. Chapter 10, the final chapter of this book, provides an account of how properties emerge from networks and how the emergent property of artificial intelligence will change the world we live in.

Summary

Early modern psychology was developed by people who were trained in physiology, and the relationship between these two disciplines has continued and expanded to the present day The link between physiology and psychology, nowadays called neuroscience, has contributed to the perception of psychology as a modern science. The relationship between psychology and physiology has taken different forms. Psychophysiology provides non-invasive study of the brain using EEG and fMRI. It shows the relationship between areas of brain activity and psychological activity. Physiological psychology provides an analysis of the chemicals of the brain and the response of brains to chemicals. It has contributed to psychoactive drug treatments and an understanding of the physiological basis of mental illness. Psychoneuroimmunology examines the relationship between the immune and neurological systems and psychology. It provides the pathway between psychological stress and somatic disease. Cognitive neuroscience links cognitive concepts with biological events. The strong version of the unity of science hypothesis is based on the principle of reductionism. Putnam has shown why, even if reductionism is possible in principle, there are practical reasons why psychology cannot be replaced by physiology. However, there are arguments against reductionism in principle: Kirsch and Hyland's methodological complementarity is based on ideas developed in quantum mechanics, Fodor's functional modularity shows how structural and functional description differ, and Sperry's emergent properties show how holistic properties emerge from a complex system. The modern view is that science is pluralistic and consistent with a weak version of the unity of science hypothesis: the different sciences provide complementary descriptions of reality. Neuroscience contributes understanding in several ways that are different to psychology by linking structure to function. It has also raised the status of psychology with the public by making psychological phenomena appear more 'real.' Neither physiology nor psychology provide a superior explanation to the other; each provides a different perspective on the functioning of the body and behaviour. Current multimodal approaches to treatment are based on principles of biopsychosocial interactionism where psychological and biological interventions are combined. Problems are caused by the public misperception that mental illness is less real than physical illness.

Essay questions and discussion topics

1 Has neuroscience made psychology more scientific?
2 What are the goals of psychophysiology, physiological psychology and psychoneuroimmunology?
3 What does the principle of complementary tell us about the relationship between sciences?
4 What were the first psychoactive drugs and how were they discovered?
5 Is depression caused by low levels of serotonin in the brain?
6 What is the relationship between functional description in psychology and neuroscience?
7 What do you understand by the term *biopsychosocial interactionism*?
8 If a happy body makes a happy mind, what are you doing to make your mind and body happy?
9 To what extent should psychologists learn about other sciences?
10 Which aspects of this lesson for life do you agree or disagree with, and can you explain why? Can you think of other lessons that might be drawn from this chapter?

Look after both body and mind to achieve health and happiness. Be tolerant of the variety of ways people use to make sense of the world in which they live.

7

How do heredity and circumstances determine what people do and experience?

The heredity-environment controversy, the person-situation debate and epigenetics

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Most students will have heard of the heredity-environment controversy. This controversy is also referred to as the nature-nurture debate. Because science can resolve differences through evidence, it is easy to imagine that data will provide an answer to the controversy. Science will provide an answer that has the form of x% of behaviour is caused by heredity and y% of behaviour by environment where x plus y equals 100%. People want a simple answer. The reason people want a simple answer is that simple answers support different political systems. People who support different political systems seek support for their particular view with a simple answer. The problem is that a simple answer is not possible. Reality is more complex than a simple percentage. This chapter covers the reason the controversy is important, why a simple percentage is misleading and the broader conceptual issues that are relevant to the cause of behaviour.

History of why the heredity-environment controversy matters

The Indian system of caste assumes that heredity determines the kind of work a person is fit to do. Nineteenth-century Europe was a class-based society in which people were born into different stations in life. Class and caste systems assume that special people, such as maharajas, kings, dukes, etc. have some special inherited characteristic that makes them fit and deserving for their particular station in life. The idea of being born to a 'station in life' is based on assumptions about the importance of heredity. In nineteenth-century Europe, marrying above or below your station was considered undesirable. Even today in India, some people have strong views that people from one caste should not marry into another caste. Belief in the importance of heredity is also part of a system of differentiating different groups of people (for example, people of African or Jewish heritage), and forms the basis of racial and other forms of discrimination.

Although many political systems are based on assumptions of heredity, others assume that it is environment that is important. John Ball's sermons in 1381 provide an early example of the rejection of heredity entitlement. Ball is reported to have preached "when Adam delved and Eve span, who was then a gentleman" (O'Brien, 2004: iv). Karl Marx's manifesto of communism assumed that all people were born equal, and therefore do not have privileges by virtue of birth. Socialist and communist political systems are antagonistic to the idea of inherited inequality. The rich don't deserve to be rich just because they have rich parents.

If environment determines outcome, then poor people are not destined always to be poor because of their heredity, and their lot can be improved by exposure to a better environment. If madness is not hereditary, mad people should not be locked away in lunatic asylums but treated in a caring environment. In sum, politics and social policy are based on assumptions of heredity and environment. The heredity-environment controversy is relevant to psychology but has far wider implications.

Nature

The idea of heredity is not new. Since recorded history, people have noted that children resemble their parents, as do the offspring of cattle, dogs and cats. It takes only a small leap of imagination from the observation that body type is inherited to the conclusion that psychological characteristics are inherited. Madness is a psychological characteristic. The concept of madness as a hereditary characteristic appears in several works of literature. For example, in Charlotte Brontë's novel, *Jane Eyre* (published in 1847), Mr Rochester married Bertha Mason but was unaware that there was "madness in the family." Bertha became mad and was hidden away and confined to her room. The story revolves round this hidden secret of Mr Rochester – that he was married but wanted to marry Jane. In the past, madness in families was often hidden because it affected the marriage prospects of other family members. It comes as no surprise that scientists in the nineteenth century assumed that psychological characteristics were influenced by heredity.

Francis Galton (1822–1911) was born in Birmingham, England, and was related to Charles Darwin – his mother was the half-sister of Charles Darwin's father. Like William James, Galton (Pearson, 1914, 1924) was profoundly influenced by Darwin's *The Origin of Species*. Darwin's theory is based on an assumption of heredity. Natural selection occurs because offspring resemble their parents. Galton wrote a book entitled *Hereditary Genius* in 1869 (Galton, 1869), some ten years after Darwin had published his *Origin of Species* (Darwin, 1859). Galton put forward the argument that genius, like any other human or animal characteristic, was inherited. Consequently, if genius was an inherited characteristic, then genius should run in families. To demonstrate that genius was inherited Galton showed that the people who achieved eminence (i.e., whose contributions were recognised by others) tended to come from about 300 families. Galton established an *anthropometric laboratory* in 1884 at the International Health Exhibition in London where, for a small fee, people could have their abilities measured. This very early type of intelligence test relied on some simple tests such as reaction time and sensory acuity, as Galton assumed a simple physiological basis underlying all ability. Note: Galton's participants paid Galton rather than vice versa!

Galton introduced the idea of measuring differences between people and helped in the creation of a statistical methodology for individual differences (Galton, 1883). Galton plotted the relationship between the height and weight of parents with the height and weight of their children, using scatter plots. He realised by looking at these scatter plots that the children's heights and weights tended to be closer to the mean than those of their parents – there

Social class in nineteenth-century England

The heredity-environment controversy appeared at a time when there were wide differences in lifestyle between the social classes in Victorian England. Belief in the importance of heredity entitlement supports a class-based society. Reformers such as Elizabeth Gaskell and Charles Dickens wrote novels that highlighted the appalling conditions experienced by the poor. Elizabeth Gaskell's first novel, *Mary Barton: A Tale of Manchester Life* (published in 1848) described the life of working-class people in an industrial city in shocking detail. The lives of the lower classes were controlled by the industrialists and upper classes. William Blake's moving poem *London* (published in 1789) expresses how damaging that control was and the terrible choices ordinary people needed to make simply to stay alive and prevent starvation.

> I wander thro' each charter'd street,
> Near where the charter'd Thames does flow.
> And mark in every face I meet
> Marks of weakness, marks of woe.
> In every cry of every Man,
> In every Infants cry of fear,
> In every voice: in every ban,
> The mind-forg'd manacles I hear
> How the Chimney-sweepers cry
> Every blackning Church appalls,
> And the hapless Soldiers sigh
> Runs in blood down Palace walls
> But most thro' midnight streets I hear
> How the youthful Harlots curse
> Blasts the new-born Infants tear
> And blights with plagues the Marriage hearse

was, as he put it, a regression towards the mean. Galton urged a follower of his, Karl Pearson, to develop a statistical formula for describing these scatter plots, and Pearson developed an index, called the Pearson product-moment correlation coefficient – a statistic that is well known to undergraduate students.

Galton introduced the terms *nature* and *nurture* (Galton, 1874, 1875). The phrase 'nature and nurture' is a convenient jingle of words and, in proposing his extreme nature viewpoint, Galton also recommended selective breeding or eugenics as a way of improving humanity, as well as sharing the widely held view at the time that Europeans were superior to ‘the savage races.’ Selective breeding of animals had been practised for centuries and was responsible for the breeds of farm animals known today. In suggesting eugenics, Galton applied what was appropriate for animals to humans. Whether humans should be treated like animals in this regard is another matter. Modern society takes a very different view towards both eugenics and racist assumptions. Both eugenics and racism are predicated on the assumption that inherited differences between humans are important.

Racism in psychology

The concept of prejudice was described in Chapter 2 in relation to intellectual snobbery and discrimination against women and Jewish people in psychology and in society in general. Although the USA welcomed immigrants in the early twentieth century, Winston (1998, p. 28) writes that “The widespread antisemitism in the United States between the world wars is well documented … as are the discriminatory practices of universities in admissions and hiring.” Jewish people fleeing Nazi Germany had to be certified that they did not have ‘Jewish characteristics’ to be employed in American universities (Winston, 1998). African Americans experienced extreme forms of discrimination in the USA because of that country’s historical association with the African slave trade, a trade consistent with Galton’s belief in the ‘savage races.’

The first European country to ban the African slave trade was Denmark-Norway in 1803, England in 1833 and France in 1848. Slavery was abolished in the USA in 1865 but only after a civil war that left a shadow that continues to affect parts of the USA to the present day. African American psychologists were almost non-existent until the 1960s. In some parts of the USA, African Americans were segregated from European Americans and received state-sanctioned discrimination until the 1960s.

The end of slavery

Although slavery is frequently associated with the African slave trade, slavery has been in existence since the dawn of time, has existed throughout the world and has taken many forms. Ethiopia was the last country to make slavery illegal in 1942, and that was despite pressure from European countries and attempts by earlier rulers to abolish the practice (Allain, 2006). Slavery was eventually made illegal by the emperor Haile Selassie; it was difficult to abolish because the practice was so embedded in the social structure of Ethiopia. At the turn of the century, about one-quarter of Ethiopians were slaves. Discrimination based on heredity has been a constant part of the human story. Moral values have changed over time and for the better. No country can look back at its past without regret for the harm it did to its fellow humans. Every country has skeletons in its past.

Racist beliefs occur for a variety of reasons. These can be studied in social psychology and are beyond the scope of this book. The heredity-environment controversy did not create racism. It was the response to racist views by Galton many others who followed who *wanted* there to be differences in psychology between races, in particular, differences regarding intelligence, because such differences would support their assumptions. The race-intelligence controversy is therefore part of the story of the heredity-environment controversy.

African American psychologists

Robert Guthrie (1930–2005) wrote in 1976 (Guthrie, 1976) about how, when he enrolled for a master's course in Kentucky, USA, in 1955, he was the only black face in a sea of white. The title of his book was *Even the Rat Was White*. Guthrie refuted the theory that was suggested then, and subsequently, that people of African heritage were less intelligent than those of European heritage. His book provides a revealing story about attitudes and behaviour towards African Americans in American universities and society.

Nurture

Although some psychologists had racist views, many others took an entirely different approach and emphasised the importance of nurture. The strongest environmentalist view (i.e., supporting the nurture position) came from behaviourists. The following quotation from J. B. Watson is repeated from Chapter 4.

> Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select – a doctor, lawyer, artist, merchant-chief and, yes, even into beggarman and thief, regardless of his talents, penchants, tendencies, abilities, vocations and race of his ancestors.
>
> (Watson, 1924/1970, p. 10)

Watson and other behaviourists assumed there was no dividing line in terms of psychological processes between animals and humans. If there are no differences between animals and humans, then there can certainly be no differences between different races of humans.

Behaviourists took an extreme nurture position and other early psychologists also favoured the effects of the environment over heredity. Witmer (1907) first assumed that mental illness was due to heredity, as did others at that time, but later changed his mind, believing that mental illness had an environmental cause (see Chapter 3). The switch from a nature to nurture interpretation of mental illness had an impact on the way mentally ill patients were treated. If it is the nature of some people that they are mentally ill, then nothing can be done about it. However, if mental illness is caused by nurture, then there is the possibility that nurture can cure it. The emphasis on the environment in education (see Chapter 3) influenced educational policy. The American Head Start programme (started in 1998) and the British Sure Start programme (founded in 1999) (Glass, 1999) assumed that the early environment of children is important to their development, and that the provision of a better environment for poorer children would help society overall.

The race-intelligence controversy

The race-intelligence controversy was important because of its relationship with the heredity-environment controversy. The data were uncontroversial. The data showed that African Americans as a group had lower mean scores in IQ tests compared to European Americans. Some thought that the differences were genetic. Others thought that there was no genetic difference between races, and that differences in mean scores were due to two environmental factors. One reason for the lower scores in African Americans was that tests tended to favour the dominant culture, i.e., IQ tests are biased in favour of the cultural features that are found in White Americans but not African Americans. The second (and possibly more important) factor is that the IQ is affected by environment, and that African Americans as a group were exposed to an environment that was less beneficial to the development of the kinds of skills measured in an intelligence test than White Americans. Even after statistically controlling for wealth or education, it is possible that African Americans experienced additional problems that could have influenced intelligence scores. The heredity and environment explanations of racial differences in IQ scores reflected deeper assumptions about humanity and biases that were sometime implicit rather than explicit. The issue has been very contentious in the history of psychology with those arguing for and against either position. The contentiousness of this issue reflects underlying assumptions that are difficult to shift. These underlying assumptions can explain the relatively small impact of consensus statements by geneticists and others that racial differences in intelligence are a myth (Serpico, 2021). Serpico (2021) quoted the consensus statement published in 1976 by the American Society of Genetics made some 45 years earlier. The quote was:

> 'THERE IS NO CONVINCING EVIDENCE OF GENETIC DIFFERENCE IN INTELLIGENCE BETWEEN RACES' (capitals in the original).
>
> (Serpico, 2021, p 207).

Serpico (2021) discussed why this consensus statement has had so little impact. Continuing prejudice encourages the belief in racial differences. Although there is no evidence of racial differences in intelligence, it does not follow that there are no inherited differences between people. The question of what exactly is inherited is addressed in the following sections.

Where do races come from?

The oldest skull of anatomically modern humans dates from 190,000 years ago, in North Africa. All non-Africans originate from a small band people who left Africa about 70,000 years ago, a band that would have numbered about 200 individuals. The light skin colour of some people is explained by evolutionary pressure. Light skin colour improves vitamin D production in northern regions. Low levels of vitamin D produces rickets, which reduces survival and reproduction – there is evidence of rickets in early European bones. However, many other physical features that distinguish races are difficult to explain – such as the almond shaped eyes of Chinese people.

What is inherited?

If a puff of air is blown into a person's eye, the person blinks. This is a reflex response. Everyone does it. It is inherited. Non-human animals inherit many complex patterns of behaviour, and these are called instinctive behaviours. For example, when ducklings hatch out of the egg, they become attached to (i.e., 'imprinted' on) the first object they see moving. That is instinct. Every duckling behaves in this way. Humans differ from animals. Apart from reflexes, they do not exhibit instinctive stereotypical behaviour.

Rather than inheriting stereotypical behaviours, humans inherit capacities to behave in particular ways. The heredity-environment controversy is sometimes presented as a controversy about behaviour, but that is incorrect. The controversy is about the capacity to behave. Inherited capacities have evolutionary advantages in that they enhance the ability to adapt to changing environments – and humans evolved in a changing environment caused by periods of glaciation (the ice ages that started about six million years ago). Human capacities can be treated in two ways: capacities that are shared between all people and capacities that differ between people.

Evolution and capacities

The capacity for language is inherited and is common to all people. Just as the blink reflex is inherited and a feature of all people, so is the ability to learn language – a characteristic that is lacking in the rat. These common inherited characteristics and their evolutionary antecedents are studied under the heading of evolutionary psychology. Research in evolutionary psychology shows, for example, that kin preference (Smith, 1964; Wilson, 1975), altruism (Silk & House, 2016) and cognitive biases (Buss, 2015) can all be explained by the survival advantage of these psychological capacities for our human hunter-gatherer ancestors.

Humans evolved as hunter-gatherers in a Palaeolithic environment, and so it is likely that humans are adapted for that environment. Humans may be happiest when their psychological environment corresponds to that of the Palaeolithic – i.e., supported within a socially cohesive group. Anatomically modern humans (including those in the Palaeolithic) differ from their hominid ancestors in having a lengthy post-reproductive period. The experiences that create happiness in old age may therefore differ from those of younger people. In sum evolution theory predicts that there are some capacities and characteristics of humans that are common to all people – those that contributed to survival in the past.

Evolution theory also provides insight into why capacities might differ between people. Natural selection requires there to be variability within a species, so those most suited to a particular environment are more likely to survive. Lack of variability means a species cannot adapt to changing environments, putting the species at risk of extinction. The environment has changed over the millennia. The human species, like other species, is genetically variable. Some of that variability has created physical differences in skin colour because of adaptation to different light levels in different parts of the world. However, there is no reason why psychological capacities should vary with light levels. Genetically conferred variation in human capacities must exist, though these capacity differences are unconnected to race.

The problem of range when calculating heritability

A simple solution to the heredity-environment controversy is to say that x% of intelligence is caused by heredity, y% of intelligence by the environment where x plus y equals 100%. There are problems with this easy solution. Let us suppose that there are genetic differences in the capacity for intelligence but the range of genetic variation within a population is very small. Some people have slightly more capacity and some slightly less capacity for intelligence. The impact of heredity is small. Now suppose that the range of capacities is very much greater: some people in the population have a lot of inherited capacity for intelligence and some very little. In this case the impact of heredity is very much greater. So far so good. The range of genetic variation determines its effect on intelligence. Now let's repeat the same logic for the environment. Suppose that people experience a very similar environment; environmental variation is small. In this case the environment will have little impact on heredity. On the other hand, if the environment is highly variable, the environment will have a much greater impact.

The logical problem is this: the answer to the heredity-environment controversy depends on the range of the variables measured. Although the range of genetic variability may be constant in different groups of people, the range of experiences within populations varies between populations. For example, in societies where there is an unequal distribution of wealth, the range of experiences will be greater than those where there is a more equal distribution of wealth. More generally, we can say that heredity will have a greater impact on behaviour in societies where wealth is equal compared to those where wealth in unequal. Environment will have a greater impact on behaviour in societies where wealth is unequal compared to societies where wealth is equal.

Statistical demonstration of attenuation of range.

Much of the data on the heredity-environment controversy is based on correlations (see following sections). The size of the correlation is influence by a statistical effect called attenuation of range. It is easy demonstrate this effect for yourself. Here is what you do.

1. You need a data set of two variables that are correlated. It should be a large data set of at least about 200 cases.
2. Call the variables A and B, and calculate the correlation between A and B.
3. Find the median point of A and allocate all cases in A to two groups, those above the median (high-A) and those below the median (low-A).
4. Correlate high-A with B and low-A with B.
5. You will notice that the correlations between high-A and B and between low-A and B are lower than the correlation between A and B.

Problems with the twin studies

Twin studies form a major part of the attempt to assess the relative contribution of heredity and the environment. If one measures the intelligence of identical (monozygotic) twins raised together, the correlation between the scores of the two twins is high. This high correlation can be attributed to both heredity and environment. However, if one compares the correlation between identical twins raised together with the correlation of identical twins raised apart, then the difference between the two correlations must be because of the environment. So, the logic of this type of study is to compare two types of twins: (a) those twins brought up together and who will have equal heredity and equal environments; and (b) those twins brought up separately who will have equal heredity but different environments. The closer the correlations are together, then the greater the impact of heredity. In Burt's study (the data are contested, see Chapter 1) (Burt, 1966), the correlation between the monozygotic twins reared apart was 0.77, which is a high correlation, particularly if one considers that a correlation cannot be higher than the test-retest reliability of the test. It was so high that others questioned whether it was fake (Kamin, 1981). Nevertheless, later research shows that there is only a small decrease in the correlation between identical twins raised apart versus together, leading to the conclusion that the contribution of heredity is large.

What is the problem? Although the decrease in the correlation between twins raised together versus those raised apart is due to the environment, the environmental difference between the two pairs of twins may be very little. If the twins raised apart are raised in similar environments, then it is hardly surprising that the two correlations, between identical twins raised together and apart, are similar. There are two reasons why the environments of twins raised apart are similar. The first is that identical twins share the same placenta. Identical twins have similar environments at a crucial point of human development (see later section on intergenerational epigenetics), and the environment provided by the placenta affects later intelligence (Raznahan et al., 2012). In such studies, the range of environmental variation is small. The second reason is that adoptive parents are not randomly selected from the population. If adoptive parents have similar characteristics, then they will bring up their respective twins in a similar way. Just because two children are raised in different families, it does not follow that they differ in the environmental factors that affect intelligence. The estimate of the relative contribution of inheritance versus the environment is based on assumptions about the environments of both sets of twins. It is impossible to quantify how similar are the environments of twins raised apart versus together, but the range of environments of adoptive parents will be less than that of the population as a whole.

A second type of study examines the correlations between identical (monozygotic) twins and fraternal (dizygotic) twins raised together. The assumption underpinning these studies is that these two sets of twins have the same environment but different genes. Again, the assumption of this research runs into problems. Identical twins do not have the same environment as fraternal twins, even if they are brought up together. The reason is that identical twins share the same placenta, whereas fraternal twins have different placentas. As the nutrients received by the foetus depends on the state of the placenta, and because placentas vary, it follows that the early environment of the fraternal twins is more dissimilar to that of identical twins. There are also social reasons for doubting the assumption that the two sets of twins share the same environment. Identical twins can be treated (and dressed) differently from fraternal twins.

In conclusion, the twin studies are biased towards overestimating the contribution of inheritance due to attenuation of range within the environment. Although twin studies can be a useful way of examining the relative effects of inheritance and environment on dispositions, caution should be exercised when interpreting results because of biases in the methodology.

The person-situation debate

Capacities are inherited, not stereotypical behaviours, but it is behaviours that matter. The relationship between heredity and behaviour depends on another relationship, that between the person and the situation. The person-situation debate is central, therefore, to understanding the extent to whether heredity matters in everyday life, and it is strange that this point is often missed when discussing the impact of heredity. Heredity does not cause behaviour. It causes the potential for behaviour.

Potential versus behaviour.

Just because you have the potential (i.e., capacity) to do something doesn't mean you will necessarily do it. This point is illustrated in a lovely poem by Thomas Gray, called 'Elegy Written in a Country Churchyard,' which was first published in 1751. The writer is looking at the tombstones of the poor rural people and wondering what their lives would have been if they had the opportunities of more wealthy people. Here are the verses that are most relevant to the capacity-behaviour relationship. Good and bad are both prevented by lack of opportunities.

Perhaps in this neglected spot is laid
  Some heart once pregnant with celestial fire;
Hands, that the rod of empire might have sway'd,
  Or wak'd to ecstasy the living lyre.

But Knowledge to their eyes her ample page
  Rich with the spoils of time did ne'er unroll;
Chill Penury repress'd their noble rage,
  And froze the genial current of the soul.

Full many a gem of purest ray serene,
  The dark unfathom'd caves of ocean bear:
Full many a flow'r is born to blush unseen,
  And waste its sweetness on the desert air.

Some village-Hampden, that with dauntless breast
The little tyrant of his fields withstood;
Some mute inglorious Milton here may rest,
Some Cromwell guiltless of his country's blood.

Th' applause of list'ning senates to command,
The threats of pain and ruin to despise,
To scatter plenty o'er a smiling land,
And read their hist'ry in a nation's eyes,

Their lot forbade: nor circumscrib'd alone
Their growing virtues, but their crimes confin'd;
Forbade to wade through slaughter to a throne,
And shut the gates of mercy on mankind,

The person-situation debate and the heredity-environment controversy have two words that are similar, but with an important difference. These words are *environment* and *situation*. The environment in the heredity-environment debate refers to the past environment of a person. The situation in the person-situation refers to the current situation. However, both words refer to the external context of a person. Evidently, situations or environments differ, and people differ. The exact way people differ need not concern us for the moment, as this topic will be addressed in the next chapter (Chapter 8). For the moment all that matters is that people differ, and situations or environments differ. The person-situation debate addresses the question:

> To what extent is behaviour determined by differences in the *current* situation versus differences in personality?

When the person situation-debate is added to the heredity-environment controversy, the question addressed becomes more complex:

> To what extent is the combined effect of a person's *past* experiences *and* their genetics determine behaviour *in contrast to* the current situation?

The question becomes more complex because personality is determined by both genetics and environment.

The combined heredity-environment controversy plus person-situation debate is shown in Figure 7.1. It can be seen from Figure 7.1 that behaviour is affected by the context in two ways. The context affects behaviour indirectly through its past contribution to personality, and the context affects behaviour directly by its present influence on behaviour. It follows that the more behaviour

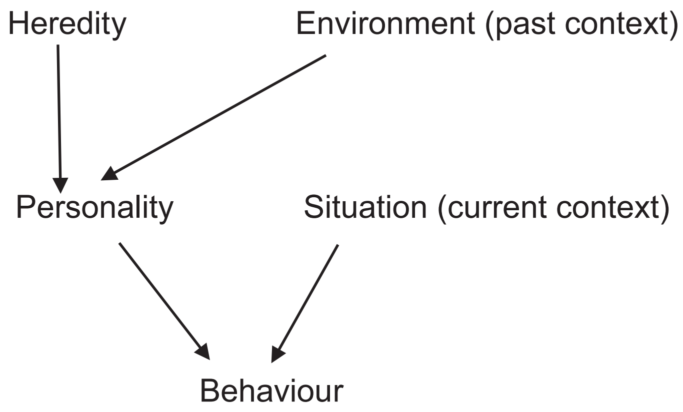

FIGURE 7.1 The antecedents of behaviour.

is determined by events in the present, the less it can be affected by heredity, irrespective of the relative contributions of heredity and environment to dispositional factors such as personality or intelligence.

In 1957, Lee Cronbach (1957) wrote a paper with the title “The Two Disciplines of Scientific Psychology” in which he drew attention to a split between two types of psychological research. One type used correlational methods to examine differences in people’s behaviour that were (assumed) consistent across situations. The other type used experimental methods to examine differences across situations that were (assumed) consistent across people. One focussed on the person; the other on the situation. This distinction remains today. Social psychologists research the effects of different social environments on people and publish the research in social psychology journals. Personality psychologists research how people differ in the same environment and publish in personality journals.

Cronbach argued that this split in psychology was unhelpful and that a combination of the experimental and correlational methods was needed. For example, experimental methods will reveal that one treatment is better than another when people are considered as a group. However, it may be that some people respond better to one treatment and other people better to the other treatment. Cronbach – and others – argued the concept of the ‘best treatment’ was based on a false assumption and suggested instead that it is necessary to determine which treatment is best for whom. Cronbach’s suggestion that correlational and experimental methods should be combined reflects earlier theoretical work by Kurt Lewin (1943b) who interpreted behaviour resulting from an interaction between the person and situation. The idea of integrating personality psychology and social psychology eventually became accepted. The *Journal of Personality and Social Psychology* was first published in 1965.

Personalised medicine

Despite Cronbach's logical argument against 'the best treatment' concept, that idea still dominates medicine and, to some extent, clinical psychology. Recently, 'personalised medicine' has provided an alternative to the assumption that there is a best treatment for any disease. Personalised medicine is defined as "treatments targeted to the needs of individual patients on the basis of genetic, biomarker, phenotypic, or psychosocial characteristics that distinguish a given patient from other patients with similar clinical presentations" (Agusti et al., 2016, p. 410).

If behaviour is influenced by both the situation and personality, then this leads to an obvious question. Which is more important? The person-situation debate arose over this question. Initially, there was an absence of consensus with personality theorists, who claimed that personality was more important, and social and experimental psychologists who suggested that the situation was more important. Consensus was reached by a position known as 'interactionism.' Behaviour is the result of an interaction between the person and the situation (Magnusson & Endler, 1977; Epstein & O'Brien, 1985).

The conclusion from the person-situation debate is that both the personality psychologists and social psychologists were correct, but they were claiming different things and so were correct in different ways. They were correct depending on what is meant by behaviour. Does the word *behaviour* refer to a single instance of behaviour, or is it an aggregation of many behaviours? The consensus reached was that if one tries to explain a single behaviour, then in most cases that single behaviour is explained primarily by the situation, and personality plays only a minor role. However, if one tries to explain an average of several different behaviours across different situations, then personality does indeed explain that behaviour. Personality explains general trends in behaviour but is very poor at explaining individual behaviours. The situation explains individual behaviours but is poor at explaining trends in behaviour. If one considers that personality traits are defined in terms of 'behaviours that are consistent across situations and time' then it is not surprising that this is exactly what personality does. Some behaviours are consistent across situations and time, some are not. Those behaviours that are consistent across situations and time make up personality.

Not only does the answer to the person-situation debate depend on whether the behaviour is an aggregation or not, the result also depends on the type of behaviour. Consider how people respond when driving and they see traffic lights. Everyone stops at red and goes at green. The behaviour at traffic lights is not determined by personality or intelligence. However, the results from a maths test result will differ between people as a function of mathematical ability, and behaviour at parties will differ as a function of sociability.

The non-linear interaction of person and situation (NIPS) model provides a theoretical framework for understanding whether situations and persons play a greater or lesser role in determining behaviour (Blum et al., 2018). According to this model, situations can be described as either strong or weak, where strong or weak refers to the affordance of the situation. In common sense language, the term *affordance* means the situation is 'telling' the person something. For example, a red traffic light has a strong affordance – it signals that you should stop. There is only one behaviour associated with the red traffic light, namely stopping. The red traffic light is a strong situation. A mouse that appears suddenly in front of you, on the other hand, can lead to several behavioural responses. You could jump on a chair, run away, try and catch it, or simply stand still and watch what it does. The mouse is a weak situation. According to the NIPS model, in strong situations, personality is unimportant in determining behaviour. Everyone stops at a traffic light irrespective of their personality. And if a person does not stop – for example, a bank robber fleeing from police – then it is not personality that is determining their behaviour at that particular moment in time, but the situation created by the police. However, in weak situations, personality plays a much greater role. People high in neuroticism may behave differently to the mouse compared to those low in neuroticism.

The NIPS model also makes a distinction between strong and weak persons. Strong persons tend to behave in the same way irrespective of the situation. For example, some people are always aggressive or always non-aggressive whatever the situation. Such persons are described as strong. Others are sometimes aggressive or not depending on the situation. Such persons are described as weak. So, if a person exhibits cross-situationally consistent behaviour, then they are described as strong and for such people personality has a greater impact on behaviour that those weak persons whose behaviour varies with the situation. The conclusion from NIPS therefore is that it is meaningless to talk about the relative contribution of persons and situations to behaviour because it depends on the person *and* situation.

There is one more piece to the jigsaw that needs putting in place, and that is an explanation of the word *interactionism*. Interactionism is the resolution of the person-situation debate. The person and situation do not add to produce behaviour: They interact. What this means in practice can be illustrated by the following example of the interaction between neuroticism and stressors. A person high in neuroticism shows a large autonomic response to a mild stressor but shows no autonomic response in the absence of any stressor. A person low in neuroticism has no autonomic response to the mild stressor nor to the absence of any stressor. Whether or not different situations affect behaviour depends on the person. It is precisely this point that was made by Cronbach in that early paper when he suggested that the two disciplines of scientific psychology should be working together. Interactionism provides a theoretical framework that is not provided by either personality psychology or social psychology (Fleeson, 2004).

The NIPS model and the concept of interactionism provide additional insight into the heredity-environment controversy. Heredity will be poor at explaining individual behaviours compared to averages of behaviour. It will be better at explaining those behaviours associated with strong people and weak situations compared to those behaviours associated with weak people and strong situations. The impact of heredity depends on what is being explained. The impact of heredity depends on the person and the situation.

Epigenetics

The above sections are based on an assumption about inheritance and how it works. The assumption is that heredity is transmitted via genes. The word *gene* first appeared in 1909 as a word to describe a unit of that which is inherited. The modern use of the word *gene* is similar to its original use except it now represents a physical entity on a chromosome that encodes that unit of inheritance (Portin & Wilkins, 2017). According to the traditional view, genes are fixed (apart from rare occurrences of mutations). Half the parent's genes are passed on randomly to their offspring, so that offspring have some of the characteristics of both parents, and children of the same parents will have different genes. Although this is true, an earlier assumption that genes are independent of the environment is incorrect. This earlier view supports a common misunderstanding that the parent's environment does not affect the genes because they are fixed units of information which are encoded by the DNA of the chromosomes, and the chromosomes are hidden away in the nucleus of the cell.

What really happens is as follows. Genes act like supervisors at a chemical factory – they make chemicals for the body. In many cases genes produce the chemicals simply because they exist. In other cases, the genes produce the chemicals only when the gene is switched on by chemicals that have the function of switching on the gene. The term *gene expression* refers to the switching on of genes, a process involving DNA methylation. Gene expression is studied under the heading of epigenetics. The term epigenetics was first coined by the biologist Conrad Waddington (1905–1975) who defined epigenetics as

> … the branch of biology which studies the causal interactions between genes and their products which bring the phenotype into being.
>
> (Waddington, 1975, p. 218)

The modern use of the word epigenetics differs from that early definition because the epigenetics refers to the process by which genes become expressed (Jablonka, 2022). Stress provides a good example of how epigenetics works. Biological and psychological stress cause the expression of inflammatory genes. The inflammatory genes create inflammatory chemicals that then create a variety of health problems including cancer (Holman et al., 2016) and psychological problems. There is a substantial body of research showing that adverse child experiences (ACEs) increase the risk of depression and anxiety (Elmore & Crouch, 2020) though there are also protective factors against the adverse effects of stress, such as social support (Von Cheong et al., 2017). ACEs do not always cause depression and anxiety, with or without social support. The reason is people's genes vary. There is genetic variation in inflammatory genes. This variation is a known risk factor for cancer (De Marzo et al., 2007) and a risk factor for depression (Danese & Baldwin, 2017).

Inflammatory genes and ACEs interact rather than add. Together they are much more likely to cause depression than by itself. Inflammatory genes will not be expressed in an environment of low stress, and so people high and low in inflammatory genes will have similar health outcomes because gene expression will not occur for people with inflammatory genes. However, in an environment of high stress, those with inflammatory genes will experience the high level of inflammation that causes disease and mental illness, whereas those with few inflammatory genes will have lower levels of inflammation. In these circumstances, a person's genes will make a difference to their health outcomes. The impact of heredity depends on the situation.

The same argument as that above applies to abilities of any kind. For example, some people become violin virtuosos. They have the gift of playing the violin. Of course, you do not become a violin virtuoso without a lot of hard work and practice, but hard work and practice does not always make a violin virtuoso. Let us suppose there is a gene that confers the ability to play the violin and this gene varies in the population. Person A has the violin playing gene and person B does not. If both person A and B are taught the violin and practice at an early age, the gene will become expressed for person A who will become a good violinist at age 20 but not for person B who, despite practice, will never become a virtuoso. The gene makes a difference. However, if they are both start playing the violin at the age of 40, the violin playing gene will not have been expressed for person A so neither will be virtuosos. The extent to which a gene creates variability in outcome depends on the environment.

The variability of the environment is relevant to an interesting phenomenon relating to the effect of age. The contribution of heredity to body weight decreases as people age. As get older, their environment – i.e., what they eat – has a cumulative effect on their body mass. The person has experienced more environment when old than young, but the effect of genes remains the same. However, in the case of intelligence, the contribution of heredity *increases* with

ILLUSTRATION 7.1 The gift of inheritance.

age. Results using twin studies show that the heritability of intelligence at age 5 years is estimated as 0.22, by age 16 it is 0.62, and at age 50 years it is 0.80 (Sauce & Matzel, 2018). The reason is that people high in cognitive ability seek situations of cognitive stimulation over the lifespan and, as they do so, more and more cognitively oriented genes become switched on. The environment is not random. People seek environments that are consistent with their genes, so the environment becomes more closely matched to their genotype. Gene-environment interactions are not only passive; they also are the consequence of an active process of behavioural choice.

Point to remember:

Genes and environment do not simply add up to produce the phenotype. They interact. The phenotype includes personality. Personality and the situation do not add to produce behaviour. They interact. Both epigenetics and the person-situation debate give the same message. If everyone is exposed to the same musical experience, then only musical genes will determine outcome. However, if some people are exposed to a musical environment and some not, then it is the interaction between genes and the environment that determines outcome.

Epigenetic inheritance

Epigenetics refers to environmental effects that affect the person from infancy onwards. Epigenic inheritance refers to environmental effects on previous generations that then influence the person.

There are two types of epigenetic inheritance. Intergenerational inheritance refers to the effect that the maternal environment has on the growing foetus. Intergenerational inheritance is relatively short term. It is the effect of one generation on the next (or next but one) and has been studied extensively regarding maternal biological and psychological stress. Transgenerational inheritance refers to a long-term process where a gene is activated, and that activated gene is then passed on down the generations.

Epigenetic inheritance has an evolutionary advantage if environments oscillate backwards and forwards over a few generations. Epigenetic inheritance allows offspring to be more suited to the environment of the parents, but without committing the genotype to that particular environment. Epigenetic inheritance provides flexibility and more rapid change in the phenotype compared to gene selection within a population (Jablonka, 2022).

Lamark's theory of evolution

Jean-Baptiste Lamarck (1744–1829) proposed a theory of evolution that preceded that of Darwin. He believed that if parts of the body were exercised and grew, then those traits would be transmitted to offspring. According to Lamarck, giraffes have evolved long necks because the parent giraffes kept stretching them to reach leaves high up. Lamarck's theory was shown to be incorrect, but the idea of inheritance of acquired characteristics has parallels with epigenetic inheritance.

Intergenerational inheritance

The prenatal environment is particularly important to the way genes are switched on or off. Some of the early research was conducted by David Barker (Barker, 1992) who used the records kept in India on birth weight to predict later health problems. The 'Barker hypothesis' is that low birth weight is an indicator of foetal stress. Foetal stress switches on several genes, including those associated with inflammation. The switched-on inflammatory genes then produce chemicals throughout the person's life that predispose to disease at age 50 years and beyond. Barker did his original work in India because the Indian health system was noted for its excellent record keeping and kept records of the birth weight of older people.

The Barker hypothesis has subsequently been confirmed for a variety of diseases, mental disorders and types of stress. Low birth weight is associated with mental health problems (Schlotz & Phillips, 2009) and attention deficit/hyperactivity disorder (ADHD) in children (Mick et al., 2002) and adults (Halmøy et al., 2012). Low birth weight is associated with greater hostility in the adult and greater adult weight (Rkkönen et al., 2008). The incidence of schizophrenia increases if, during pregnancy, the mother was exposed to psychological stress (particularly in the first trimester), including bereavement, war, famine and natural disasters such as floods, earthquakes and famine (Malaspina et al., 2008; Roseboom et al., 2011). Autism is associated with maternal exposure to air pollution (Chun et al., 2020) and with antidepressant exposure during pregnancy (Andrade, 2017). There are critical periods when the genes are particularly prone to being switched on – such as the first trimester of pregnancy. These switched-on genes then affect the person for the rest of their life, including their psychological characteristics (Jones et al., 2018). In addition, because the ovum cells of females are formed in the womb, influences on the pregnant woman can affect not only the child of the pregnant woman but also the grandchildren.

Transgenerational inheritance

Whereas intergenerational inheritance is transmitted through the experience of the mother, transgenerational inheritance can be transmitted through the mother or father, and the change in gene activation can then be passed on to future generations (Jablonka, 2022). Although there is less evidence for transgenerational inheritance compared to intergenerational inheritance, a review by Varela et al. (2022) cites studies providing evidence for transgenerational effects that increase the risk of schizophrenia and post-traumatic stress disorder, as well as some evidence of transgenerational inheritance for autism.

Transgenerational inheritance has implications for groups of people who have suffered poor environmental conditions over many generations. Such people would experience epigenetic effects that are less beneficial than those people who have for generations lived in a more benign environment. Transgenerational inheritance has implications for those marginalised people whose are less fortunate than those in the more affluent first-world countries. If generations of people have been exposed to a cognitively poor environment, then this has implications for differences in average intelligence between groups of people.

Lessons from epigenetic inheritance

The heredity-environment controversy is predicated on the assumption that genes remained fixed, and the twin studies are based on that assumption. Epigenetics and epigenetic inheritance show that genes can become expressed by environmental factors. Some of the variations attributed to heredity in twin studies could therefore be the result of epigenetic inheritance.

The evidence of epigenetic inheritance shows how damaging wars and other catastrophic events are not only to the humans who experience them but also to their offspring. The prenatal environment plays an important role in the development of future generations. A wide variety of psychological and biological adverse events (including exposure to pollution) affect the growing human in the womb. Growing and raising a new human is an immensely important task and one that is very much undervalued in modern society. Relatives, friends and employers have a responsibility when interacting with pregnant women. The way a pregnant woman is treated affects not only the pregnant woman but will also have long-term effects on her offspring. A thousand years from now (when hopefully there is better provision for the psychological needs of humans) future generations will be appalled at the way we treat pregnant women today.

ILLUSTRATION 7.2 Pregnant woman of the future.

Summary

Conclusions from the heredity-environment controversy have been used to support contrasting positions about politics, race, class and caste. Although evolution theory predicts genetic differences in human capacities, a simple quantitative estimate of the relative contribution of heredity and environment is impossible as that figure depends on a variety of factors. Reported estimates of the relative contribution of heredity and environment to intelligence that are based on twin studies should be treated with caution as the methodology creates a bias in favour of heredity. The person-situation debate draws attention to the interaction between person variables (explained by genetics and earlier experience) and situation variables (i.e., the present situation), an interaction explained by the non-linear interaction of person and situation (NIPS) model. Epigenetics shows how genes are expressed through environmental influences and explains how adverse childhood experiences create a range of health-related problems including psychological problems. Research on intergenerational epigenetic inheritance shows how the mother's experiences affect gene expression of the developing foetus, and transgenerational epigenetic research shows how expressed genes of mothers and fathers are passed down through subsequent generations.

Sauce and Matzel (2018) suggest that the correct conclusion of the heredity-environment controversy is that "it depends."

1 It depends on the variability of the environment affecting the person's past.
2 It depends on the variability of the environment affecting the person's ancestors.
3 It depends on the extent to which relevant genes are expressed by environmental factors.
4 It depends on whether prediction is of a single behaviour or cross-situationally consistent behaviour.
5 It depends on whether the situation is strong or weak and the person strong or weak.
6 It depends on whether intergenerational and transgenerational epigenetic inheritance counts as inheritance or not.

Essay questions and discussion topics

1 What are the social and political implications of the heredity-environment controversy?
2 What biases occur in the twin studies of heritability?

3 What is the NIPS model and what is its relevance to the heredity-environment controversy?
4 What is the meaning of epigenetics and what is its relevance to the heredity-environment controversy?
5 What is the meaning of intergenerational and transgenerational inheritance?
6 Are children like their parents? And if not, why not?
7 What would make your environment (social and physical) better?
8 What should be done to help working women while pregnant to achieve a healthy environment for the developing foetus?
9 If you had to choose, which should be given more governmental support than it receives at the present time: early years education or further and higher education?
10 Which aspects of this lesson for life do you agree or disagree with, and can you explain why? Can you think of other lessons that might be drawn from this chapter?

> *The environment affects a person throughout their life. Talents develop with practice. Be kind to pregnant women and help them avoid adverse circumstances as their offspring are the future. Moral judgements change over time. Just as we disapprove of things that were acceptable in the past, future generations will disapprove of what we find acceptable now.*

8

How should people's differences and uniqueness be explained?

Personality and humanistic psychology

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In some ways everyone is the same. In some ways everyone is different but like some other people. In some ways everyone is unique.

Different topics in psychology have different assumptions. Experimental psychology (including much of cognitive psychology and social psychology) assumes everyone is the same. What is important is the way people react to different situations. Other topics in psychology assume that every person is different but like some other people. These topics include personality theory, attitude measurement, intelligence and ability, and well-being. What is important is how people differ. People differ along dimensions of person variables so that more than one person can be at any one point along a person variable dimension. The person-situation debate (described in Chapter 7) examines how person variables and situations combine to produce behaviour. However, it is also evident that in some ways everyone is unique. Uniqueness is one of the ideas explored in humanistic psychology. Humanistic psychology developed in the late 1940s and 1950s (i.e., in the dying days of the empire of behaviourism and before the dominance of cognitive psychology), describing itself as 'the third force in psychology' – the other two forces being behaviourism and psychoanalysis.

This chapter examines how psychologists have studied people who are different, either by shared differences or by uniqueness. The focus of this chapter is the assumptions that determine the methodology rather than details that are provided elsewhere in psychology courses.

Measuring shared differences: personality

The theoretical terms used in the cognitive paradigm are called person variables. There are different types of person variable, and the person variables themselves vary between people. The measurement of person variables and how people are different is part of every psychology course. Differences in person variables are studied in topics as varied as personality, intelligence and ability, motivation and values, attitudes, and well-being. As a general rule, differences between people are assessed by questionnaire, and factor analysis is commonly used in the process of validating the questionnaire. Factor analysis is an important method in the development of personality research, and the conceptual basis of factor analysis will be described later in this chapter.

Murray's (1938) book has the title *Explorations in personality*. The book is a consensus statement from a group of people who decided what personality was simply by thinking about it, and then exploring their ideas with different ways of measurement. Murray lists 44 variables that were considered important for personality, the majority of which were 'needs.' Some of these needs, such as the need for achievement and the need for affiliation, feature

Types versus traits

There are two categories of personality theory: types and traits. The theories of Freud and Jung are type theories. Type theories involve discrete categories (e.g., oral personality, anal personality and phallic personality). Type theories assume that a person falls into one or more of these discrete categories. You either are or are not an oral type. Trait theories assume that people vary along continua, and personality is described by variation along these continua. Psychologists support trait theories, but differ in the dimensions that are considered important for understanding differences between people.

in later motivational research programmes, but others, such as the need for abasement and the need for counteraction, have had limited subsequent research. Other variables describe traits such as emotionality, creativity and anxiety. In addition, personality varies in terms of 'energy' or the intensity of action – Murray suggests this is a general property that is a feature of all needs. He also suggests that personality varies in terms of 'superego,' taking a concept from psychoanalysis where people vary in the extent to which their behaviour is constrained by moral judgements. Murray measures these highly heterogenous variables in several ways. In addition to questionnaire items, he asked judges to talk to people and then rate their personality, giving attention to the degree of agreement between judges and how to aggregate their scores. He also used projective tests. Murray developed the Thematic Apperception Test (TAT), which is a series of cards with pictures, to assess personality. The TAT was used subsequently both clinically and by later motivation researchers (e.g., McClelland, 1961). People are asked to describe what they see, though Murray writes: adding

> Only by experience we discover that much more of the personality is revealed if the S is asked to create a dramatic fiction rather than to guess the probable facts.
>
> (Murray, 1938, p. 531)

The thematic apperception test (TAT)

The Thematic Apperception Test, or TAT, is based on the psychoanalytic principle that unconscious needs can be revealed by asking people to generate a story from an unclear figure. The technique was used in the 1940s and 1950s by researchers studying individual differences in motivation, particularly in the context of achievement motivation and affiliation motivation. The technique is simple in principle. Count every time there is a reference to achievement-related imagery.

Here is a description of how it works. One of the pictures in the TAT pack is of a young boy looking at a violin. The participant is asked to write down what is happening. If the person writes, for example:

> The boy is looking at the violin and looking forward to improving by practising and then going out and planning with friends.

this would score 1 on the achievement scale and 1 on the affiliation scale. If the person writes, for example:

> The boy is looking at the violin, he is about start practising so when he grows up, he will be a famous violinist.

this would score 2 on the achievement scale and 0 on the affiliation scale. If the person writes, for example:

> The boy is thinking how boring the violin is and how he would like to play with friends.

this would score 0 on the achievement scale and 1 on the affiliation scale.

What the TAT cards look like

It is worth going online to have a look at the original TAT pictures – they really are very odd. They boy with the violin is one of the more normal ones. Put 'thematic apperception test' into a search engine and then click on images. Draw your own conclusions from what you see!

It is not necessary to use the TAT cards to infer motivation from fantasy. One of the more curious uses of the technique was carried out by David McClelland and published in his book *The Achieving Society* (McClelland, 1961). First, McClelland collected children's stories written at different points of time in history. He then analysed children's stories for achievement content, plotting the amount of achievement at different points of time. Second, he measured how countries and empires rose and fell over time using economic activity as a measure of economic success. McClelland was able to show that a rise in achievement content of children's stories preceded the rise in the economic fortune of countries and empires by about 20 to 30 years, and that the decline in countries and empires coincided with a fall in achievement content with a similar time lag. McClelland and others afterwards argued that achievement motivation was learned by children depending on the way they were brought up. Early independence training led to more achievement motivation in later life and hence more economic success for the person and the person's country. Differences in achievement motivation was responsible for the differences in economic fortunes of countries. Differences in motivation are the result of different ways of bringing up children, of differences in the environment.

Achievement motivation, sex and academic performance

The previous chapter (Chapter 7) presented evidence that girls generally achieve higher grades at school than boys, particularly in maths and literacy skills. Girls are higher in achievement motivation than boys and their higher motivation can explain, but only in part, the superiority of girls (Steinmayr & Spinath, 2008).

Personality using factor analysis

There are three things to note about Murray's work. The first is that his list of needs is unfalsifiable. The list is a matter of opinion, albeit one based on consensus. The second is that there is an emphasis on methodology. Murray wanted his work to be scientific and approached this goal by having a rigorous methodology. Note, in the quotation above, how he calls the participant 'the S' – meaning the subject. This use of this word makes the sentence sound scientific. Rigorous scientific methodology, however, does not make something a science. Science is defined by falsifiability. The third thing to note is that, at least at first sight, there are numerous ways in which personality can vary, some relating to needs, some to traits and some to values.

The problem with Murray's work is that he proposes different ways in which people vary but without providing any independent evidence for their ontological status – i.e., that these variables exist in some way that is independent from the mere statement that they exist. The solution to this problem came from a different source, from the assessment of intelligence.

Spearman's book *The Abilities of Man* was published in 1927. Early research in intelligence had identified different abilities that are now recognised today: arithmetical, visual spatial and literacy (see Chapter 2). Scores on these different tests were correlated. Spearman wanted to know what was causing the correlations and developed factor analysis to find out. Students are often told 'correlation doesn't mean cause.' In fact, it is possible to infer cause from correlations, you just can't be sure what is causing what. If A is correlated with B, then one cannot tell whether A causes B, B causes A, or if they are both caused by C. If neither A nor B cause each other, then it is possible to infer that C must exist. C is referred to as a latent cause.

Imagine that you are in room with six ceiling lights, and you cannot see the switch. Three lights (A, B and C) come on and off together. Another three lights (D, E and F) come on and off together. How many switches are there? The answer is two – one for A, B and C and one for D, E and F. This is the logic that is used to infer cause from factor analysis. Factor analysis – or more properly now called Exploratory Factor Analysis (EFA) – is a method for exploring the correlations between a set of variables. Let us take the following correlation matrix as an example where there are seven variables, A, B,C, D, E and F.

	A	**B**	**C**	**D**	**E**
A					
B	0.7				
C	0.8	0.6			
D	0.2	0.3	0.2		
E	0.2	0.1	0.3	0.7	
F	0.1	0.2	0.3	0.8	0.6

There are two clusters of high correlations. A, B and C form one cluster, and D, E and F form another cluster. EFA could be used to conclude that there are two factors, and therefore two independent causes. In reality, correlation matrices are seldom straightforward, so what happens is that the statistical procedure presents various alternatives that are plausible descriptions of the data. EFA is not a statistical test. It is a way of exploring the relationship between variables. Confirmatory factor analysis does provide a test, but its use does not alter the fact that there are often several plausible different interpretations of a correlation matrix.

Spearman used EFA to provide evidence of a general factor of intelligence (given the label '*g*') because all the different tests of ability were at least slightly correlated, and therefore provided evidence of a 'general factor.' Evidence of *g* is supported further by physiological data (see Chapter 6). Although Murray refers to Spearman's concept of *g* in his book, he didn't use factor analysis – which is a very lengthy calculation without the help of computers. Later personality theorists were able to use either the same or similar statistical methods to those used by Spearman to determine how many factors of personality there were. In principle, the method is simple. Generate a number of personality statements, known as items. Have the items rated on a 'like me/unlike me 'scale (e.g., a 7-point Likert scale) by a large number of people. Conduct EFA. The factors that emerge describe the underlying person variables that cause the variation in the items, and therefore cause variation in behaviour.

The only the problem is that it possible to come up with different numbers of factors and, therefore, of personality dimensions depending on the theoretical assumptions, how the EFA is conducted and the items that make up the item set for analysis (Briggs & Cheek, 1986). Using trait items in the questionnaire, Cattell's personality test is based on 16 factors (Cattell, 1945, 1966), Eysenck has 3 (Eysenck, 1944, 1953, 1955), and Costa and McCrae (1992) have 5 factors. Students studying personality will be taught the 'five-factor,' or Big Five, theory, as this is the one commonly used today and is the one most widely accepted. However, there is also a six-factor personality scale (Jackson & Tremblay, 2002) and a two-factor solution related to the Big Five (Yik & Russell, 2001). Some but not all the differences between these trait-based personality theories can be explained by different levels of organisation of person variables. The two-factor theory can be interpreted as a higher order Big Five. Neuroticism makes up one factor, and a combination of extraversion, agreeableness, conscientiousness and openness makes up the other. The two-factor solution is also reflected in the widely used positive and negative affect scale (PANAS) (Watson et al., 1988). However, although there are sensible relationships between different EFA solutions, unresolved differences exist. There is only a limited relationship between Cattell's 16 factors and the Big Five (Byravan & Ramanaiah, 1995; Cattell, 1995).

The various questionnaires described above are all based on the idea of a trait. The items of the questionnaires consist of trait items, that is, items describing behaviours rather than the reasons for behaviour. Murray's needs are reasons for behaviour. Modern personality theorists have also proposed scales that describe the reason for behaviour rather than behaviour itself. Rokeach's value scale measures individual differences in values (Rokeach & Ball-Rokeach, 1989). Values influence behaviour but they are not behaviours. Inspection of personality journals will show that there are many personality scales that have little relationship to the Big Five. For example, there are scales of empathy, intolerance of ambiguity, and individualism-collectivism to name three chosen at random. Scales measuring individual differences in motivation, including achievement motivation and affiliation motivation are still used. In sum, there are numerous other ways of measuring personality focussing on particular topics of interest. Factor analysis is a useful exploratory tool for understanding personality, but different solutions are possible depending on the items in the questionnaire and how the factor analysis is conducted.

This very brief overview of personality theory shows is that (a) there are many ways in which people differ and (b) there are several different ways of describing those differences. How much has the understanding of personality developed since Murray's book? Scientific progress can be evaluated by gain in knowledge, truthfulness, usefulness and understanding (see Chapter 1). There is also an additional criterion that has been proposed specifically for psychology: a gain in resources. Modern personality theory can be compared using each of these criteria with the analysis of personality provided by Murray in 1938. Modern personality theory has more knowledge, usefulness and resources than before. There are many personality scales, and the process of assessment is better. In addition, research on the determinants of personality (see Chapter 7) provides information about the environmental factors both for the person and the person's ancestors that shape personality. Modern personality theory is more truthful than Murray's, as factor analysis provides a way of evaluating hypotheses about data. However, the understanding of personality is still limited because there is little consensus on the fundamental questions about the nature of personality. That is a challenge for future personality research.

Idiographic versus nomothetic science

The German philosopher, Wilhelm Windelband (1848–1915) distinguished two types of knowledge: nomothetic and idiographic (Lamiell, 1998). Nomothetic knowledge occurs where general laws can be formed about objects and where there are many objects that are the same. Natural science is nomothetic. An atom of carbon is exactly the same as any other atom of carbon. (Knowledgeable physicists: please apply the same argument to isotopes.) An atom of oxygen is the same as any other atom of oxygen. So, any theory about oxygen applies to any atom of oxygen; any theory of carbon applies to any atom of carbon; and any theory of carbon dioxide applies to any molecule of carbon dioxide; and so on. Most of psychology is nomothetic. If a theory does not apply to all people, at least it applies to some people. Theories of personality place individuals on a scale, a scale that applies to all people. Although people may fall at different places on that scale, given a large enough sample, some people must share the same point on the scale. Personality theory is a nomothetic approach to differences between people, as are theories of attitudes and theories of ability and well-being. These are all ways in which people can differ, but at the same time share features with other people.

Windelband contrasted nomothetic science with idiographic science. Like nomothetic science, idiographic science has laws or theories. However, a different theory is needed for each context. The idiographic approach lacks the universality of laws that characterises nomothetic science. Each event in history is unique, so it is possible to treat history idiographically as well as nomothetically where the latter describes general trends (Lyman & O'Brien, 2004). Equally, each person is unique, so it is possible to treat psychology idiographically as well as nomothetically. Each person has a unique form of description and explanation, but it is an explanation or theory that follows the rules of science in being falsifiable.

Humanistic psychology is not the only approach within psychology that assumes the uniqueness of the individual. Hermeneutical psychology is also predicated on the assumption that each person is unique. However, hermeneutical psychology rejects the scientific rational that is accepted by humanistic psychologists. The hermeneutical approach to uniqueness is discussed in Chapter 9.

Humanistic, phenomenological and existential

The terms *humanistic*, *phenomenological* and *existential psychology* are sometimes used in different ways and sometimes interchangeably. The terms *phenomenological* and *existential* derive from philosophies, both of which share the idea that the mind provides important insights. The term *humanistic psychology* was the term used by US psychologists in promoting phenomenological and existential psychology, and was the name given to Division 32 of the American Psychological Association when it was founded in 1971. Nowadays, the term *humanistic psychology* is used as a general category that includes almost all those approaches that focus on consciousness and the conscious mind.

Measuring uniqueness

The concept of a trait forms the basis of modern personality theories – hence the term *personality trait*. Neuroticism, extraversion, openness, conscientiousness and agreeableness are all traits. So are aggression, silliness and laziness. Traits are almost invariably treated as a nomothetic concept in the sense that every trait applies to everyone. For example, everyone can be placed somewhere along a dimension of neuroticism. Everyone can be placed somewhere along a trait of aggression. Each trait dimension applies to everyone.

Personality traits from an idiographic perspective

By applying Windelband's distinction to personality theory Allport (1962) proposed that traits should be considered idiographic rather than nomothetic. Here is Allport's reason. A trait describes a pattern of behaviour that is consistent over different situations and over time. So, for example, if someone has an aggressive trait, then one would expect that person to be aggressive at work, at home, in the park and on holiday. By contrast a person who has a non-aggressive trait would be non-aggressive at work, at home, in the park and on holiday. In both cases the behaviour is consistent, and it would be reasonable to describe the two people as being aggressive and non-aggressive, respectively.

Now consider another person who is aggressive at work and in the park but not at home or on holiday. Or another person who is aggressive at home but nowhere else. These individuals cannot be described as falling anywhere on the trait of aggressiveness, because their behaviour is inconsistent across situations. Allport argued that traits sometimes apply to a person and sometimes not. So, each person can be described by an array of traits that may differ from the array of traits used to describe someone else. Each person has their own unique (or reasonably unique) array of traits. When a trait applies to a person, then that person can be represented on that trait with a number along the continuum of the trait. However, a person can also have a trait that is unique to a specific situation. Allport's approach is both idiographic and quantitative but at the same time admitting the existence of nomothetic traits.

The idiographic approach to traits assumes that sometimes it is the situation rather than a trait that determines behaviour. A similar idea is found in the non-linear interaction of person and situation (NIPS) model that was described in Chapter 7. According to NIPS, strong people exhibit the same trait in different situations. Weak people vary their behaviour according to the situation. However, there is a difference between Allport's idiographic traits and NIPS. In the case of NIPS, the terms *strong people* or *weak people* refer to a tendency that occurs across traits; it is a nomothetic concept. By contrast, in Allport's idiographic trait theory, a person can be weak with regard to one trait but strong with regard to another.

Despite being theoretically plausible, Allport's idiographic approach to traits never caught on. It is so much easier to explain personality in terms of dimensions shared by everyone rather than dimensions that are unique to each individual. In addition, personality theorists argue that people are in fact reasonably consistent across situations for the higher order traits, such as the big five traits of neuroticism, extraversion, openness, conscientiousness and agreeableness, so it is meaningful to treat them nomothetically. Of course, they would say that wouldn't they! Personality theory is based on a nomothetic assumption. The NIPS model would suggest that consistency of behaviour across situations applies only to some people, namely, strong people. Perhaps both are correct to some degree. Students should come to their own conclusions.

Personal construct theory

Personal construct theory is an idiographic *and* quantitative approach to measuring personality that is still used today. Proposed by George A. Kelly (1905–1967), the theory starts from the assumption that there is no objective reality. Instead, people *construct* a reality based on their experience. Reality is subjective and each person creates their own reality. Kelly suggests that people are naïve scientists: They form hypotheses about the world based on observation, because ordinary people, like scientists, are trying to predict and anticipate events (Kelly, 1955, 1963). Kelly is described by some as a humanistic psychologist; to others he is an early cognitive psychologist who focussed on perception. Kelly himself resisted being labelled with either category, considering his own work unique (Benjafield, 2008).

The personal construct

Kelly's theory of personality is based on the idea of a 'personal construct.' A personal construct is a way of construing (i.e., interpreting) the world. People

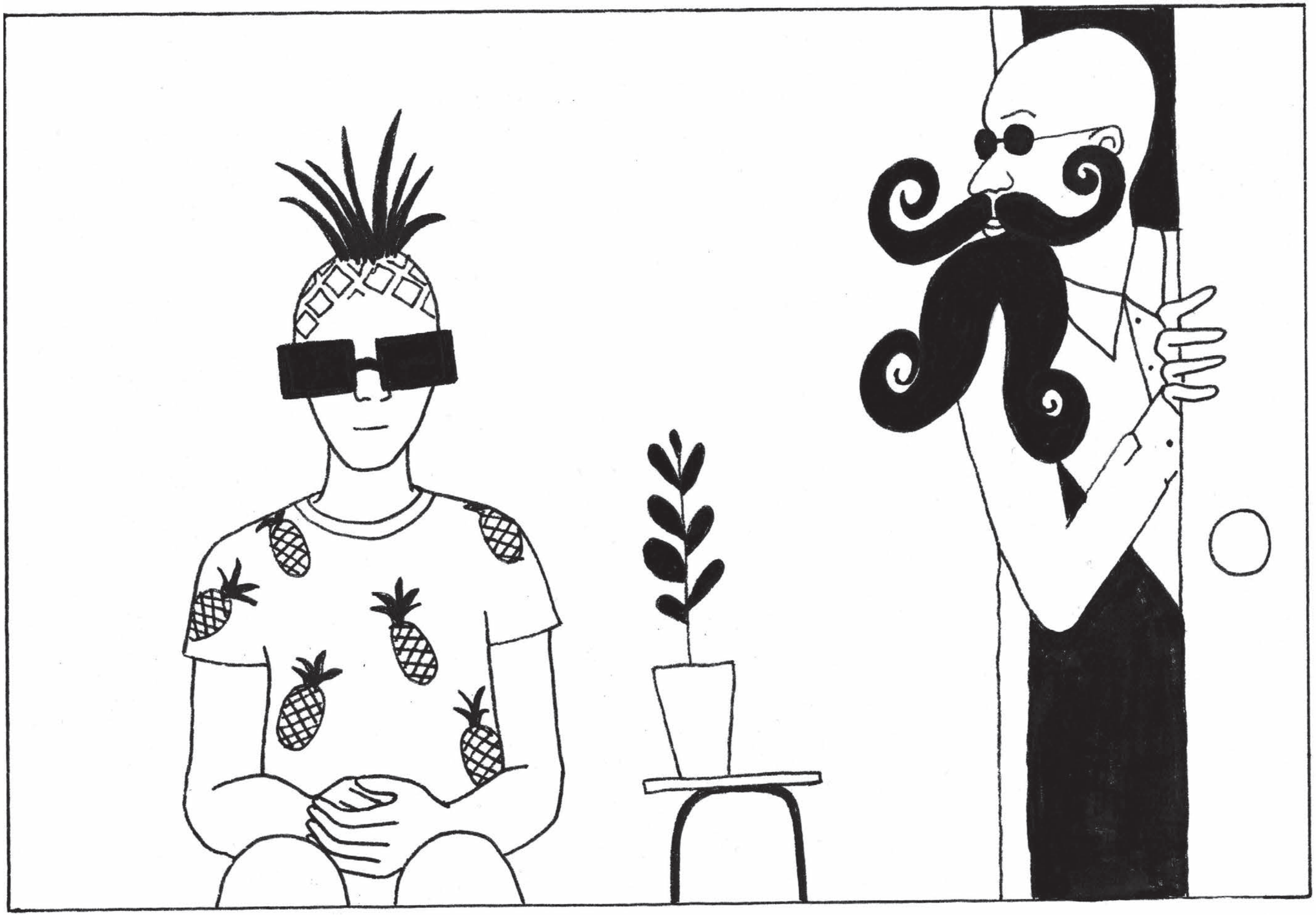

ILLUSTRATION 8.1 Everyone is unique.

have different ways of construing or interpreting the world, that is, they have different personal constructs. By understanding personal constructs, psychologists can understand how people function and how they differ between themselves.

A personal construct is a dichotomy that is used to make sense of the world. It is a way of judging something using two opposite poles. The two poles are called a similarity pole and contrast pole. Any object is classified either in terms of the similarity pole or the contrast pole. This may sound complicated, so the easiest way to understand a personal construct is through an example of how they are discovered.

Imagine three objects:

A whale
A rat
A trout

In what way are two of these objects similar and one different? There are several possible answers, but suppose you replied with:

"A whale and rat are mammals whereas a trout is a fish."

In this example, 'mammal' is the similarity pole of the construct and 'fish' the contrast pole.

The construct is *mammal versus fish*.

However, another possible answer is:

"A whale and trout live in water, a rat lives on land."

In this second example, 'lives in water' is the similarity pole and 'lives on land' the contrast pole.

The construct is *lives on water versus lives on land.'*

If students are asked to compare a whale, rat and trout, they usually create many more constructs, e.g.,

Smooth versus hairy
Big versus little
Eaten by people versus not normally eaten by people

A construct is like a theory. It has a focus in the sense that it applies to a particular kind of context. For example, the construct *mammal versus fish* applies only to animals. When you see an animal, it is reasonable to classify it in terms of whether it is a mammal or not. When you see a plant, you are unlikely to ask yourself the question, "is this a mammal or fish?"

Kelly's theory suggests that

- An individual's personality is their construct system.
- People have different constructs. They construe the world in different ways.
- Finding out about someone's constructs tell us what that person is like and how they will respond to different situations.

Kelly provided a counselling service for students and schoolchildren. As part of his counselling service, he developed a method for understanding a person's construct system. He called this method the 'repertory grid test' or 'rep test' for short. Because he found that many students' problems arise from their interactions with others, constructs relating to the way a person views other people are particularly important.

Exercise to find out about your own constructs about people

The following procedure will allow students discover what constructs they use in their relations with other people.

1 Write down a list of six people you know (i.e., six real people, such as friends and relatives). For example, this might be Bob, Mary, Peter, Sue, Alison and Roger.
2 Take the first three people in the list, and ask yourself in what way are two are similar and one different? For example, you might say that Bob and Mary have a sense of humour and Peter hasn't.
3 Write down the similarity pole (the way two are similar) and the contrast pole (the way the third person is different). For example, this would be 'sense of humour versus no sense of humour.'
4 Now take another three people from the list. For example, this might be Peter, Sue, and Alison.
5 Ask yourself again, in what way are two similar and one different? You might say that Peter and Sue are old, and Alison is young.
6 Write down the poles of the construct again. For example, 'old versus young.'
7 Now take a further three people and repeat the process. It doesn't matter which three people you compare as long as it is a different combination. Continue doing this until you have made at least ten comparisons, or until you are generating no new constructs.

Having created your list of constructs, change your role and imagine you are the examining psychologist. The examining psychologist gains insight into the constructs that lie behind the words used by the client. The examining psychologist uses this insight to advise the client. If you are continuing with this exercise, you will be able to give yourself some sound advice.

First, the examining psychologist needs to find out how many constructs the client has. Sometimes the client uses different words for constructs that have similar meanings. For example, a client might present three sets of similarity and contrast poles: 'intelligent versus not intelligent,' 'educated versus not educated' and 'thick versus bright.' A moment's reflection will show that these different words refer to one underlying construct dealing with intelligence, so the examining psychologist should interpret these as one. The more constructs the person has, the more adaptable the person is in a complex world, so people who have many constructs usually do better in social contexts than those who have few.

Second, the examining psychologist interprets in what way the person construes the world in order to help the person. This involves the psychologist trying to interpret how the client views the world the world about them from the constructs that have been produced. Again, it is easiest to understand this with an example.

Imagine you are an examining psychologist and have been presented by the following constructs of a client:

Easy going – Hypercritical
Feels inferior – Feels confident
Socially skilled – Unpleasant
Tense – Easy to be with
Maladjusted – Easy going
Understanding – Hypercritical

The client's constructs relate to issues of perceived criticism and being criticised by others. The client has issues concerning self-confidence. The psychologist will also note that a therapist will be judged using the same constructs as the client uses for other people. The psychologist will have to make a special effort not to appear critical and provide a way of helping the client become less defensive.

Kelly helped clients by advising them to try using other constructs. In practice, this meant asking clients to pretend to be someone else in a therapy session. Kelly asked people to try out what it feels like to take the role of someone else – hence, the name of his therapy, fixed role therapy. Kelly's method and theory show that it is possible to measure the mind, but at the same time respect that every person is unique.

Modern use of personal constructs and comparison with nomothetic techniques

The rep test is used today, but not necessarily by psychologists and not necessarily in a clinical context. It is a useful technique for understanding the constructs people use in different contexts. For example, the rep test has been used to find out how ordinary people attribute meaning to buildings. By finding out what constructs people use when they judge buildings, architects can take the perceptions of ordinary people into account in architectural design (Bannister & Fransella, 2019). The rep test has also been used to find out how people construe meaning in different types of work-related organisations so that managers can better understand how workers respond to their decisions (Bourne & Jankowicz, 2018). The rep test has been used to find out what constructs people use when they go to a museum, to help in the design and management of museums (Caldwell & Coshall, 2002). In these cases, the researchers refer to the 'rich meaning' that the technique provides and, in each case, people, ordinary people, are presented with three buildings, three organisations, three museums, or whatever is the focus, and asked in what way two are similar and one different.

The use of the rep test in applied contexts can be contrasted with the equivalent use of the semantic differential (Osgood et al., 1967). The semantic differential assumes that everyone uses the same three dimensions of judgement. These dimensions are:

Evaluation (good versus bad).
Potency (strong versus weak).
Activity (active versus passive)

The semantic differential assumes that everyone uses the same three constructs when judging objects and uses these three constructs irrespective of the object being judged. The constructs are based on factor analysis (see above). Factor analysis reveals that judgements of objects tend to form three distinct factors. Personal construct theory assumes that people use different constructs when judging objects. To some extent both views are true. To some extent people have common characteristics when judging objects. However, the ability of the rep test to find out how different types of constructs are used in different situations enables the technique to provide a more situation-specific analysis of the attribution of meaning. It is the situational specificity of the rep test that makes it most attractive to those working in applied contexts. Furthermore, if different people use similar constructs to judge a particular type of object, then it is perfectly possible to use those constructs to develop a scale that is used nomothetically. Idiographic research can inform nomothetic research.

Being uniquely happy

Abraham Maslow (1908–1970) was one of the founders of the 'third force in psychology' (see introduction to this chapter) but died shortly before the founding of the humanistic psychology division (Division 32) of the American Psychological Association in 1971.

Maslow is known for his hierarchy of needs (Maslow, 1954, 1968), an idea that has been described as the best-known incorrect theory in psychology (Hoffman, 1980). The hierarchy is (from the top) self-actualisation, esteem, belongingness and love, safety, physiological needs. Maslow proposed that lower-level needs require satisfaction for the higher-level needs to emerge. In fact, the theory only describes a general trend. People who are struggling to keep family and home together can have little time for themselves, though an artist can self-actualise while starving in a garret. It is certainly possible to self-actualise when hungry.

Maslow's concept of self-actualisation, at the top of the hierarchy, has had a greater impact than his concept of a hierarchy. The concept of self-actualisation features in the work of just about every humanist psychologist.

Self-actualisation means that you strive towards becoming the person you really are. There are two main characteristics of the concept of self-actualisation. The first is that it breaks with the *causal* tradition that characterises both psychoanalysis and behaviourism and replaces it with a *teleological* alternative. In the case of behaviourism and psychoanalysis, a person is thought to be caused to do things because of prior events. In the case of psychoanalysis these prior events are early childhood experiences. In the case of behaviourism, the prior events are patterns of reinforcement. In both cases the person is *driven* to behave by prior causes, that is, by things that have happened in the past. Maslow suggests that people behave in the way they do because they are trying to achieve something in the future. That is, people strive towards future states, rather than being driven by prior states. The use of a future state to explain behaviour is referred to as a teleological explanation. Teleological explanations (i.e., saying what someone is trying to achieve) are fundamentally different from the causal explanations. Only causal explanations are used in the physical sciences, and so the use of teleological explanation marks a distinct break with the natural science tradition on which much of psychology is predicated. The teleological explanation is a psychological explanation and not found in the physical sciences – one does not refer to atoms 'wanting to do something.' So, the first feature of self-actualisation is that this is something people are striving towards, rather than something people are driven to do.

The second feature of self-actualisation is the assumption that each individual is unique and different. Self-actualising is not a matter of becoming a better person, but rather becoming the person 'you are supposed to be.' This idea of 'supposed to be' assumes that *by nature* people have characteristics which make them unique. That is, the 'real' you is predetermined in some way, though Maslow did not commit to genetic determinism. What is self-actualising for one person may not be for another.

Maslow's emphasis on positive goal satisfaction is reflected in more recent works on goal satisfaction, including that of positive psychology (Csikszentmihalyi & Seligman, 2000), a movement that emphasises the importance of finding what is good in life rather than changing what is bad. Maslow even used the term *positive psychology* in the 1950s (Froh, 2004).

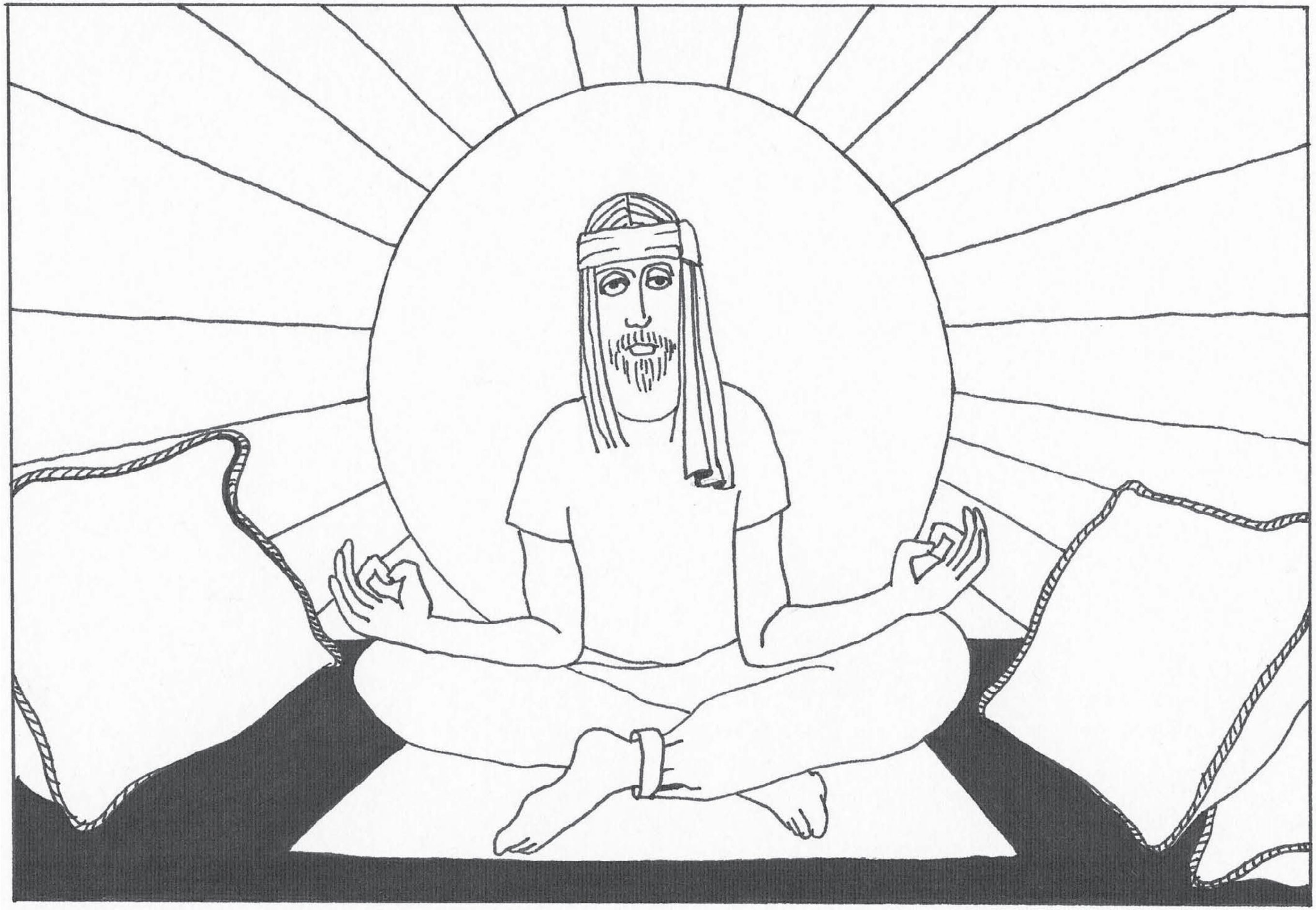

ILLUSTRATION 8.2 Self-actualising.

In his later works Maslow suggested that people self-actualise in two ways, one with and one without spiritualism or transcendence (Maslow, 1970). For some people spirituality is an important part of self-actualising, but for others it is not. Spirituality is not just a matter of spiritual or religious beliefs – but rather a sense of awareness of the ultimate. Maslow believed that Einstein was a spiritual self-actualiser because, in thinking about physics, Einstein had a concept of ultimate reality.

Origins of self-actualisation

Maslow was born in Brooklyn, New York, and was the eldest child in a large family of immigrant Russian Jews who lived close to the border with Poland. The following story is told of Rabbi Zusya (unknown–1800) of Hanipol, Poland: When he was dying, he expressed concern about meeting God and said to those about him "When I reach the next world, God will not ask me, 'Why were you not Moses?' Instead, he will ask me, 'Why were you not Zusya?'" Why were you not the person you were meant to be? It is highly likely that Maslow would have known about Rabbi Zusya as well as the Hasidic tradition that Zusya represented. Hasidism includes two ideas that feature in humanistic psychology. One is the joy of living; the other is the acceptance of suffering.

The idea that spirituality forms part of high-level goals was proposed independently by Viktor Frankl (1905–1997), who felt that other humanistic psychologists neglected this aspect of human existence (Pytell, 2006). Frankl was Jewish and living in Germany at the time of the Holocaust. He was sent to Auschwitz and managed to survive but his entire family did not. Frankl is the originator of 'logotherapy,' an approach to therapy based on understanding the clients' meaning of life (Frankl, 1959, 1967, 1969).

Frankl suggested that the human superordinate goal was to find meaning in life. For him, self-actualisation meant meaning in life. Frankl distinguished three categories of the meaning of life.

- First, there is meaning that is based on what one accomplishes or gives to the world. Our work can give us a sense of meaning, whether it is paid employment, a hobby, being a parent or helping other people.
- Second, there is the meaning that comes from our experiences with the world. These experiences include things that are beautiful as well as the experience of love. The nature lover who looks from the top of a mountain, the gourmet who enjoys food, and the lover gazing into the loved one's eyes – all gain a sense of meaning from those experiences.

- Third, there is the meaning that comes from our approach to suffering and those things that cannot be changed. This last meaning has resonance with Frankl's experience in a concentration camp where those who found meaning, including those who found meaning in future revenge, survived best. Frankl believed that there was meaning in demonstrating that one could suffer with dignity (Yalom, 1980).

Frankl's personal experience

In his book *Man's Search for Meaning*, Frankl (1959) describes his time in the Auschwitz concentration camp. Pytell (2000) writes that Frankl was in Auschwitz for only three days and provides other negative statements about Frankl. Pytell's description is incorrect but has been repeated by other authors including myself in the first edition of this book. Batthyány (2021) provides documentary evidence that shows that Frankl spent three years in concentration camps, including Auschwitz and Dachau, and corrects other mistakes made by Pytell about Frankl's life. Frankl's wife was gassed soon after they arrived, but he managed to survive and used his experiences and survival as the basis for his later theory. Historical accounts are not always accurate, though the reason for inaccuracies is not always clear.

Self-actualisation from a nomothetic perspective

Each person's meaning in life, or each person's self-actualisation, is unique. A common theme in humanistic psychologists is that the ability to find meaning in life is important for well-being. Later authors have shown that it is possible to measure the degree of meaning or self-actualisation using nomothetic techniques. The 'meaning in life questionnaire' (Steger et al., 2006) asks a person to rate their satisfaction with the meaning or purpose of their life. The scale produces a score that reflects that person's meaning of life, without that person having to define what that meaning is. The satisfaction with life scale measures a person's satisfaction with life (Diener et al., 1985). The 'sense of coherence scale' (Antonovsky, 1993) provides a similar sort of measure in that people can rate satisfaction with aspects of life that give it meaning. Research shows that people who feel that their lives have meaning, whatever that meaning is, are happier and healthier than those who do not. The silver-lining questionnaire measures the extent to which people find meaning in illness (Sodergren et al., 2004). Research shows that those who find meaning in illness recover faster

(Hyland, Sodergren & Lewith, 2006) and have a better level of well-being (Harding, 2018).

Other recent authors have examined which goals, when satisfied, lead to happiness. Self-determination theory is based on the nomothetic assumption that everyone achieves happiness and self-actualisation through the goals of autonomy, competence and relatedness (Deci & Ryan, 1985).

In summary, the insights gained in humanistic psychology have influenced other areas of psychology. Ideas developed by humanistic psychologists that were developed originally within an idiographic framework have subsequently been used by other psychologists who used nomothetic measurement and research.

Treating people uniquely

Every psychotherapist would (or should) say that they treat each client as a unique person. The recognition of the uniqueness of the person is implicit in the talking therapy of Freud, who suggested he was acting as an archaeologist in uncovering a person's past. Everyone has a unique past. Everyone has a unique present. When training a psychotherapist, it is impossible to prepare the therapist in advance for all the different unique cases that will be experienced. However, it is possible to train psychotherapists in features that are common to all or some clients. Among the various humanistic contributors to advances in psychotherapy, Carl R. Rogers (1902–1987) stands out. Rogers is considered the founder of counselling psychology.

Rogers believed there were three types of knowing (Rogers, 1942, 1951):

- *Subjective knowing*: The knowledge we have of our own consciousness, knowledge that is unique to us. Rogers referred to this as the phenomenal field. The term *phenomena* – meaning mental content – derives from the philosopher Husserl (1910/1965).
- *Objective knowing*: The shared knowledge we have of the outside world, i.e., the kind of knowledge from observing things around us.
- *Interpersonal knowing*: Interpersonal knowledge is the understanding of one person's phenomenal field by another person. Rogers' approach to psychotherapy focusses on interpersonal knowledge, how a therapist can understand the phenomenal field of a client. Rogers believed that it was possible to form and test hypotheses about the interpersonal field of a client, and so interpersonal knowledge is a falsifiable science in that regard, like any other science.

Rogers believed that humans are basically good. They are good when they are free or mature and they are only bad when they are neurotic. This idea of the fundamental goodness of Rogers' approach can be contrasted with that of Freud who thought people were driven by fundamentally bad instincts and were good only because they were constrained to be good by society.

Rogers adopted the idea, proposed by Maslow, that people strive towards self-actualisation and he believed that self-actualisation always manifested itself positively in one way or another. It is only when people are neurotic that they deviate from this pattern of goodness. Unkindness and cruelty are a deviation from the natural human state, not part of it.

Rogers noticed from his clinical practice that clients often referred to themselves. They would say things like, "I have not been feeling myself recently" or "I am not happy with the way I am." Rogers inferred that the self is something that is perceived. The self is an organised conceptual gestalt. It is not made up from lots of different bits and pieces. It is organised as a whole. Furthermore, the whole that is the self can grow and change and yet retain the same identity. The student applying to go to university is the same person when they graduate. The phenomenal field of the self remains the same, yet experiences change the way the student feels and behaves.

Are humans good or bad?

The question of whether people are fundamentally good or naturally bad was debated long before the development of psychology. The Christian idea of 'original sin' suggests that people are basically bad (due to the fall of Adam) and are redeemed only through the mediation of Jesus Christ. By contrast, the philosopher Jean-Jacques Rousseau (1712–1778) supported the idea of 'the noble savage' who was pure and noble in the natural state. Rousseau believed that society corrupts what is otherwise a noble human. The Freudian view coincides with that of Christianity, whereas Rogers' view is consistent with that of Rousseau. The modern view is that humans have the capacity for good or evil, and that this capacity is influenced by environmental factors. There is evidence of a biological bias towards goodness or badness in some people (Fox, 2017), but the issue of heredity and environmental contributions to behaviour is complex (see Chapter 7).

Two types of self

Rogers distinguishes two types of self:

- *The self*, also known as the actual self or the real self, refers to the way clients describe themselves as they are now.
- *The ideal self* refers to the self that clients would like to be.

One aim of Rogerian therapy is to reduce the discrepancy between the self and the ideal self. The therapy is linked to the idea of uniqueness of people: the self that is right for one individual may be different from the self that is right for another. Rogers' goal in providing therapy was to help a person become the person they really are and be satisfied with the person they really are.

Measuring self-ideal–self-discrepancy

The Q-sort technique, used by Rogers, is based on 100 statements that describe a person. For example, the statements might be 'am generally happy' or 'get upset easily.' The statements are written on cards. The client is first asked to sort the statements into two piles, those that are 'like me' and those that are 'unlike me.' The cards are then shuffled, and the client is asked to sort the statements into two more piles, those that are 'like the ideal me' and those that are 'unlike the ideal me.' The number of differences in the card allocations between the first sorting and second sorting determines the discrepancy between the self and ideal self.

Self-consistency or congruence

Rogers adds one more idea to the distinction of the self versus the ideal self. The client develops the concept of self because of their experiences about the self. For example, if whenever you met someone new, they said to you 'you are amazingly beautiful,' you would begin to believe that you are amazingly beautiful. The concept of congruence is about the relationship between the perception of yourself, and the objective data with which you are presented. So, for example, if everyone says, 'you are amazingly beautiful,' and you believe that you are beautiful, then that is congruence. But if everyone says, 'you are amazingly beautiful,' and you believe that you are ugly, then that is incongruence. A modern and more easily understood example of incongruence is provided by anorexia. People with anorexia think they are fat, whereas the objective data – and what everyone else is saying – is that they are very thin.

Rogers believed that incongruence resulted from childhood experiences and was unhealthy because it created a distorted sense of reality, a distorted sense that could lead to anxiety and depression. Rogers distinguished two ways of bringing up children: with unconditional positive regard and with conditional positive regard.

Children brought up with conditional positive regard are disciplined with the withdrawal of love as a means of punishment. That is, when the child is naughty, the parent becomes distant and unloving. Children brought up with unconditional positive regard are not disciplined with withdrawal of love as a means of punishment. Naughty children are disciplined in one way or another, but the children always believe that they as individuals are loved – it is the behaviour not the individual that is being punished. Rogers believed that conditional positive regard was very damaging, as children brought up in this way would learn to believe a reality – the parent's reality – that is not their own. That is, to regain the parent's regard, the child learns to distort reality.

Other selves

Later authors have developed Rogers' theory further with additional self-related concepts. Higgins (1987) introduced the distinction between the ideal self (what you would like to be) and the ought self (what others would like you to be). The ought self is particularly relevant to the feelings of dissatisfaction that come from social comparison. Higgins suggested that the discrepancy between the self and ideal self leads to depression whereas discrepancy between the self and ought self leads to anxiety. Another approach taken by Markus and Nurius (1986) is that there are several possible selves, including the past self and future self. Although people are free to create many sorts of possible self, the self they create is bound by their circumstances. Later authors have emphasised the malleability of the self concept. This idea of malleability is also found in the fixed role therapy of George Kelly (see earlier in this chapter). A person can become a different person by choosing to become a different person.

Therapy

Rogers (1957) suggested that six conditions were needed for therapy to be effective. This is how Rogers defined them:

1. Two persons are in psychological contact.
2. The first, whom we shall term the client, is in a state of incongruence, being vulnerable or anxious.
3. The second person, whom we shall term the therapist, is congruent or integrated in the relationship.
4. The therapist experiences unconditional positive regard for the client.
5. The therapist experiences an empathic understanding of the client's internal frame of reference and endeavors to communicate this experience to the client.
6. The communication to the client of the therapist's empathic understanding and unconditional positive regard is to a minimal degree achieved.

(Rogers, 1957, p. 96)

Note how Rogers' definition uses jargon in a way that gives the impression of a science. 'Two persons in psychological contact' simply means that two people are communicating in some way. Although Rogers presents his theory as scientific, he was aware of the tension between being scientific and a purely human sense of understanding other people, a tension he discussed in 1955 (Rogers, 1955) where he refers to a purely intuitive approach to understanding people (see Chapter 9). During its history, psychology has needed to present itself as a science to gain acceptability within a culture that is dominated by science. Humanistic psychologists maintained the scientific status of psychology even though each person is unique. The tension between the purely intuitive and the scientific is discussed in Chapter 9 in the context of hermeneutical psychology, an approach that rejects the scientific model entirely.

Rogers originally called his therapy non-directive therapy because he wanted to emphasise the fact that the therapist is not directing the client to a particular fixed goal. However, he found that other therapists were not as successful as he was, the reason being that non-directive was being interpreted as uninterested or even stand-offish. So, in his later writing, Rogers called his therapy client-centred therapy to emphasise the unconditional positive regard and empathic understanding that was central to his therapy.

Rogers' client-centred approach underpins the common factors or contextual model of psychotherapy (see Chapter 5). The description given by Rogers earlier about what is needed for effective psychotherapy is very similar to that described by Frank and Frank (1991) and quoted in Chapter 5. The underlying assumption shared by both Rogers and Frank and Frank is that it is the therapeutic context that provides the therapy rather than anything specific that happens in the therapy session. Rogers stresses the importance of the relationship in psychotherapy. The common factors model includes other components, including the cognitive component of expectancy. Frank (1961, 1974) suggests that depression and anxiety are caused by demoralisation and the therapy experience remoralises the person. In both cases it is the context which is helping the person.

The contextual model is supported by empirical data showing the small impact of specific factors (Wampold and Imel, 2015) (see Chapter 5). A recent reformulation of the contextual suggests that the contextual factors operate through implicit beliefs rather than cognitions, and so the difference between the more commonly accepted cognitive behaviour model of therapy (Beck, 1967) is that remoralisation occurs at an implicit level (Hyland, 2020). The reformulated model suggests the context is important in providing a positive experience for the client, and it is this positive experience both inside and outside of the therapeutic context rather than cognitive change that is important. This reconceptualization therefore ties together the cognitive idea of beliefs (except that they are implicit rather than conscious cognitions) with the psychoanalytic idea of the unconscious (except it is beliefs not motives that are unconscious).

Summary

Nomothetic science explains the generality of people and events. Idiographic science is the science of the uniqueness of people and events. Most of psychology is nomothetic. Personality psychology is the study of the shared differences between people. People can be represented as locations on personality dimensions. Murray used consensus to conclude that there were 44 ways in which personality differed, and he developed the thematic apperception test (TAT) as just one of several different ways of assessing personality. The statistical technique of factor analysis was developed as part of the discovery of the concept of general intelligence. Later research used factor analysis to discover latent variables, which were then treated as dimensions of personality. Although the Big Five theory is widely accepted and supported by factor analysis, factor analysis can produce 16, 6, 3 and 2 factors of personality depending on assumptions and methodology. There are many ways in which differences between people are described and measured: abilities, traits, motives and values.

In addition to shared differences, every human is unique in some way and the uniqueness of humans is studied in humanistic psychology. Allport reinterpreted the concept of a trait from an idiographic perspective, where cross-situational consistency varies. Kelly's theory of personal constructs assumes that everyone construes the world in a different way. A person's constructs could be assessed through the repertory grid test, a test that can be used to find out the constructs a person uses when they judge any situation. Maslow, Frankl and others assumed that people are motivated by a goal of self-actualisation or a search for meaning. People self-actualise in different ways, just as people can find meaning in their lives in different ways. Although there is uniqueness in self-actualisation, meaning and life satisfaction, these concepts can be measured nomothetically by allowing people to use their own definitions of meaning and life satisfaction. The uniqueness of the therapeutic encounter is emphasised in Rogers' psychotherapy, an approach that underpins modern counselling and the contextual model of psychotherapy with its emphasis on the importance of the relationship with the client, one characterised as unconditional regard.

Essay questions and discussion topics

1. What is the difference between nomothetic and idiographic science?
2. What is the thematic apperception test and how has it been used to assess motivation?
3. What is personal construct theory? How do personal constructs differ from the semantic differential?

4 Explain the logic of factor analysis. Why are there differences in the number of personality factors found by different researchers.
5 What do you understand by Rogers' approach to understanding people and conducting therapy? What is the meaning of congruence and what is the difference between conditional and unconditional regard?
6 Complete the Big Five Inventory (it is open source and can be accessed through the Internet). Score your results. Do you think the results are accurate?
7 What constructs do you use when choosing a partner? Why are these constructs important to you?
8 What does self-actualisation mean for you? What is the person you want to become? What do you want from life?
9 Here is a shared activity for small group of people. Choose a picture as a starting point (one of the TAT cards if you like). Each person writes a story about what is happening. Then swap stories and rate your neighbours for achievement and affiliation imagery. Swap again, so that two people have rated each story. Now examine the similarity of the judges' ratings for the same story and the degree of difference between people.
10 Which aspects of this lesson for life do you agree or disagree with, and can you explain why? Can you think of other lessons that might be drawn from this chapter?

People differ. The ability to recognise and understand those differences will help you navigate through life. Understanding yourself is perhaps the most important skill of all.

9

What makes a good listener? What is the role of intuition and what questions should you ask?

Academic qualitative research, commercial qualitative research, politics and hermeneutics

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With the exception of psychoanalysis, all the different types of psychology described so far in this book use some form of quantification of variables. Whether it is cognitive neuroscience, behaviourism or the psychophysics of the nineteenth century, variables are measured along some form of quantified scale. Personality theorists measure personality with personality scales, social psychologists measure attitudes with attitude scales, cognitive psychologists measure performance. Psychology uses the same principle of quantification as the natural sciences. Most of psychology is based on a quantitative paradigm

An important minority of psychologists believe that psychology is different from the natural sciences and that quantification of variables loses the essential meaning of what is being investigated. They believe that quantification is wrong, or at least captures only part of what psychologists should be interested in, and that psychological phenomena should be described qualitatively. Not everyone who uses qualitative methodology believes it is better than quantitative methods. Psychologists working within the quantitative paradigm can also use qualitative methodology, but in support of quantification rather than an end itself. Qualitative methodology is therefore used in two ways. It is used as the *only* method within the qualitative paradigm, and it is used *alongside* quantitative methodology in the quantitative paradigm. Those who use qualitative methodology within a quantitative paradigm are able to justify their work as scientific through the quantitative evaluation of their data and are therefore less concerned about the scientific status of their qualitative research. However, those who use qualitative methodology exclusively and in preference to quantitative methodology take pains to ensure that their work both is and is seen to be scientific.

Qualitative research methodology derives from two entirely separate sources. The qualitative methodology used by academic psychologists has its roots in sociology. The qualitative research methodology used by commercial researchers has its roots in psychoanalysis. The result is that in practice there are two entirely different approaches to qualitative methodology, one academic and the other commercial. This chapter:

a) introduces the assumptions and practice of the qualitative paradigm (i.e., when qualitative methodology is used as an end in itself);
b) provides an example of how qualitative research is used within the quantitative paradigm;
c) explains how commercial qualitative research developed and how it differs from academic qualitative research;
d) describes those psychologists who believe that psychology should not be a science; and
e) describes a politically motivated approach to psychology that uses qualitative methodology but does so with a specific aim in mind.

Note that the term *qualitative paradigm* refers to an assumption that qualitative methodology is superior to quantitative methodology. A paradigm is defined as a set of assumptions (see Chapter 1). The term *qualitative research* refers to the qualitative methodology itself, which can be used within the qualitative paradigm but is also sometimes used within the quantitative paradigm.

Social constructionism: the theoretical basis of the qualitative paradigm

The term *social constructionism* is used in several different senses and is used by both psychologists and sociologists. The term first appears in the title of a book *The Social Construction of Reality: A Treatise in the Sociology of Knowledge* written in 1966 (Berger & Luckman, 1966), and, as the title of the book implies, it is used in the context of sociology. In the unity of science hypothesis, the discipline of sociology is at a higher level of organisation than psychology. Just as psychologists believe that psychology cannot be reduced to physiology, sociologists believe that sociology cannot be reduced to the psychology of individuals. According to Berger and Luckman (1966) reality is created by society. Meaning is an emergent property of society. Social psychologists began using the term social constructionism by the early 1980s (Gergen, 1985) but with a greater emphasis on meaning emerging from groups of people rather than society as a whole.

Social constructionism represents a movement rather than a unified school of thought (Edley, 2001). A useful way of understanding social constructionism is to compare it with Kelly's theory of personal constructs. Personal construct theory assumes that each person construes the world in a different way and so people have different interpretations of meaning. Social constructionism, by contrast, suggests that meaning emerges from the interaction between people, and therefore cannot be understood by examining the thoughts of individual people. Because of the emphasis on socially constructed meaning, the qualitative paradigm rejects examination of individual differences within groups. Meaning must be a property of the group as a whole because it is socially constructed. There is no interest in examining meaning at the level of the individual. The metatheoretical assumptions of the qualitative paradigm therefore excludes examination of individual differences,

This idea of emergent and socially constructed meaning requires a methodology. Psychologists have always been concerned about their scientific status. Because qualitative methodology differs from the quantitative methodology of natural science it was important to the newly emerging qualitative researchers that qualitative research methodology should both be and appear to be scientific. Scientific status was achieved by a focus on methodology rather than intuition. An important feature of qualitative research methodology is that it ensures results are replicable, as failure to replicate was one of the reasons that the earlier introspective method was rejected (see Chapter 4). People can have different intuitions, but a rigorous methodology ensures consistency in results. Qualitative researchers developed several different methodologies, but they all provided a detailed understanding of how research should be carried out and how it should be reported. The reporting of qualitative research is an important part of the process. An example of the importance of documentation is provided by the COnsolidated criteria for REporting Qualitative research checklist, or COREQ for short. This checklist has 32 items that should be documented when writing a qualitative research paper. Authors are required to state where in their paper each of the 32 items is specified. In brief, the methodology of qualitative research became ‘scientific’ by virtue of its analysis and documentation (Willig, 2001).

Note: According to the logic of science, something is scientific if it produces statements that are falsifiable through observation (see Chapter 1). Science is not defined by any particular methodology. However, people judge whether something is scientific on the basis of what they think science should be like, and often that is defined by methodology. What people think matters as those promoting the qualitative paradigm were well aware.

Qualitative research within the qualitative paradigm

The different qualitative research methodologies have much in common but have different emphasis. Two early methods were grounded theory and interpretative phenomenological analysis, and together they illustrate the kind of issues that feature in later approaches.

Grounded theory was developed by two sociologists (Glaser & Strauss, 1967) with the intention of avoiding the imposition of existing theoretical frameworks on data. The method requires an examination of qualitative data and subsequent formation of a theory without using any preconceptions. The theory is grounded in the data rather than an intuitive or speculative interpretation of the data. The emphasis on data-driven theory is therefore consistent with inductivism of the earlier philosophy of science rather than the hypothetico-deductive method that characterises twentieth-century science (see Chapter 1).

Although grounded theory uses the logic of inductivism, it is a very different sort of induction from that which would generate a statement such as ‘all swans are white.’ There is a creative element in the way the words used by people are then used to develop the theory. This creative element is a feature of all qualitative methodology. Because there is the possibility that different people with different types of creativity might develop different theories from the same data, psychologists prevent this happening by limiting the creative element – in contrast to commercial qualitative researchers who are far freer with the creative aspect. In order to maintain the scientific criterion of replication, academic psychologists develop theories from qualitative data in a way that is transparent, so that other people can come to the same grounded theory from the same data. Creativity is always present but constrained. The concept of grounded theory emphasises the link with the data rather than with preconceived theory or intuition.

As the name suggests, interpretative phenomenological analysis (Smith, 1996) owes its origin to the philosophy of phenomenology, a philosophy that helped create phenomenological and humanistic psychology (see Chapter 7). The philosophy of phenomenology was developed by Edmund Husserl (1859–1938). Husserl was interested in intersubjective experience, which means the way we understand the experience of others. The word *phenomena* refers to conscious content. Interpretational phenomenological analysis uses some of the ideas developed by Husserl, including the possibility of bias when one person examines the words of another. To avoid bias researchers should 'suspend' their own beliefs or 'bracket' their beliefs so they can understand what the other person is saying. Even so, there is always the possibility of 'hidden meaning.' The concept of hidden meaning is different from the psychoanalytic concept of the unconscious. The meaning is hidden from the listener not the speaker. When a student says 'I don't find halls of residence noisy' this is not because the student really does find them noisy but isn't saying so. However, it may be that the listener's understanding of what is meant by 'noisy' and 'halls of residence' differs from that of the speaker. Although the recognition of potential bias is part of the methodology of phenomenological analysis it does not necessarily feature in research papers claiming to use this method (Brocki & Wearden, 2006).

In summary, there are two features to note when qualitative methodology is motivated by the need to be scientific. One is that this inductive process has a creative aspect of theory development, but that the interpretation and theory is always closely tied to the literal interpretation of what is being said. Second, there is always the possibility of misunderstanding or of there being alternative interpretations of what someone says, and, to avoid this, words are interpreted literally. Qualitative methodology assumes that people mean what they say. The methodology of analysis and the documentation of that analysis is important for ensuring that qualitative methodology both is and is seen to be scientific. The following sections provide more detail about two different types of qualitative methodology.

Thematic analysis

Thematic analysis is a way of taking some form of written or spoken text and identifying themes, and the themes are then used to provide an interpretation of the text. The word *theme* should be interpreted literally. A theme is a topic or concept. Braun and Clarke (2006) suggest there are six stages to thematic analysis.

1 Familiarisation – where the researcher becomes familiar with the data.
2 Coding – where the researcher decides on the main points and concepts of the data.

3 Searching for themes – the researcher examines possible ways of identifying recurring ideas in the data.
4 Reviewing the themes – the researcher makes sure that the themes provide a good way of describing the data by examining how the themes relate to the data.
5 Defining and naming themes – where the researcher provides a name and detailed description of each theme, describes the 'story' of the theme, a story that can be illustrated by particular parts of the data.
6 Writing up – where the researcher weaves the various themes together into a coherent story.

There is a natural human ability to understand others, and there is also a natural human ability to classify things. Thematic analysis makes these natural abilities explicit and, in so doing, provides a process that can be evaluated by others, and therefore has claim to objectivity. The detailed process provides the possibility of falsification that is required for something to be a science. Thematic analysis can be supported by computer programs, such as NVivo, programs that help by saving time and improving accuracy. Computers are part of science, so the use of computers in the analysis of themes associates the qualitative paradigm with science. The perception of science by others is seldom based on logic. However, it is perfectly possible to carry out thematic analysis without the aid of a computer. One of the advantages of thematic analysis is that it can be applied to many different kinds of data (Clarke and Braun, 2013). It can be applied to written text, to conversations, to interviews and to focus groups. It can be used within the qualitative paradigm but also within the quantitative paradigm in support of quantitative research.

The following study (Becker et al., 2017) used thematic analysis to investigate whether academic enrichment programmes for first year undergraduate students helped their well-being. Previous research found that these academic enrichment programmes improved their stated goal of improving performance, but it was not known whether these programmes also helped well-being. Twenty-five undergraduates, who had taken part in an academic enrichment programme, took part in interviews and focus groups. The interviews were recorded and transcribed and after careful analysis and discussion of the transcripts (described in the paper) the authors identified four themes. The programme helped students to feel cared for, it cultivated a sense of belonging, it helped prevent and remediate distress, and it helped the students become resilient. Each of the themes had sub-themes that expanded on how these benefits arose. The authors used their results to provide advice about caring for students not only in the first year, but throughout their stay at university.

The effect of an academic enrichment programme on well-being could have been investigated quantitatively. In this case, a randomly selected group of students would be given a well-being questionnaire before and after the programme and the results compared with a randomly selected control group who did not attend the programme. Leaving aside the practical and ethical issues of such a study, the quantitative approach would reveal the degree of well-being improvement, allowing comparison with other programmes. It could also be used, if other baseline measures were taken, to determine which personalities benefited most from the programme. The quantitative method therefore has some advantages over the qualitative method. However, the quantitative analysis would not have revealed the reasons students felt their well-being improved, which could then be used to assist the development of such programmes. The qualitative method has some advantages over the quantitative method. A reasonable conclusion is that both quantitative and qualitative forms of analysis have value, but different kinds of value: They should be considered to be complementary (see Chapter 1). People come to different conclusions. Not everyone would agree with this conclusion, and you should come to yours.

Conversational analysis

Conversational analysis, as the name suggests is a way of analysing conversation. It is a method that is consistent with the assumption of social constructionism that meaning is revealed through the interactions between people. Conversational analysis is interesting because of its detailed methodology. The following example shows how conversational analysis is carried out and how it can contribute to understanding.

The Mental Capacity Act of 2005 states that all people, whatever their intellectual impairment, should have the right to make their own decisions, and this is reflected in the policy of institutions caring for people with mental impairment. Antaki and colleagues (Antaki et al., 2008) wanted to examine how the Act was implemented in a particular residential home. In order to do this, they recorded the conversations between carers and residents and then analysed those conversations using the techniques of conversational analysis. The authors found that in some cases the carers provided choice in a way that the residents could understand and could make an informed choice, but in other cases staff presented choices in a way that the residents found confusing. For example, some staff repeated the choices after the resident had made a choice, which was interpreted by the resident as a criticism of the resident's first choice. The researchers were therefore able to advise the managers of the care home about training that would enable better interactions between carers and residents.

Conversational analysis requires training in a form of analysis that provides a detailed written representation of discourse. An example of this written representation, taken from Antaki's paper, is reproduced here starting from line 8 in the discourse (Antaki et al., 2008, p. 1172):

8	→	Kath:	[chicken, or beef, (1.0) [or (.) lamb.
9		Vic:	[°(beeh-)°
10		Kath	lamb.
11	→	Vic:	((nodding)) lah. (0.7)
12			(0.7)
13		Kath:	Lamb.
14			(0.5)
15		Kath:	((leaning head left)) or chicken,
16	→	Vic:	((nodding)) (beeh-) °lahm°,
17		Kath:	((leaning head left)) or chicken,
18	→	Vic:	((moves hand forward to point to picture)) (mickeh).
19		Kath:	which meat do you want.
20		Vic:	((points to a different picture)) (°mickeh°).
21		Kath:	chicken.
22		Vic:	((leans back)) yeh ((nods))
23		Kath:	okay:° ((turns away from Vic)

This text illustrates three features of conversational analysis. The first is that this form of analysis provides the kind of methodological rigour one would expect from a science. The second is that discourse is being treated as a form of data without any attempt to find hidden meaning in the minds of those taking part. The third is that meaning can be found in the discourse itself that was not apparent to those taking part. The meaning that this analysis reveals is in the conversation, not in the minds of those taking part. The conclusions drawn by the researchers will be clear to anyone reading that extract. Although Kath wants to make sure Vic is making an informed choice, Vic is having difficulty negotiating what he is being asked to do because of the way it is being asked.

The Romantics

The idea that there is a form of non-numeric meaning in the world is a feature of nineteenth-century German Romanticism exemplified in Goethean Science (Steiner, 1883/1988). Goethean science involves examining objects as they are and trying to intuit their essence. The essence cannot be ascribed a number. It is a purely intuitive process of feeling. In Goethean science, the colour white is a colour which has its own properties and 'feels' different from other colours. In Newtonian science, the colour white is simply a combination of all the colours of the rainbow and does not exist as a distinct colour.

Qualitative research within the quantitative paradigm

One of the arguments proposed by Karl Popper (Popper, 1963) (see Chapter 1) is that science proceeds through a series of conjectures and refutations. The conjectures are hypotheses about the world. Where do those conjectures come from? Popper said that this was part of psychology and therefore outside his realm of interest. In part, conjectures come from observation. The observations that generate hypotheses could be accidental. When Fleming discovered penicillin (see Chapter 1), his observation was accidental. However, it is perfectly possible to generate hypotheses by observing the world systematically, and by searching for clues that might assist in hypothesis generation or help in some other way within the quantitative paradigm. Qualitative methods are also used within the quantitative paradigm to help with hypothesis generation and methodological development. However, when used in this way, qualitative methods are part of the process of quantitative research and their only aim is to assist quantitative research. The qualitative research does not have to justify itself as being scientific, as the criterion of science is achieved through the quantitative research.

A good way to understand how qualitative research helps quantitative science is with an example. The American Food and Drug Administration (FDA) plays an important role in the evaluation of pharmacological treatments, including the regulation of new medicines. Medicines are licensed for treatment if they can be shown to be better than placebo in double-blind clinical controlled trials and the benefit of treatment outweighs the side effects. These evaluations are carried out using quantitative data that is often some form of physiological measurement. However, patient-reported outcomes (i.e., questionnaires completed by patients) are also used in clinical trials and the FDA have provided guidelines for constructing questionnaires, guidelines that include a qualitative stage.

Qualitative research in drug regulation

The American Food and Drug Administration (FDA) published guidelines for the construction questionnaires measuring 'patient-reported outcomes' in 2009 (US Department of Health and Human Services Food and Drug Administration, 2009). These guidelines identify three stages. The first stage is concept definition. The second stage occurs when the domains of quality of life are discovered through qualitative research with patients. The third stage of quantitative research with patients establishes the reliability and validity of the questionnaire. Prior to that date, many researchers published questionnaires without either reporting or carrying out qualitative research. The FDA guidelines emphasised the importance of qualitative research in medicine.

In this example, the authors wanted to develop a questionnaire to measure the quality of life of patients with severe asthma in order to assess the benefits of new treatments. They developed the questionnaire following the FDA guidelines. The authors recruited a number of people with severe asthma and interviewed them, asking about the various ways in which asthma affected their lives. They used thematic analysis to identify the different kinds of problems patients reported and found that many of the problems reported by patients were not included in existing questionnaires, which were designed for mild and moderate asthma (Hyland et al., 2015). The researchers then constructed a questionnaire on the basis of those interviews. In order to construct a questionnaire that was written in a way that patients would find most comfortable, the authors asked patients to evaluate their questionnaire using focus groups (Hyland et al., 2018). In the focus groups, the patients read the questionnaire, commented on it and suggested modifications that were then adopted by the researchers. Finally, the patient-modified questionnaire was used to collect quantitative data validating the questionnaire. The questionnaire was validated by examining its factor structure and demonstrating a correlation with a measure of lung pathology. It was only after the combined use of qualitative and quantitative research that the questionnaire was ready for use as an outcome measure in clinical trials of new asthma treatments. So, interviews and focus groups were used in the research process, but the qualitative methods were not an end in themselves. The qualitative stage was used to produce the questionnaire, which was then validated by quantitative data.

Talking to patients can be immensely helpful to researchers. In fact, many medical grant-giving bodies require that patients *should* be involved in the design of the research. The technical term for this is *patient public involvement*, or PPI. Psychologists working within the qualitative paradigm would draw a clear a distinction between this kind of informal use of qualitative research, such as PPI, and their own methodologically more rigorous use. However, those using qualitative research within the quantitative paradigm are far less worried about appearing scientific. In the first paper published on the development of the new questionnaire (Hyland et al., 2015) the authors used thematic analysis in the usual way and then quantified the number of times patients in their sample referred to particular problems. Such quantification is contrary to the principles and practice of those working within the qualitative paradigm.

Qualitative research can be used to develop questionnaires, but it can also be used in hypothesis generation. Talking to people can provide information that stimulates hypothesis generation. The really difficult and important skill of scientific research, the skill that makes an immense difference to the quality of research, is getting the right question. It takes experience to know what right questions to ask. The most impactful research questions are often not those that are being asked now, but those that will be important in a year or two when the data are collected, analysed and the paper submitted. There is a purely intuitive process in developing research questions that depends on the person.

Quantitative science depends on an intuitive process that involves qualitative understanding. Intuition is part of science just as much as scientific methodology. The issue of 'getting the right question' will be covered in the next section.

Commercial qualitative research methods

Academic qualitative research has its roots in sociology. Social constructionism and grounded theory were developed by sociologists. Interpretative phenomenological analysis is associated with the philosophy of phenomenology. Commercial qualitative research has its roots in psychoanalysis and was developed before the sociologists and before the psychologists adopted qualitative research. Psychoanalysis never struggled to prove it was a science, nor did the commercial qualitative researchers. Their aim was pragmatic: to produce good commercial results. They were successful because they were commercially successful.

Two types of market research emerged in the 1950s: quantitative and qualitative. Quantitative market research involved questionnaires that were used to record people's quantitative response to particular questions. For example, a person might be asked how much they would like to buy a product, or whether they thought a product was useful, with the response recorded, quantitatively, on a numeric scale. Students may be familiar with quantitative market researchers who stop them in streets and shopping malls with a clipboard and who ask them if they could spare a few minutes to answer some questions. The method used by qualitative market researchers was different from that of the quantitative researchers in that no questionnaires were used.

Dichter

Ernest Dichter (1907–1991) is credited with being the founder of qualitative market research (Stern, 2004). Dichter was trained in psychoanalysis in Vienna and obtained a doctorate in psychology in 1934. The Dichters were Jewish (at one time Ernest Dichter lived across the street from Freud, their houses being 18 and 19 Bergasse, respectively) and Dichter originally planned to be a psychoanalyst. However, he was financially unsuccessful and started working for a market research company in Vienna. After he was arrested in 1937 (the market research company was accused by the Nazis of subversive activity), he and his wife fled to Paris in 1938 and then to America. In America, Dichter joined a market research company and developed his own unique and different way of finding 'motivational triggers.' He set up a consultancy business in 1939 and founded The Institute for Motivational Research in New York in 1946. Other institutes using his methods soon appeared.

Dichter was strongly influenced by Freudian theory and so he assumed that the reason why someone liked a product might not be available to that person's conscious. The reason why someone liked something had to be inferred from the way they talked about it, rather than asking the person directly, and in particular, how they talked to each other about it. Advertising could then be linked to the reason someone liked something. For example, Dichter analysed why people liked soup in order to advise soup manufacturers about advertising strategy. This is what he wrote:

> Soup is endowed with magic power … It protects, heals, and gives strength, courage and the feeling of belonging … Magic arises from the brewing together of special ingredients.
>
> (Dichter, 1964, pp. 67–68)

The Campbell Soup Company developed a series of advertisements based on Dichter's advice. They used the slogan "good for the body, good for the soul" to market their soups. They also used Dichter's interpretation in visual displays involving cherubic-looking, rosy-cheeked, happy toddlers where an emphasis was placed on the nourishing bond between mother and child, all of which was enhanced by the 'magic' of Campbell's soups (see examples in modern advertising at www.campbells.com).

Dichter and other market researchers not only tried to understand the motivational basis for consumer objects, but they also came up with slogans and strategies for improving sales. When he first moved to America, Dichter advised Proctor and Gamble on how to sell their soap. He came up with the slogan "wash your troubles away." A Proctor and Gamble executive acknowledged his creativity by writing "You s.o.b., you are really a copy writer" (Stern, 2004, p. 166).

Although Dichter used the term motivational analysis, he used the term in a different sense to that used by most psychologists. When measuring motivation by questionnaire or by motivational interviewing, there is an assumption that people are aware of their motivations. Dichter used the psychoanalytic idea that people were often not aware of their motivations. An example of unconscious motivations can be found in Dichter's work for the Betty Crocker company. To make cake, it is necessary to find and weigh out various ingredients, mix them together and bake them in an oven. The Betty Crocker company came up with simple idea: premix all the ingredients, so that all that is needed is to mix with water and then place in the oven. When asked, American housewives were enthusiastic about this idea. They said they would buy the product. However, sales were disappointing. Despite saying they would use Betty Crocker cake mix, people were not doing so. Dichter concluded that the reason housewives were not buying Betty Crocker cake mix was because they felt guilty as it was not proper cooking. Dichter came up with a solution: ask the housewife to add an egg to the mix along with the water. The solution worked. A simple change in the way the product was presented overcame the unconscious bias against the product. Having to add an egg to the mix allowed the housewife to feel she was doing proper cooking rather than cheating by using a convenience product.

> **Psychologists' earlier contributions to advertising**
>
> W. D. Scott (see Chapter 3) was the first psychologist to develop the science of advertising, using direct suggestion (e.g., use Pears soap). J. B. Watson (see Chapter 4) had a career in advertising after he was excluded from universities. Watson advertised products by associating them with other positive images (e.g., an attractive woman with a car). The motivational researchers went yet further by selecting objects to associate with the product that had the same motivational features as the product (e.g., nurturing and soup).

Schlackman

Dichter's ideas were brought to the UK by William 'Bill' Schlackman (1930–2019). Schlackman was working as a delivery boy for *Time* magazine. He opened a package and read a report by Dichter on why people read *Time* magazine and realised that this was the kind of work he would like to do. Schlackman worked for Dichter before moving to the UK (his wife was English) and setting up in practice as an independent qualitative researcher in 1961. Bill Schlackman developed Dichter's ideas of motivational research both in terms of concept and in terms of methodology and established qualitative market research as an important part of advertising and marketing (Patterson, & Malpass, 2015).

Schlackman suggested that four types of information were of interest to market researchers, depending on whether the person was aware of the information and whether they were prepared to share that information with someone else:

Aware and would share.
Aware but would not share.
Not aware but would share if became aware.
Not aware and would not share if became aware.

Schlackman developed qualitative research methodology and projective tests to assess information a person was unable or unwilling to share. He was influenced by the work of Carl Rogers and Rogers' emphasis on the therapeutic relationship and technique of non-directive questioning (see Chapter 8). Schlackman therefore emphasised the importance of establishing a good relationship and talking to consumers in way that allowed them to feel comfortable. Direct questions could elicit stereotypical responding, and defensiveness would prevent people saying what they really thought. Schlackman was aware of the importance of defensiveness from Dichter's work with Betty Crocker, so he used non-directive questions and encouraged a chatty informal type of interaction with the consumer. He made sure that the physical environment would make people feel safe, so that they did not feel they were 'being grilled by a policeman.' When talking to groups of people Schlackman recognised that groups became more relaxed with each other over time. He developed the use of 'sensitivity groups' where groups of people met on a regular basis – an idea also used in psychotherapy. Schlackman set the context so that people would be highly relaxed and able to reveal what they thought about a product.

In addition to setting and style, Schlackman developed a number of projective techniques that would help him discover what people really thought about a product. The thematic apperception test was already being used in the USA, but Schlackman developed new types of tests. A common feature of these techniques was that a person could express their ideas without having ownership of the ideas. Here are some of the techniques.

- *Balloon writing*. The consumer is presented with a picture that includes a person with a word balloon coming out of the person's mouth. The consumer is asked to write what the person is saying.
- *Sentence completion*. The consumer is asked to complete a sentence, often the sentence is attributed to someone else.
- *Psycho-drawings*. The consumer is asked to draw a picture or make a collage of a concept or product.
- *Secret pooling*. People write things on pieces of paper that are placed in a box and so, when read, no one knows who has written what.
- *Thematic apperception tests*. The consumer is presented with a picture and asked to write a story about it.
- *Word association tests*. The consumer is presented with a word and asked to say the first word that comes into their head.

Not only did Schlackman develop concepts and ideas, but he also contributed to marketing. He developed the idea of product branding and showed how the design of packaging (in particular colours) could contribute to the concept of a product. This work was an early example of what became known later as the semiotics of advertising. The word semiotics means the study of signs and symbols. Schlackman believed that packaging could provide a symbolic representation of the product that enhanced its attraction to consumers. For example, in the design of baby's nappies (diapers), Schlackman was aware that mothers were repelled by the idea of dirty, wet nappies (diapers) and therefore emphasised hygiene and cleanliness in packaging by using plenty of white contrasting with bright primary colours. The packing you see on supermarket shelves today did not get there by accident. They are based on principles of marketing semiotics developed by Schlackman.

Schlackman's ideas and techniques were developed by other early pioneers of qualitative market research in both the UK and the US, and by the 1980s qualitative market research was an established profession. The market researchers were usually part of a team involved in the development and evaluation of products and had a role called an 'account planner.' An account planner was part of the sales team. Their role was to understand exactly why people would like to buy a product and therefore maximise the attraction both in terms of the product itself and the presentation to consumers. Account planners used a variety of techniques for understanding consumers, techniques that far extended beyond those used by academic qualitative researchers. Account planners listened to what people said, and also the way that they said it, in order to gain insight into why people said what they did. Sidney Levy at Social Research, Inc., wrote

> We created devices such as matching people, animals, cars, pictorial symbols and soliciting dreams. We took pictures of houses and living rooms, we sent interviewers to spend days observing and making detailed notes on what respondents did and said. Essentially, we engaged in accumulating case studies, personal histories and ethnographies; and we conducted group interviews before they came to be called 'focus groups'.
>
> (Levy, 2006, p. 10)

The following three case studies illustrate some of the different ways qualitative research has been used commercially.

Mild coffee

In the 1960s coffee drinking was beginning to replace tea drinking in the UK as the socially upwardly mobile drink of choice. This was in part due to the convenience of instant coffee that had been developed by the company Nestlé. The instant coffee produced by Nestlé was a brown powder. Also in the 1960s, and in recognition of the popularity of instant coffee, Nestlé developed a granular form of instant coffee ('freeze dried') that had a better flavour. However, some people continued to buy the original powder form and Nestlé wanted to find out why. Were the mild coffee drinkers simply unaware of the better granular coffee, or was there something about the powdered coffee that made it taste better?

The market researchers asked drinkers of powdered coffee why they preferred it. The powder coffee drinkers described their coffee as being "not bitter" and said that it "didn't upset my stomach," as well as other descriptives that were all about what the coffee did *not* do in comparison to the coffee granules. The researchers inferred from the way the coffee drinkers talked about coffee that they didn't really like coffee – they drank it because it was socially more acceptable to drink coffee rather than tea. The powder coffee drinkers did not refer to the social aspects of drinking, but this was inferred by the researchers. Nestlé used this research to reposition their powder coffee as 'mild coffee' and advertised it with pictures of women in 'nice' middle-class kitchens drinking coffee with other 'nice' women. The marketing pitch was "this coffee is a good social activity," rather than "this coffee tastes nice."

In this example, the researchers used a technique commonly used in academic qualitative research, a focus group, but made an inference that went beyond what academic researchers would have made. The coffee drinkers may have been aware of the reasons for their choice of coffee but were not willing to share. The inference made by the commercial researchers was not falsifiable, but the aim was not to produce science but to influence consumer behaviour.

Starbucks

Starbucks started as a single coffee shop in Seattle, USA, in 1971 offering high-grade coffee, and by 1980 it was developing into a brand with many stores. Starbucks started as something special, but as it grew research showed that it was losing its specialness, it was becoming 'the McDonald's of coffee shops.' What made Starbucks special? Was it the quality of the coffee that attracted people or was it something else?

The researchers used a technique they called dream catching (other names are also used for this technique). In this technique, coffee drinkers were asked to close their eyes and imagine they were drinking the best possible coffee in the best possible coffee shop. Then the researchers used guided imagery and asked the coffee drinkers to focus on different aspects of the coffee shop, the people, the smells, the colours, the feelings, the textures, the food, and so on. The researchers found that the images and ideas produced by the coffee drinkers were remarkably similar. However, it was not the coffee that made a Starbucks coffee shop special. What made Starbucks special was the 'space' where people could meet and socialise. Starbucks went on to market itself as the 'third place.' Home was a 'first place,' work a 'second place,' and Starbucks was a third place where strangers could meet and feel at home, but without the responsibilities of home and work. It was a place where they could relax and unwind. The researchers realised that the idea of a third place had always existed. Examples include the English pub, the Japanese tea garden and the Italian piazza. It was a place where people could meet, relax and talk but without being at home or at work.

On the basis of the research findings, Starbucks developed its brand as the 'third place' (Simon, 2009). It provided armchairs and other objects to create a sense of informality and comfort. It made its coffee shops not just a place to drink coffee but a place to socialise. The idea of a coffee shop as social venue became so accepted as part of social culture that it was to feature in an American sitcom called *Friends*. In this sitcom a group of four young people spend most of their time talking while sitting on a sofa in a coffee shop.

In this example the researchers used a technique not normally employed by academic researchers. By using the dream-catching technique, the participants became aware of something they had previously been unaware of but were happy to share with the researchers. The researchers then used the results to modify their product and marketing.

McDonald's

McDonald's is an American burger chain that opened its first store in the UK in 1974. At first it was very successful. The American brand and 'being American' went down well in the UK. However, after about 30 years, it found it was losing market share to other brands, including Burger King – which was also originally an American brand. The different burger restaurants produced roughly the same product. What was going wrong?

The researchers used a projective technique. They asked people to imagine each of the burger chains was a person, and then to describe what that person was like. Many people described McDonald's as a 'loud American' whereas other brands were seen as family-friendly characters. Inspection of the television advertisements revealed how this impression was gained. The advertisements that McDonald's were using showed a McDonald's representative, wearing tie, in a McDonald's store explaining how good the McDonald's products were. British people don't show off about how good they are! The company changed advertisements, this time showing a family (no ties in sight!) eating in one of their restaurants, and sales improved.

There are other techniques both projective and non-projective that might have produced the same result. For example, the problem that McDonald's was trying to solve could have been approached from the perspective of personal construct theory (Chapter 8). People could have been presented three burger bars and asked in what way two were similar and one different. Whether the same result would have been achieved is uncertain, but this example illustrates that, in psychology, problems can be solved in many different ways. One view of progress in psychology (Chapter 1) is that it has progressed because it has more tools in its toolkit (Feest, 2022). Qualitative methodology has certainly added to that toolkit.

Academic qualitative methodology versus commercial qualitative market research

A number of differences between academic and commercial qualitative research follow from the examples above. Academic researchers are concerned to be scientific and to be seen to be scientific, commercial researchers are not. Academic researchers ensure that results can be replicated, commercial researchers are not interested in replication. On the contrary, as the different qualitative research companies compete for employment and contracts, each company would like to present itself as especially good at what it does. In addition to these two differences, there is one other difference: assumptions about the research question.

Academic studies answer research questions. The research question is defined at the time the study is planned. Most academic research requires approval by an ethical review board. The ethical review board will want to know what the research question is and how it is being investigated. In the case of interviews, they will want to know the questions that are asked. In the case of focus groups, they will want to know the topics that are going to be discussed. Protocols for academic qualitative research specify what the participants will be asked. The protocol specifies the known unknowns.

Commercial qualitative researchers start from a different set of assumptions. Their aim is to gain insight into another person's understanding. They start from the assumption that they do not know the questions to ask – they do not have a research question. They start from an assumption that there are unknown unknowns, and their aim is to find out what those unknowns unknowns are. Commercial qualitative research studies have an ethical code of practice, the key element of which is respect for the participants. There are accepted techniques, such as those described above, and the research is deemed ethical as long as the participants have a positive experience.

The difference between academic and commercial qualitative research can be summed up as the difference between known unknowns versus unknown unknowns. The aim of academic research is to find the known unknowns. The aim of commercial research is to find the unknown unknowns. A training manual for commercial qualitative researchers provided by Arnie Jacobson gives the advice "if you are at the beginning, don't start at the end." Asking a question should be at the end of the research. Finding the right question is the start of the research.

The observant student will have noticed that when qualitative research is used in questionnaire development, the researchers are trying to establish the right question to ask. However, when this is done, researchers are interested only in finding about specific types of questionnaire item that reflect the concept they are trying to measure. The questions they ask participants, and report in the protocol, reflect this predetermined concept. Quality-of-life questionnaires are limited to questions about the adverse effects of illness on life. They do not ask about the benefits of illness. However, although patients are adversely affected by illness there are also positive consequences (Sodergren & Hyland, 2000). The initial insight into positive consequences of illness came by chance when the author was interviewing patients for a quality-of-life questionnaire and a patient said something without being asked. The patient said that, although his respiratory disease created many problems, there were also some benefits. This single statement by just one patient was the impetus for a research programme taken up by Samantha Sodergren for her PhD and used in her later professional career. Noticing inconsistencies can be helpful both in science and life in general. The intuitive element of qualitative research has value in marketing, but it also has value in science.

Psychology not as a science: hermeneutic psychology

The qualitative methodology used by the majority of psychologists therefore meets the criterion of a science, that of falsification. However, there are also those who believe that humans should not be understood in terms of falsifiable statements.

The word *hermeneutic* derives from the god Hermes, the messenger of the gods, who transmitted the thoughts – or meanings – of gods to humans. The central idea of hermeneutics is that meaning is transmitted between people, and it is possible to understand another person using intuition. Hermeneutics assumes that it is possible to take part in the inner life of another person through intuition. A shared understanding of the world makes intuition possible. It is a feature of being human that allows us humans to 'rethink' what the other person is thinking. The focus on intuition rather than method is something that makes hermeneutic psychology distinct.

> Hermeneutic philosophy does not aim at objective knowledge through the use of methodical procedures but at the explication and phenomenological description of [the] human.
>
> (Bleicher, 2017, p. 2)

Hermeneutic psychology owes its origins to hermeneutic philosophy developed by the German philosopher, Wilhelm Dilthey (1833–1911). Dilthey (1894/1977) provided an alternative to the historical analysis of the time where historians were trying to understand history in terms of general laws. Dilthey suggested instead that history should be understood by rethinking the thoughts of historical characters. He believed this was possible because humans share characteristics that enable them to have insight into each other's minds. The understanding that Dilthey proposed was not based on falsifiable statements, but on the intuitive understanding of others. It was based on the imaginative re-creation of the inner contents of a person's thoughts emerging from sympathy borne out of shared lived experiences (Bevir, 2007).

An important feature of the hermeneutical approach is that there is an explicit recognition that the context is important. The context includes the person who is trying to understand the other. So rather than thinking of 'understanding the other' as being something that can be objective and context-free, there is recognition that it involves a relationship with an observer and the context in which the interaction takes place. We cannot be dispassionate observers of each other (Slife & Christensen, 2013).

Hermeneutic enquiry shares with phenomenology the idea that the listener's beliefs can prevent a true understanding of what the speaker means, but adds one additional feature, sometimes called 'the criterion.' Although all interpretations are relative, they are not equally good. The 'criterion' is the extent to which

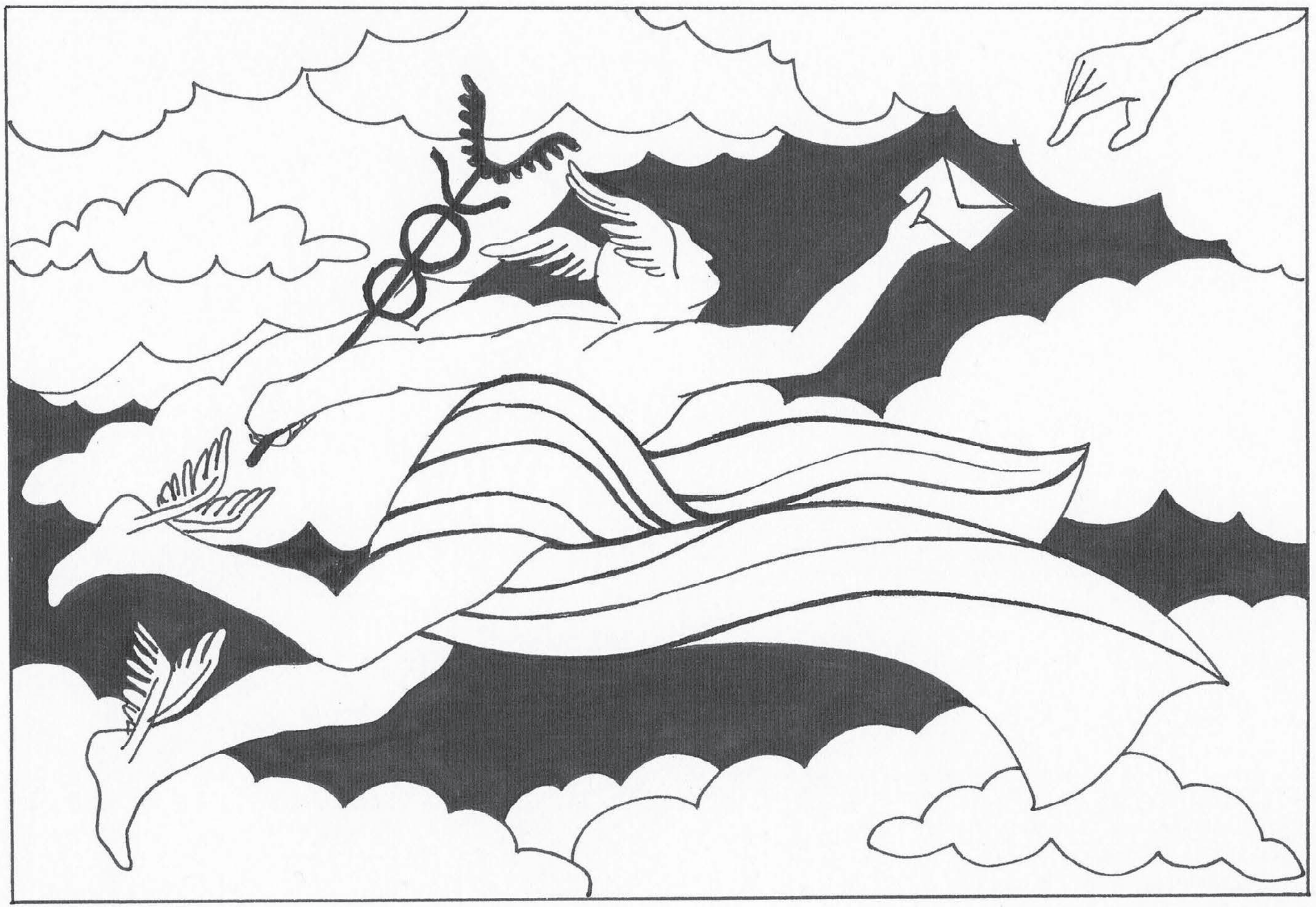

ILLUSTRATION 9.1 Hermes taking thoughts between humans and the gods.

a person is able to gain hermeneutical insight of another person. Characteristics that help hermeneutic enquiry include lack of selfishness, open-mindedness, self-effacement, tolerance, and a sincere desire to understand another person (Bleicher, 2017). Harmful characteristics include self-righteousness and "conscious or unconscious resentment of ideas and positions which differ from the more common ones, and especially from those held by the observer" (Bleicher, 2017, p. 34). The quality of the intuitive understanding of the other depends on the observer, and the extent to which the observer meets the criterion, a criterion that involves a state of mind. All observers are not equal. People vary in empathy and empathetic ability. The recognition that observers are not equal sits uncomfortably with psychologists, whose aim in qualitative research is to achieve the status of a science, but it is not a problem for commercial qualitative researchers.

Hermeneutics versus other approaches

Replication is important in science. Interpretative phenomenological analysis assumes that if the listener's beliefs are 'suspended' then it is possible to obtain an accurate and replicable understanding of the other person. Replication follows so long as beliefs are suspended. Hermeneutics makes clear that replication does not necessarily follow because observers differ in terms of the criterion. Commercial qualitative researchers do not aim for replication because they compete with other qualitative research companies for clients. The aim of hermeneutics and interpretative phenomenological analysis is to understand a person's conscious experience. Commercial qualitative researchers use projective techniques to understand mental content that people are either unaware of or unwilling to share.

The idea of 'understanding the other' in an intuitive way is part of Rogers' approach to therapy (see Chapter 8). Rogers presented his work as part of the scientific tradition in psychology and his theories consist of general (nomothetic) statements that can apply to all people. However, Rogers was aware of the conflict between the intuitive and the scientific. This is what he wrote in one of his later works in what he described as a personal statement:

> I have felt an increasing discomfort at the distance between the rigorous objectivity of myself as scientist and the almost mystical subjectivity of myself as therapist.
>
> (Rogers, 1955, p. 267)

And

> The essence of some of the deepest parts of therapy seems to be a unity of experiencing.
>
> (Rogers, 1955, p. 267)

Rogers' (1955) description of the therapeutic process is the same as that found in hermeneutics – and is at odds with his earlier descriptions of the process of psychotherapy as a scientific endeavour. A 'unity of experiencing' does not produce a falsifiable statement. Rogers' recognition of the tension between the scientific and non-scientific was made possible because he inhabited both worlds, a world where psychology was justified to others in terms of science and an intuitive world of trying to understand the minds of his clients. It is interesting to note that when Rogers (1951) refers to the training of counsellors, he states that what he tries to do is to teach an attitude rather than a skill. The criteria that enhance hermeneutical skill identified by Bleicher (2017; see also section above) could all be described as attitudes.

Psychology as politics: critical psychology and feminist psychology

The term *critical psychology* is used to describe an approach to psychology that, as the word suggests, is strongly critical of the way psychology is practised. As the above sections of this chapter have shown, the dominant scientific and nomothetic approach to psychology has been criticised in a variety of ways. However, critical psychology is *very* critical of psychology.

Why is critical psychology critical of psychology? There are two reasons. The first and less important reason is the same as that given by those who use qualitative methods as ends in themselves. Psychology is following the path of a natural science and, in so doing, misses the deep meaning that is formed in social discourse. Critical psychologists therefore support the general criticism and solution provided by social constructionists – i.e., the rigorous, positivistic, quantitative methodology so beloved by many psychologists should be replaced by a more humane, qualitative methodology. The second reason is the one that really defines critical psychologists. They point out that the practice of psychology isn't some abstract activity that is carried out in an ivory tower. On the contrary, psychology is a *political activity*, and that psychologists, often unwittingly, play a political role in society.

There are two consequences of psychology's failure to appreciate its political role. First, psychologists contribute to an unfair and unequal relationship between groups of people, a relationship that can be exploitative. For example, occupational psychologists help capitalist masters make their workers work hard, thereby helping the profits of the capitalist masters but not helping workers themselves. There is some truth in this criticism. Work stress is undoubtedly bad for health, but stressed workers can, under some circumstances, produce more. The reference to capitalism reflects a tendency in critical psychology to support a Marxist view, or, at the very least, one that is collectivist rather than individualist. Other unequal power relations are found in the relationship between psychotherapists and their clients, between psychiatrists and their patients, between social workers and their clients, and between teachers and their pupils. Again, there is some truth in this sort of criticism, though it certainly does not apply to all therapeutic relationships. As pointed out in an earlier chapter, Rogerian therapy is based on an explicit rejection of the idea that the therapist is in control of the patient. Another unequal power relationship is found between men and women, and this forms part of the focus of criticism in feminist psychology (Wilkinson, 1996). Feminist psychology draws attention to other gender and power imbalances in psychology and negative attitudes to women (see Chapter 3). Feminist psychology covers a wide variety of topics but at its heart is a concern with women, the similarities and differences between feminist psychology and the psychology of men, and the absence of research focussing on issues specific to women (Stewart & Dottolo, 2006).

The second consequence of psychology's failure to recognise its political role means that that political role is not properly studied. Critical psychologists therefore aim to remedy this deficit by providing an academic study of the political role psychologists play. The first issue of the journal *Annual Review of Critical Psychology* was published in 1999 and contains a manifesto for what critical psychology should do (Parker, 1999). The manifesto draws attention to four components that could be considered to form the subject matter of critical psychology:

1 How psychology operates to serve those in power.
2 How psychology is culturally constructed and operates within a historical context.
3 The way people are regulated, manipulated and surveyed by others.
4 The study of ordinary, everyday practice by psychologists.

The journal *Feminism and Psychology* was first published in 1991. In a paper published 28 years later writing in the same journal Lafrance and Wigginton (2019) suggest that feminist psychology involves:

1 The politics of asking questions.
2 Attention to language/discourse.
3 Reflexivity.
4 Representation and intersectionality.
5 Mobilising research for social change.

Critical psychology can itself be analysed from a political, cultural and historical perspective. It became a recognised contributor to psychological thought at a time in history when there was a new type of political development in the UK, called Thatcherism. Thatcherism was named after British Prime Minister (1979–1990) Margaret Thatcher, who famously said, “There is no such thing as society.” Margaret Thatcher espoused a form of individualism that many, including the critical psychologists, felt was wrong. Some undergraduate psychology courses do not cover critical psychology or feminist psychology, though the argument that psychologists are part of a political and historical context is as true now as it was in the past.

Summary

Academic psychologists use qualitative methods *either* because they believe qualitative methods are superior to quantitative methods *or* because they use qualitative methods in support of quantitative methods – for example, in questionnaire development. In both cases the methodology has its roots in social constructionism, a concept developed in sociology that states that meaning is socially constructed and therefore can be understood from interactions between people. Concern that the methodology is, and is viewed as, scientific leads to a close link between the data and theoretical inference. Grounded theory shows the need to limit theoretical speculation and rely on inference that is ‘grounded’ in the data. Interpretative phenomenological analysis draws attention to the potential of bias when interpreting data, and the need for the listener to ‘suspend’ or ‘bracket’ their beliefs when listening to others. Thematic analysis provides a methodology that can be applied to a variety of different kinds of data where themes are identified and described. Conversational analysis is a technique that provides a detailed description of the words people use in a conversation. Commercial qualitative research has its roots in psychoanalytic theory. Unlike their academic colleagues, commercial qualitative researchers are unconcerned about the scientific status of what they do and do not aim for replication, but, rather, are concerned about practical outcomes from their research. Commercial qualitative researchers are more theoretically speculative and have a far wider range of techniques, including projective techniques. Mild coffee, Starbucks and McDonalds provide examples of how research carried out by ‘account planners’ influences marketing strategy and product development. Hermeneutical psychology is based on the premise that understanding people should be intuitive; it identifies criteria that assist this aim and leads to the conclusion that people differ in their ability to understand others. Critical psychology rejects the methods and aims of mainstream psychology and instead examines the political impact of psychology including power relations between men and women.

Essay questions and discussion topics

1 What are the assumptions and purposes of academic qualitative research?
2 What is the difference between thematic analysis and conversational analysis?
3 How do academic qualitative researchers ensure that their research is scientific?
4 In what ways can qualitative research assist quantitative research?
5 How did commercial qualitative research develop and how does it differ from academic qualitative research.
6 What are the aims of critical psychology and why is it critical?
7 What roles does intuition play in science?
8 In becoming scientific has psychology 'lost its soul'?
9 Why and how does empathetic ability vary between people?
10 Which aspects of this lesson for life do you agree or disagree with, and can you explain why? Can you think of other lessons that might be drawn from this chapter?

The way you ask questions will influence the answer you get. Be aware that your own beliefs and attitudes can bias what you hear, and that people may not be aware of the reasons for what they say or do. Sensitivity to others is a psychological skill that varies between people.

10

What happens when the whole is greater than the sum of its parts?

From gestalt psychology to artificial intelligence and the future of humanity

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The words 'the whole is greater than the sum of its parts' refers to a concept called emergentism. Emergentism, i.e. the concept of emergent properties, appears in many ways throughout science. Emergentism justifies the existence of chemistry as separate from physics, it justifies biology as separate from chemistry, it justifies psychology as separate from biology and it justifies sociology as separate from psychology. Psychological phenomena are *caused* by fundamental particles spinning in space but cannot be *explained* by fundamental particles spinning in space. Chapter 6 explains why the unity of science hypothesis does not imply reduction. Emergentism is a property of science not just psychology.

In psychology the idea of emergent properties first appeared in the gestalt movement and later in field theories. However, the understanding of why something should be 'greater than the sum of its parts' has occurred relatively recently with the development of network theory, connectionism and artificial intelligence (AI). This final chapter of the book starts with history but then focuses on the present and future, a future that will be influenced by AI.

There are two ways of understanding the world: analysis and synthesis. The process of analysis examines the different parts of something. After analysing something into its separate 'bits,' the whole is found by adding the separate bits together to make the whole. In the physical sciences this often involves micro-analysis, i.e. finding the smaller and smaller parts – for example, the genes in biology or fundamental particles in physics.

The process of synthesis shows how the different parts of something interact and combine to form a whole that cannot be understood by the contributions of the individual parts. Throughout the history of science, and in several different disciplines, there is a tension between those who want to analyse yet smaller and smaller parts of the jigsaw and those who want to see the meaning of the jigsaw as a whole. Both analysis and synthesis produce knowledge, but they produce different types of knowledge and understanding.

The coalescence hypothesis versus brick wall hypothesis was introduced in Chapter 2. If the taste of lemonade can be understood as the combination of two separate tastes, lemon and sugar, then the sensation of lemonade can be analysed into its separate components. If, on the other hand, lemonade is a unique taste, different from lemon and from sugar, then lemonade is a synthesis of sugar and lemon and is more than the sum of its parts. The brick wall versus coalescence controversy was a debate among philosophers in the nineteenth century and was a precursor to an important movement in psychology, the gestalt movement.

The gestalt movement

The gestalt movement was never associated exclusively with one university or person, nor was it associated with a particular type of psychology (Ellis, 1999). Instead, the gestalt movement represents an idea that predates the beginning

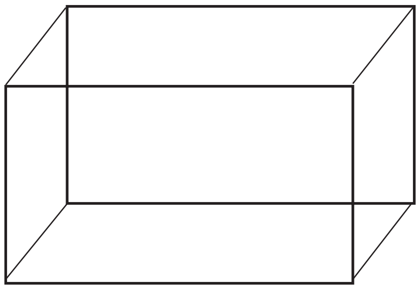


FIGURE 10.1 The Necker cube. Watch it and see how two different interpretations are possible.

of academic psychology and continues to be important (Ellis & Humphreys, 2020). The assumption underlying the gestalt movement can be summed up in the phrase: the whole is greater than the sum of its parts. The word *Gestalt* is a German noun meaning shape or configuration – it does not translate easily into English. The use of this noun reflects the idea that psychological shapes or structures are more than the sum of their parts.

Phenomena that are now described as gestalt phenomena were discovered in the middle of the nineteenth century, long before the gestalt movement was recognised. The Necker cube was drawn by Necker in 1832 and the old woman/young girl illusion appeared on a German postcard in 1888. The significance of the gestalt movement is that explanations were provided for phenomena that were previously treated only as interesting illusions. The gestalt movement provided theory.

The beginning of the gestalt movement is attributed to a chance observation made by Max Wertheimer (1880–1943). In 1910, Wertheimer was travelling by train from Vienna while on holiday and noticed how an illusion of movement was created by telegraph wires along the track. This illusion is familiar to many train travellers – the wires seem to move up and down. The idea of apparent movement was not new. There was a nineteenth-century toy called a stroboscope that exploited this phenomenon, and Louise and Auguste Lumière invented the Cinématographe in 1895. Wertheimer did not see anything that had not been seen before. His contribution was that he realised that the phenomenon of apparent movement could not be explained by the then current theory of movement perception that had been proposed by Wundt (see Chapter 2) (Wertheimer, 1912). Wundt thought that the apparent motion was caused by the summation of eye movements – i.e., you perceive movement because the eyes move. Wertheimer believed and was eventually able to show that movement perception was 'more than the sum of the parts' of any elements observed by the observer (Ash, 1995).

Wertheimer started to investigate this apparent movement, or the *phi phenomenon* as it was called, using himself and two colleagues as observers. Along with Wertheimer, these two colleagues, Wolfgang Köhler (1887–1967) and Kurt Koffka (1886–1941), are looked on as the founders of the gestalt movement.

Wertheimer used an instrument called a tachistoscope that enabled images to be presented on a screen at precisely defined times and for precise durations. Tachistoscopes were standard psychology experimental equipment before the introduction of computers (they were used by the author when a student). As an example of an experiment done by Wertheimer, imagine lines placed at slightly different angles, which we can call line A and line B, and which can be shown independently on a tachistoscope screen or on a computer (Figure 10.2).

First, line A is shown on the screen. Then line A disappears, and line B appears. Then line B disappears, and line A reappears again, and so on. Wertheimer was able to vary the rate of alternation between lines A and B. He found that, as the rate increased, there came a point when it appeared that a line was moving between A and B, and *something* was actually visible between them. The line appears to be rotating around the point where the two lines meet. In fact, the same experiment is more easily demonstrated by two lights in a dark room that are separated by a short distance. If the light alternates between A and B, it appears that the light is moving between A and B and *something* is visible between A and B. The demonstration of apparent motion was interesting but was not novel. Wertheimer's important contribution, which was published in 1912 (Wertheimer, 1912), was a modification of this type of *phi* experiment.

Wertheimer used three lines, two of which are called A, and one is called B (Figure 10.3). As before, the A and B lines alternate on the screen, but in this case the two A lines appear at the same time. The B line appears, then the two A lines appear as the B line disappears, then the A lines appear again, and the B line disappears. This arrangement creates the peculiar impression that the B line moves in two directions at once – it looks as though the B line splits and moves outwards. Wertheimer realised that this impression could not be caused by eye movement, because *the eyes cannot move in two directions at the same time*. His demonstration therefore showed that Wundt's explanation of how we perceive motion was false. Motion is not perceived because of the way the eye

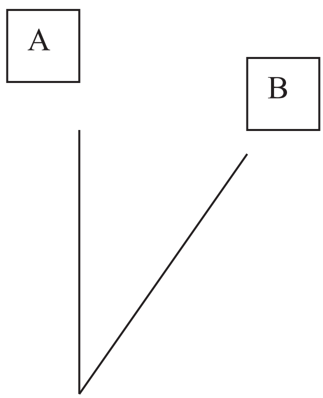


FIGURE 10.2 Line A appears and then disappears and replaced by line B, then vice versa.

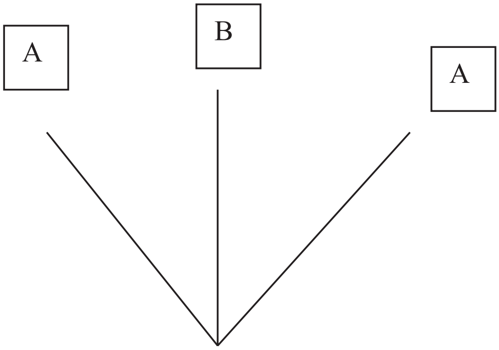
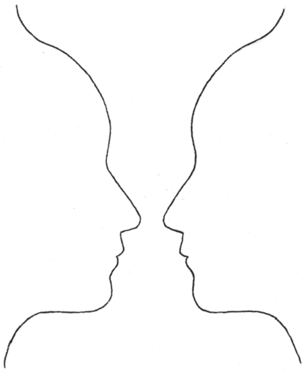


FIGURE 10.3 Line B appears then disappears and is followed by lines A and vice versa.

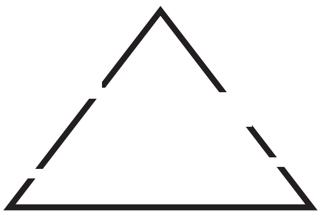
moves but is due to the overall pattern of what we see. Why do we see movement from the overall pattern? The answer is that perception follows certain rules, so that when a pattern of a particular kind appears, then we perceive according to that rule.

The idea that perception follows rules or principles led over a short period of time to the discovery of several gestalt principles. Students studying psychology will already be familiar with these principles from the study of visual perception. They include:

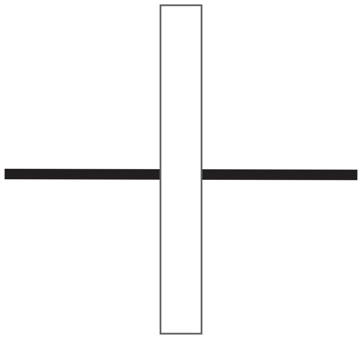
- **Figure-ground**: Several examples of these exist, including the face-vase illusion below and young-old woman illusion.



- **Closure:** Gaps in a line appear to be filled in. See below, where the gaps in the triangle appear to be filled in.



- **Continuity:** There is an assumption that lines that are interrupted are continuous. See below, where the black line appears to be behind the white box. The principle of continuity is exploited in the 'three-rope trick.' Search online and you will find videos showing you how to do the three-rope trick. It is a very convincing piece of conjuring that exploits this gestalt principle. I used to demonstrate it during lectures.



- **Similarity:** Objects that are similar are assumed to be connected. Notice how in the figure below there appears to be a cross made out of the letter b.

aaaabbbbbaaaa
aaaabbbbbbaaa
aaaabbbbabaaa
bbbbbbbbbbbb
bbbbbbbbbbbb
aaaabbbbbaaaa
aaaabbbbbaaaa
aaaabbbbbaaaa

- **Proximity:** Objects close together are assumed to be connected even if they are different objects.

aa	aa	aa	aa	aa
ab	ab	ab	ab	ab
bb	bb	bb	bb	bb

Gestalt principles also are used in colour perception. The colours of the rainbow are well known: red, orange, yellow, green, blue and violet. So where is brown? Where is gold? Where is silver? Gold and silver are the easiest ones to explain. Gold is yellow and silver is light grey with particularly bright highlights (highlights are the reflections that come off shiny objects). If you examine a painting of a gold shield, you will see that from a distance the shield really looks gold, but when you come up close it is simply yellow. The trick is that artists put in more highlights than are in the surrounding objects so that you assume that the object must be shiny gold. Colours such as gold and silver show that people infer colour not only from the colour impinging on the eye but from the whole of the visual array.

Brown is a little more difficult to understand but it has to do with 'brightness constancy.' Brightness constancy where judgements are made of part of a visual array *in relation to* other parts of the visual array. The brain infers colour from the cones at the back of the eye, and so brown must be somewhere on the visible spectrum. If you have paints that are red, orange, yellow, green and blue next to each other, they look like those colours – i.e., red orange, yellow, etc. However, if you take a colour such as yellow, and reduce the amount of light that is emerging *relative to its surroundings*, then this 'yellow' looks brown. Brown (there are lots of different browns) is the colour that we infer from knowing that relatively little light is being reflected from a colour that is somewhere in the middle of the spectrum – of course, when no light is reflected, then we assume the colour is black. Colour perception shows that colour is not just a matter of an addition of signals from the cones in the eye but is an inference that is made from the total array of the visual image in the visual cortex.

Gestalt learning phenomena and other gestalt psychologists

Although much of the early research and phenomena labelled as 'gestalt' were associated with perception, the idea of gestalt has a wider application. The early gestalt psychologists focussed on perception because most early psychology was perceptual. The gestalt psychologists were proposing a new, holistic way of understanding the psychology of the time. However, gestalt psychologists were also interested in learning.

Wolfgang Köhler was one of Wertheimer's collaborators in his early experiments (Henle, 1971). Köhler's later work focussed on other topics including human values (Köhler, 1947, 1959, 1966). Köhler investigated insight learning in chimpanzees (Köhler, 1925), working on the island of Tenerife at the German Primate Research Centre. He conducted a famous study with chimpanzees. The study took various forms, but in one there is banana outside the chimpanzee's cage which is just out of arm's reach. A stick is placed in the cage with the chimpanzee. After a time, the chimpanzee will pick up the stick and hook the banana inside. Repeated study shows, for example, that the chimpanzee picks up the stick faster if the stick is between the chimpanzee and the banana rather than at the other end of the cage. The significance of Köhler's studies was to show that learning happens in an 'all-or-nothing' fashion. At one point in time the chimpanzee did not know what to do and at the next point it did. This finding was important because it contradicted the more atomistic theories of learning that were being developed by animal psychologists working within the behaviourist tradition (see Chapter 4) where learning was believed to be a gradual process of the strengthening of stimulus-response bonds. Köhler's research showed that learning could be all or nothing.

America

Koffka moved to America in 1924. Wertheimer, who was also Jewish, moved to America in 1933 when the German National Socialists dismissed all Jewish professors from German universities – including Nobel prize winners such as Albert Einstein. Köhler, who was not Jewish, published an article in 1933 strongly criticising German discrimination against Jews (Henle, 1978). Köhler left Germany for America in 1935. The three men were friends throughout their academic lives (Brett & Wertheimer, 2005).

Kurt Koffka moved to America before his German friends. He was proficient in English before he left (Koffka, 1922, 1924, 1935) and his proficiency in English enabled him to promote gestalt principles in the English-speaking world (Gibson, 1979). He influenced Tolman (see Chapter 4) and befriended James J. Gibson (1904–1979), whose book *The Ecological Approach to Visual Perception*, published in 1979, is viewed as an important culmination of the gestalt approach. One of Gibson's many ideas was that, when people look at a visual array, they immediately register what objects are *for*. So, for example, if a person sees something that has the structure of a path, that person will know that the path is for walking on. The shape of a hammer will indicate that the object is for hitting things with. Gibson described these 'what things are for' as affordances.

> A *path* affords pedestrian locomotion from one place to another … An *obstacle* can be defined as an animal-sized object that affords collision and possible injury.
>
> (Gibson, 1979, p. 36)

So, an affordance is a gestalt – it is the whole that is perceived directly.

Field theories

All research is based on untested metatheoretical assumptions (see Chapter 1). The assumption of cause and effect is one of those assumptions. From the perspective of analysis (in contrast to synthesis) it is possible to examine the effects of causes one at a time. In an experiment a single independent variable affects a single dependent variable. A single stimulus causes a response. It is possible that a response may result from an interaction between two stimuli in which case such an interaction could be investigated with a two-way analysis of variance. Three interacting stimuli could be investigated with a three-way analysis of variance. But what about 6 or 100 interacting stimuli?

The general form of psychological explanations is shown below. Alternative words appear in the boxes.

Situation Stimulus Environment	→	Person variable Mechanism Processing	→	Response Behaviour

The words *situation* and *environment* can be interpreted either as a single variable, a single stimulus, or as a complex combination of multiple stimuli. Field theories take the latter approach. The gestalt movement assumed that the whole is greater than the sum of its parts. If that is so, it makes sense to consider how all the many, many different causal relations that happen at one time interact to produce an outcome. Field theories assume that theories should explore how all the different causal relations occur together. In this section two field theories are examined: the field theory of Lewin and Kantor's inter-behaviourism.

Lewin (1890–1947) was Jewish, like Koffka (gestalt psychologist, see above), and moved to America in 1933 when Jews in Germany were banned from working in universities. Lewin was already familiar with gestalt psychology. The following quote sums up the essence of Lewin's field theory:

> Whether or not a certain type of behavior occurs depends not on the presence or absence of one fact or of a number of facts as viewed in isolation but upon the constellation (structure and forces) of the specific field as a whole.
>
> (Lewin, 1939, p. 889)

Lewin suggested that behaviour is the result of different forces that result from a person's "life space," where that life space consists of all the different experiences and motives that make up a person. Lewin suggested that behaviour can be considered a path through this life space, and he gave a name to this space, *hodological space*. He was influenced by newly developed mathematics of topology and invented symbols to represent the various concepts in hodological space. In his most detailed publication of his theory (Lewin, 1938), he provided four pages of symbols used in the diagrams that he created to represent hodological space. This type of representation looks very scientific! However, looking scientific is not sufficient for success.

Although field theory naturally stems from gestalt principles, field theory was also developed by a behaviourist, Jacob Kantor (1888–1984). Kantor had worked with Skinner (see Chapter 4), whom he admired, but he felt that the interactional nature of behaviourism was not sufficiently developed (Morris, 1984). Kantor proposed a form of behaviourism called inter-behaviourism (Kantor, 1970). Kantor suggested there was a bidirectional causal connection between stimulus and response, instead of the single-directional, stimulus-causes-response approach taken by other behaviourists. Kantor's approach was described as ecological behaviourism. He suggested that the stimulus-response interaction took place in a context, and it was the context that was neglected in other behaviourist approaches to understanding behaviour.

The idea that there is a bidirectional causal relationship between stimulus and response was developed further in post-behaviourist theories of adaptation. Piaget suggested that motor skills develop through a process of feedback between responses and the consequences of those responses (Piaget, 1980). Control theory (see Chapter 4) is a theory of adaptation and has been used to explain purposive behaviour (Powers, 1978). The control theory diagram shown in Chapter 4 is reproduced as a reminder.

Field theories and theories of adaptation such as control theory share a common principle that it is not possible to isolate the organism and study it separately from its natural environment. The simple S-O-R theoretical sequence that seems so appealing and was developed from the earlier behaviourist S-R sequence does not provide a good theoretical model for explaining many aspects of behaviour. It is the interaction with the natural environment that is important.

The idea of understanding behaviour in terms of many simultaneous causal interactions is found not only in field theories of psychology: it is also the basic assumption of ecology. Ecologists study the mutual interactions of species in the total environment. Some argue that experimental studies fail to provide a true picture of the mechanism's underlying behaviour because they lack ecological validity. The term *ecological validity* means that findings from research applies to real life – i.e., the ecological setting in which life occurs. There is an implication that a valid or true account of human behaviour requires investigation in its natural setting, not in the laboratory, though a non-laboratory setting is not a requirement for ecological validity.

Field theories can be considered an extension of ideas first proposed by the gestalt psychologists. Sharps and Wertheimer sum up the contribution of the gestalt movement to modern psychology as follows:

> Several points for modern psychology emerge from the Gestalt perspective. Phenomena should be studied within their full context; there is a need to acknowledge the domain specificity of principles in experimental psychology; it is wise to study phenomena that either exist in the real world or have close real-world analogues; psychology must recognize interchanges between organisms and surroundings as determinants of behaviour."
>
> (Sharps & Wertheimer, 2000, p. 315)

Field theories in psychology are intuitively plausible. So why are they practically unknown? Students reading this book could ask fellow students whether they have heard of either Lewin or Kantor. Lewin and Kantor suggested *how* psychology theory should be constructed. The problem is they never demonstrated that this type of theory was able to solve problems that could not be solved by other existing theories – despite Lewin being committed to the practical use of psychology. The history of psychology is one where different people have advocated different types of psychology. If all that is done is to recommend a particular type of theory, then this advocacy eventually disappears. What is needed is a demonstration that the particular approach or theory can provide an answer not provided elsewhere. Despite the intuitive plausibility of what they were writing, neither Lewin nor Kantor were able to put their principles into practice, and the reason was they lacked a theory and a technology to put it into practice. That theory and technology has now been developed: it is called artificial intelligence (AI). The principles underlying AI will be described later in this chapter.

Life explained by network systems

What is the difference between a living organism and a dead one? This question is at the root of why emergent properties occur. Several explanations were provided for the difference between living and inanimate objects during the nineteenth and early twentieth centuries. A popular one was that living organisms have a 'vital force' that leaves them when dead. This idea of a vital force was used by Mary Shelley in her book *Frankenstein*. Shelley proposed that this vital force came from a newly discovered force, the force of electricity.

The psychologist William McDougall (1871–1938) had a number of interests outside psychology. In his last book, *The Riddle of Life* (McDougall, 1938/1939), McDougall reviews several explanations for the difference between living and inanimate matter. These explanations included animistic ones (such as that used by Mary Shelley), which McDougall dismisses as being unscientific. One of the explanations favoured by McDougall was that of Max Loewenthal who wrote about it in his book *Life and Soul*, published in 1934. Although Loewenthal strays into animistic theories, which McDougall rejects, Loewenthal makes the prescient suggestion that living organisms are different from non-living matter because of the way they are organised. Loewenthal's reason was this: snails can be frozen to –120 °C when they will appear dead but, if carefully thawed, they will come back to life. As a 'life force' or any form of energy cannot exist at such low temperature, Loewenthal suggests that life must have something to do with structure, a structure that is independent of temperature. The nature of this structure was not known.

It is now known that it is a particular type of structure that makes life possible. It is a network structure. Network physiology is a relatively new topic in physiology and is recognised as the defining feature of life (Ivanov, 2021). In addition, networks form the basis of artificial intelligence (AI). AI is made possible through the use of a parallel distributed processing (PDP) system. A PDP system is one where processing occurs simultaneously over the whole network. Network structures and parallel distributed processing are important concepts

ILLUSTRATION 10.1 Creating life from electricity.

in understanding psychological phenomena. Research and understanding of networks provide a solution to the problem that the gestalt psychologists failed to answer: how exactly are patterns recognised as a whole?

Networks and magic

Networks are intuitively difficult to understand because so many causal relations are occurring at the same time. It is easy to understand A causes B causes C. But it is not easy to understand simultaneous causes between multiple nodes in a network. However, one way of getting an intuitive understanding of networks is to consider a flock of birds. Birds form flocks that fly through the air, often in beautiful patterns. Have you ever watched a flock of birds and wondered how it happens? How is it possible that different species of birds form flocks in different shapes? It looks magical. Magic is simply a mechanism that is not understood. If you don't want the magic taken out of flocks of birds, skip the next paragraph.

The shape of a flock of birds is an emergent property. It is achieved because each bird follows a rule within a network formed by the bodies of the birds. The rules are slightly different between species, but they all involve some kind of copying of the behaviour of neighbouring birds. The shape and behaviour of the flock are achieved by all the elements of the network, that is the birds, following the same simple rule. The shape of the flock of the birds is an emergent property. It cannot be predicted from the behaviour of a single bird, only from the behaviour of the flock as a whole. If the brain (and body) is a network system, then there will be emergent properties that cannot be reduced to individual neurones. The network structure and its consequent emergent properties, therefore, provide an explanation for why psychology cannot be reduced to physiology. Psychology depends on physiology, in the same way that a flock of birds depends on the individual birds themselves, but there are psychological properties that cannot be predicted from physiology – assuming, of course, that the underlying structure is one of a network.

Clocks versus flocks

A mechanical clock (the sort with six cogwheels) is a sequential processing system. A flock of birds is a parallel processing system. If one cog in the clock is damaged or missing, then the entire clock stops functioning. If one bird in a flock of birds drops dead, then the flock continues without interruption. Sequential processing systems are sensitive to local error. Network systems are not. The fact that the brain has some, but not infinite, plasticity when damaged might suggest that there is some modularity and some connectionism in the way the brain works.

The natural way that humans understand their world is by examining the parts, i.e., the process of analysis, and then, if necessary, seeing how those parts work together. If 'the whole is greater than the sum of its parts' then this natural way of understanding is no longer possible, and what happens seems like magic. There is a way of understanding, however, using mathematics.

Artificial intelligence (AI)

The early history of the development of artificial intelligence (AI) includes two seminal works. One was the contribution of the behavioural psychologist, Donald Hebb (1904–1985); the other was the collaboration between the neuropsychiatrist Warren McCulloch (1898–1969) and mathematician Walter Pitts (1923–1969).

Donald Hebb published his book, *Organization of Behaviour: A Neuro-psychological Theory* in 1948. Hebb was interested in discovering what happened in the brain when learning took place, in particular the type of learning known as classical conditioning. Hebb knew that the brain was a network of interconnected neurones and came up with a simple proposition, a proposition now known as the Hebbian learning rule. The Hebbian learning rule is that if two neurones fire simultaneously, then the connection between those two neurones strengthens. The rule is sometimes stated by the slogan:

> Neurones that fire together, wire together.

Hebb showed that networks can adapt or learn if they follow rules. Several other rules were later developed to show how networks could learn.

Different types of learning rules

A distinction is made between unsupervised and supervised learning rules. The Hebbian learning rule is unsupervised in that there is no external agent giving feedback. Other rules can explain 'supervised learning' where the network learns to recognise patterns on the basis of feedback from a 'teacher.' Supervised learning explanations are used in several applications of AI, including pattern recognition and behavioural adaptation.

McCulloch and Pitts developed their ideas through the interdisciplinary collaboration of neuroscience and mathematics (Abraham, 2002). Inter-disciplinary developments can be some of the most important in the development of science. The McCulloch-Pitts model is based on a simple assumption (McCulloch & Pitts, 1943). Suppose there is a network of neurones that are either 'on' or 'off.' Then assume that this on-off state of a neurone corresponds to true-false in a logical argument. McCulloch and Pitts showed that variation in the connection strengths between the neurones in a network could produce on-off or true-false states that followed the rules of logic. The contribution of their approach was to show that networks could *solve problems*, simply by the connection strengths of the neurones.

The two pieces of the jigsaw, from Hebb and from McCulloch-Pitts, were put together in what become known as connectionist psychology (Ellis & Humphreys, 2020). A network system can learn and, in doing so, solve problems. In adapting to their inputs, networks can learn to function better in their environment. Connectionist psychology and artificial intelligence are based on the same assumption. The assumption is that, in order to understand or mimic the intelligence of a human, it is necessary to have a structure of a network where multiple, simultaneous causal connections occur. This network structure enables a type of causality called parallel distributed processing (PDP). Instead of processing occurring in a sequential pattern where one problem is solved after another, all the problems are solved at the same time. This ability of a system to solve problems in parallel creates capacities that cannot be achieved with a sequential processing system. One of these achievements is pattern recognition. Parallel distributed processing and the science of AI provide an answer to the question that the gestalt psychologists were unable to answer: what mechanism makes pattern recognition possible?

The Hebbian rule and reductionism

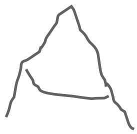
Hebb developed his rule to explain classical conditioning. If the rules of classical conditioning can be deduced from the Hebbian rule, then classical conditioning can be said to be reduced to the underlying physiological network structure (see Chapter 6). Most of the findings of classical conditioning can be explained as a consequence of the Hebbian rule, but not all. The phenomenon of spontaneous recovery cannot be explained by the Hebbian rule. It could be explained by another rule. The rule would need to explain why, in the classical bell-plus-food paradigm, ringing the bell without food leads to a decrease in salivation. However, if the dog is rested and the bell is rung again, salivation starts again. Can you think of a rule that would do this?

Pattern recognition

How is a pattern recognised? How do we recognise the letter A when handwriting differs so much between people? One way would be to have a series of templates, of different kinds of A. For example, the following shows the letter A using different fonts:

A A A A A

Any new letter could be compared with a storage bank of the letters A to see whether the letter was an A. The problem with the template approach is that it will recognise the letter A only if it has been seen in that format before. The templates here would fail to recognise a letter A that has never been written before, but which you, the student, will recognise as a letter A. Humans – and machines that mimic humans – are able to recognise the letter A in a format that has not been seen before. Pattern recognition requires an understanding of the relationship between the elements of the pattern – the relationship between the lines that make up a letter A, for example:



Pattern recognition devices, i.e., devices capable of recognising a letter even if that form of the letter has not been seen before – use neural network structure similar to that shown in Figure 10.4. Figure 10.4 shows only three input nodes, but there can be many more; and there can be many more between the input and output nodes. The input layer receives inputs from the external environment. Suppose the external environment is the letter A and the aim is to decide whether the picture is an A or some other letter. Each of the many input nodes receives a signal from that picture. Each input node is either switched on or off, depending on whether it is detecting a black part or a white part of the picture. The input layer therefore captures the information in the picture in binary, and the neurones in the output layer provide the answer – for example, whether the letter is an A or not.

Figure 10.4 shows that information is processed in parallel – hence a parallel distributed processing system, rather than a linear system where one logical process is followed by another. The perceptive student will ask, "But how *exactly* does this parallel distributed processing system provide the correct answer?" It does it by getting the correct strengths of connection between all four layers: the input, the two hidden and the output. The strengths of connection can vary and once they are *exactly* right, then the system will correctly recognise patterns as a letter A. The perceptive student will point out, "Yes, but how do you get the connection strengths *exactly* correct? The diagram looks incredibly complicated, and it looks like an

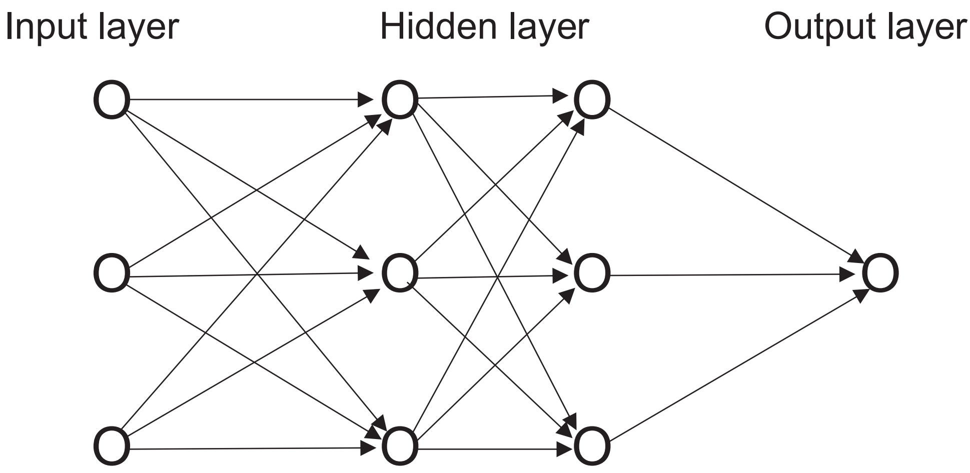


FIGURE 10.4 There are four layers of neurones: one input layer, two hidden layers and one output layer.

impossible task." The answer is that a human does not work it out. Instead, the answer is provided from a type of machine learning, called supervised learning.

Supervised learning occurs when a network adapts because of feedback. First, the network needs to be trained. Training is achieved by presenting the network with letters of the alphabet in different fonts, some of them being As, and providing the network with information about whether the letter is an A or not. Then, if the network adapts using a 'supervised learning rule' or algorithm, the connection strengths will gradually change so that they are just right to be able to detect whether a letter is an A or not. There are several different possible supervised learning rules, but they all provide a way of gradually changing the connection weights until they provide the correct solution. So long as the network adapts – i.e., the connection strengths change – in accordance with the learning rule, then, after training, the network will be able to correctly identify the letter A, whatever form that A takes. This form of learning is also referred to as 'deep learning.' Note that supervised learning is a form of feedback and is therefore an extension in concept of the simple control loop (see Chapter 4). Although Figure 10.4 has the appearance of an S-O-R sequence, training involves a feedback system.

Supervised learning or deep learning illustrates an important feature of artificial intelligence. After training, a machine will be able to perform tasks that it has not been programmed to perform. The human does not have to write the rules for task performance. The machine learns those rules by itself. In some cases, the machine is capable of learning something that the human has *not* been able to learn. The science of artificial intelligence was motivated by a desire to create a machine to do what humans are capable of doing. However, in creating artificial intelligence, scientists have been able to demonstrate *how* humans do what they are capable of doing.

Example of a learning rule

Supervised learning rules are based on mathematical rules and are beyond the scope of this book. Here is one example, called the back-propagation method. First, calculate the difference between the actual and desired output and multiply this by some function of the inputs to that output unit. This calculation creates an error term. Then, using that error term, adjust the weights of the connections from the penultimate layer in the network to the output unit. Repeat this procedure between the penultimate units and the layer behind them, and then repeat back through all the other network layers back to the input layer.

The human ability to recognise patterns, an ability demonstrated by the gestalt psychologists, is made possible because the brain uses the processing capacity of a network structure. Information is encoded in the connections between the nodes in the network – as Hebb originally suggested. When people see a hammer, they realise that it is used for hitting, and when they see a road, they realise that it is used for walking, because actions – i.e., affordances – are just some of the many connections in the network of information that is encoded in the brain. It is the network structure of the brain that gives humans (and other animals) the capacity to process, understand and respond to their environment in the way they do.

Modularity and connectionism

Cognitive psychology, like every other part of psychology, developed on the basis of assumptions. The assumption of cognitive psychology is that the information is processed in the brain in the same way that it is processed in a computer, that is, a sequential processing computer. This assumption forms the basis of Fodor's modularity approach to the mind. Information is processed in modules that have different functions (see Chapter 6). Each process is completed in a module before the next one takes place.

Connectionist psychology provides a challenge to the modularity theory of mind (Massaro, 1990). Suppose I ask you the question, "What is big, red, moves and found in London?" You may guess straight away, "a London bus." How do you do this so quickly? What you do *not* do is search through a module of all big objects, a module of all red objects, a module of all things in London, and find the one object that is common to all three. A computer could do it this way because a computer is incredibly fast, but it would take a human too long. People immediately realise "a London bus" because information isn't organised in modules. Instead, information is organised as a network of concepts, where concepts are nodes connected to other concept nodes with connections of varying strengths. The word *red* is a node connected to everything that is red. The word *big* is connected to everything that is big, and the word *London* is connected with everything in London. When I ask you "what is big, red, and found in London?" the connections from all three nodes become activated and the *combined activations* all link to one concept, that of a London bus.

Modern pattern recognition devices use the same logic. They look for connections, not for templates in modules. Evidence from neuroscience shows that the brain has the property of modularity. However, the example above shows that the brain also has the property of connectionism. Modularity and connectionism are not mutually incompatible. Gross differences in function – for example, problem solving versus balance – are organised on a modular basis and therefore amenable to physiological analysis. However, fine differences in meaning are organised on a network or connectionist basis. The brick wall and coalescence hypotheses presented in Chapter 2 were considered mutually exclusive hypotheses. By contrast, analysis and synthesis are complementary (see Chapter 6) ways of understanding the world. Both types of description provide information that the other cannot. The prefrontal cortex becomes active when a person solves the problem "What is big, red, moves and found in London?" The same part of the brain becomes active when a person solves the problem "What animal is large, white, and lives in the artic?" The module is the same, but the meaning within the module is different.

Connectionist or network systems are so complex that it is not possible to follow a causal sequence between the situation and behaviour. The complexity of network systems provides two options for explanation. The first is to have an entirely atheoretical explanation of the kind suggested by Skinner (see Chapter 4; see also Skinner, 1953, 1971), where particular types of input produce particular types of output, and there is no attempt to understand what happens between the input and output. The other is to interpret what happens in the network in terms of meaning. A network encodes meaning by the strength of the connections between the nodes of the network. The input-output connection can therefore be interpreted in terms of the meaning that connects them. It is this latter approach that is taken in psychology. Instead of trying to follow the causal sequence of neurological events, psychologists interpret those events in terms of meaning and changes in meaning. In summary, physiology creates meaning; however, meaning cannot be explained in terms of physiology, even though physiology and neuroscience contribute to understanding in other ways.

Networks in medicine

Modern Western medicine is based on principles of modularity. The body is composed of different modules – heart, lung, stomach, eyes, etc. Each of those modules can contain error, and the error creates disease. Disease is modular. The modularity of modern medicine is analogous to the modularity of a car. Each part sometimes needs repair. The technology of AI has provided considerable advances in the diagnosis and treatment of diseases within the paradigm of modularity. However, just as the brain is both a modular and network system, it is also possible to use the theory of AI to understand the body as a network system, and not only as a modular system.

In the last 15 years, there has been an increasing recognition that the body functions both as a modular and a network system (Ivanov, 2021). The neurological system 'talks' with the immune system and they both 'talk' with the endocrine and gastric systems, etc. Research within the medical network paradigm shows how a network system creates the comorbidities of disease (Bashan et al., 2012). Other research shows how stress alters the connection strengths between the nodes of the network in a way that is consistent with Selye's theory of stress (Gorban et al., 2021). More speculatively, it has been proposed that the body acts as a network system that exhibits properties of intelligence, and that intelligence is not only a property of the body's brain module (Hyland, 2002, 2011, 2017; Melidis et al., 2018). The medically unexplained symptoms of fibromyalgia can be explained using the idea that the body acts as an AI system that, under specific circumstances, produces error (Hyland et al., 2016; Hyland 2017).

Some symptoms cannot be explained by the pathophysiology of disease. AI provides a novel way of understanding these symptoms that are difficult to understand. William James (see Chapter 3) suggested that mental content has an adaptive function. The function of thoughts, feelings and symptoms is to alter behaviour so that people "prosper in the land." If those thoughts, feelings and symptoms fail to achieve their purpose, then an intelligent system might adapt by increasing the intensity of the mental content. If symptoms do not achieve their purpose, then over time the symptoms shout louder. This mechanism has been used to explain depression as the result of persistence in sad-causing behaviour (Hyland, 2020), the fatigue of chronic fatigue syndrome as the result in persistence in activity despite fatigue (Hyland 2011) and the pain of fibromyalgia as persistence in activity despite pain (Hyland et al., 2016; Hyland, 2017). The message of this approach is simple. Listen to what your body is trying to tell you because if you don't it might adapt and shout louder.

In conclusion, network science has become an important part of scientific development, not only to psychology and medicine, but also in ecology (Bodin et al., 2019) and elsewhere. It is a paradigm shift that has created not only a new technology but also a new way of understanding the world in which we live.

Do animals have consciousness?

If intelligence is a property of a network system and life is made possible due to a network system, it is impossible to escape the conclusion that animals have intelligence. Consciousness evolved to enable animals to control their environment through behaviour, so *all* animals that move have some degree of consciousness, and some more so than others. If one takes the moral position that cruelty to humans is fundamentally bad, then cruelty to animals is also bad. That principle of avoiding cruelty should apply to all animals, not just mammals. The reason that some Jain monks and nuns take special care not to kill insects is because they consider all life sacred. If you swat a fly, it is OK to feel sad at the complicated beauty you have killed, but flies spread disease and all life is to some extent competitive. The moral position is not straightforward.

The fourth industrial revolution

There have been four industrial revolutions. Steam power created the first industrial revolution during the eighteenth century. Electricity created the second industrial revolution at the end of the nineteenth century. The development of computers in the second half of the twentieth century created the third industrial revolution, it created the information age. The fourth industrial revolution has been created by the development of artificial intelligence (AI). Humans are just at the beginning of the fourth industrial revolution. The age of artificial intelligence has implications for psychology and psychologists and for the future of the human species

The first three industrial revolutions occurred because of novel technological developments: steam, electricity, computers. The fourth industrial revolution is different because is not a new technology. Instead, it is a new way of using an existing technology, the technology produced by the invention of computers. Computers, tablets and phones are sequential processing machines. What modern computers do is basically the same as what they did with the very first computers. They perform tasks one after another. They perform tasks one after another, they process information sequentially. However, modern computers are very, very fast. Because of their incredible speed, they can do the calculations that are needed to *simulate* a parallel processing machine. Parallel processing is complex but is simply a matter of mathematics. The sequential processing machine is sufficiently fast that it can give the appearance of doing the same tasks as a parallel processing machine. It is maths and programming that give modern devices the behaviour found otherwise only in living organisms.

Your phone, tablet and computer are not alive. An iPhone does not grow up to become an iPad. Unless there is a change in technology, the robots of the future will not be alive. If, however, it becomes possible to make a truly parallel processing machine in the way that humans are parallel processing, then one can certainly raise the question as to whether the machine is alive and should be granted the rights of 'wet' organisms. Science fiction has a strange way of becoming true. The communication devices used by the characters in the television program *Star Trek* seemed implausible at the time. Mobile phones are now taken for granted. It is impossible to tell what technology will be developed in the future but, for now, animals have rights that machines do not, and living machines exist only in science fiction. Even if living machines are never constructed, that still leaves a brave new world to be developed, a brave new world of sequential computing systems that create intelligent machines that appear, except for their hardware, to be just like living organisms.

This book is being written at the start of fourth industrial revolution, so anything written now will soon be out of date. At the time of writing Chatbots have been developed that will write student essays for them as well as perform other writing tasks at the press of a button. How this new technology influences education and assessment is yet to be seen. Nevertheless, it is possible to draw some general conclusions about the influence of AI on modern life that at first sight seem contradictory:

- AI has provided people with the ability to control their environments better.
- AI has provided the ability for one group of people to control the behaviour of another group of people.

Although AI is welcomed because it provides the sense of being in control (e.g., intelligent thermostatic control of rooms), the reality is that interaction with the online world also provides the opportunity for *your* behaviour to be controlled by others. Two groups of people are trying to control you. First, commercial organisations help select the information you receive using a variety of techniques including social influences. Second, governments try to control behaviour. The extent to which governments control behaviour depends on the political system. By their nature, autocratic regimes control behaviour of ordinary people, so autocratic countries are more likely to exploit the possibility of observing what you do and providing the information it wants you to receive. From a global perspective, authoritarianism is on the increase (Berberoglu, 2020). The new brave world of AI provides an additional challenge to the problem outlined in the first chapter. How do you know if something is true? As what you believe to be true depends on the information you receive, who controls the controller of that information? The implications for democracy are greater than ever, as AI will affect lives in ways that are difficult to predict. The last section of this book is written both in hope and as a warning.

The brave new world of social robots: implications for humanity

Whatever technology takes place, one thing does not seem set to change: human biology. Humans evolved over millions of years, most recently in the last 200 thousand years as hunter-gatherers living in small social-support groups. Human evolution as been influenced by group selection: the selective advantage where members of a species cooperate (Wilson, 1975). Humans are social animals whose survival has depended on cooperation. Humans are naturally social animals. One of the unique features of the human species is that the life cycle extends beyond the period of reproductive capacity. Post-menopausal women had a function in prehistoric times that is explained by the "grandmothering hypothesis" (Hawkes & Coxworth, 2013). Fossil evidence shows the existence of 70-year-old anatomically modern Palaeolithic people, but a much shorter life span for earlier hominids. In our evolutionary past, old people did not live alone. They were part of a group and their function included caring for and educating children while the young adults hunted and gathered. Children and old people were an essential and functioning part of past hunter-gatherer groups.

Humans are unique as a species in keeping other animal species as pets. Only some species qualify for pet status. Cows and alligators are not normally kept as pets. Pet ownership fulfils a psychological social need that comes from our evolutionary past. Older people living alone have better life expectancy and better well-being if they have a pet. Pet keeping is effective because humans anthropomorphise animals. Many dog owners treat their dogs as though they are humans and junior members of a family; dogs treat humans as though they are dogs and superior members of a pack. This generally works well even though it is based on mutual misunderstanding. Dogs and cats are cheaper to maintain and require less commitment than children. While pet ownership is increasing in the USA, the number of children being born is falling, though causality cannot be established (Aruah et al., 2019). Although pets are increasingly popular, pet ownership is not without its problems. In a study conducted in the UK in 2018, one-quarter of participants reported that they had bitten by a dog in their lifetime, and the incidence of dog bites was 18.7 per 1,000 population per year (Westgarth et al., 2018). In the UK, there are about 3.3 dog-related deaths per year; in the USA about 50 (Tulloch et al., 2023).

Pets smell, they cause nuisance to other people. Pets die, which makes their owners sad. For some people pets provide a solution to an unsatisfied psychological need, but they are far from ideal. Social robots have the potential to provide a far more satisfactory solution. Although existing pet owners would reject the idea, future sales of social robots will not be to existing pet owners but to a generation whose formative years were influenced by cartoon characters, video games and other paraphernalia of the digital world. Social robots have the potential not only to be good companions: they can also do jobs around the house, something that pets can't do. Just imagine having a friendly robot who will do the cooking and cleaning for you and chat to you when you feel like it. A social robot who uses the science of AI to get to know you and anticipate your needs. What more could you ask for?!

Clever Hans

Pet owners sometimes say to me that their pet understands exactly what they say. Clever Hans was a horse in Berlin at the beginning of the twentieth century who became famous for understanding speech and solving mathematical problems. In fact, horses, like other animals are highly sensitive to body movements and his owner was unintentionally providing cues that enabled Hans to solve problems by tapping out the answer with his hoof (Samhita & Gross, 2013). The 'Clever Hans effect' is an experimental bias where experimenters unwittingly give participants their preferred answer – technically known as a demand characteristic. Humans anthropomorphise animals and objects that move. It is a sad fact that, when a dog is stolen, the owner pines for their pet. In my village there is currently a reward of £10,000 for information leading to the return of a treasured family pet. Unlike a stolen human, a stolen dog will soon be perfectly happy with a new owner who may well be unaware of the dog's history. Dogs have a need to belong to a pack, and the new owner will fulfil that function just as well as the old – though knowing this is unlikely to be helpful for bereaved pet owners.

What should social robots look like? The 'uncanny valley' effect demonstrates a non-linear relationship between the human realism of a robot and likeability (Mathur & Reichling, 2016). People prefer robots that are recognised as non-human or robots. Robots that are almost human (i.e., imperfect humans) are considered creepy. So, a social robot should not necessarily resemble a real human being. The aim in designing a social robot is to elicit an appropriate response with something that cannot be mistaken for a human but is treated as a human. The social robots of the future may have two legs or four, they will have hands that can pick up and manipulate small objects. They will undoubtedly help with housework and do a lot more than robotic vacuum cleaners of today.

PARO was the first commercial social robot. It was designed to look like a baby seal, with soft fur, large eyes and large head in relation to body size and it responds to being touched. Research shows that interacting with PARO improves the well-being of older people and reduces pain in painful procedures (Geva et al., 2022; Wang et al., 2022). Other existing social robots (e.g., NAO and PALRO) are more recent and look more like a stereotypical robot. Human babies and children have large eyes and heads in relation to their body size as well as smaller noses than adults. These features can be exploited when conveying the psychological message of the social robot as a substitute child. In films, 'nice' aliens (such as E.T.) are portrayed as being the size of a child, with large eyes and a round head. The appearance and feel of a social robot are features that will be developed with future psychological research, but existing research shows how child substitute cues (big eyes, flat round face, small nose) are seen as positive.

Large eyes

Large eyes in a face function as a kind of unconditioned stimulus that produces a positive response. Have a look at eye size and other facial characteristics of 'nice' cartoon characters when you get an opportunity. Larger than real life eye size is a recognised characteristic in manga comics and anime films where female depiction creates an idealised female appearance that differs from the real women in Japan (where manga and anime originate from) (Wilson, 2002). Interest in romantic relationships by young Japanese males is currently low, possibly because of unrealistic idealised female representation (Ghaznavi et al., 2019).

PARO is more effective if it is switched on, compared with switched off (Geva et al., 2022), so the behaviour of the social robot is important. PARO does not talk, but in the future social robots will be able to recognise and respond to emotion with a mixture of physical responses and words. Emotionally intelligent robots are still at an early stage of development but theoretically there is no obstacle to their development (Marcos-Pablos & García-Peñalvo, 2022). Once social robots look appealing, are helpful around the house, and provide the kind of emotional support that people are genetically programmed to need, it is almost inevitable that people will want to own one. How will social robots affect people? People often speak to smart home devices (Alexa, Siri) in a manner that would be described as rude. Some researchers believe the trend towards casual rudeness can be prevented by the requirement for polite wake-up words (Williams et al., 2020). What is certain, however, is that once the technology has been developed, the socio-emotional characteristics of robots will be important to producing robots that people want to buy.

Competition between the manufacturers of social robots will create choice. Psychologists will become involved in robot design to provide that choice. Robot owners of the future will have a choice of robots with different body types, different types of faces, different types of pitch or accent (male, female, regional, etc.) and, perhaps most important, different personalities. One hundred years from now , it is likely that humans will be able to choose a social robot that is just the kind of person they would like to have as a companion as well as one that can cook and do chores around the house.

One way that social robots may affect human society is their influence on fertility and reproduction. Infertility problems are increasingly common, and the inability to conceive can be devastating for those involved. However, not everyone wants a child or is strongly motivated to reproduce. The global fertility rate is currently about 2.3 children per woman, but that rate has halved over the last 50 years. In advanced countries the fertility rate is far lower. In Japan (where social robots were first developed) it is 1.3 children per woman; in Germany it is 1.5 and in the USA 1.6. The world population of 8 billion is still rising principally because of the high birth rate in African countries. However, the United Nations predicts that the world population will peak below 10.5 billion in 2080 at which point it will start falling. It may start falling before then. Fertility rates decrease with technological development for a variety of reasons. The population of Japan has been falling for several years, and in other developed countries the only reason it is not falling is because of immigration. In China the fertility rate is 1.3 children per woman and has been low for 40 years due to the one child policy. However, even with the relaxation of that policy the rate continues to fall, and in 2023 India overtook China as the country with the most people. Social robots can help with housework and childcare, so why have a child when you can have a nice, reliable social robot that gives you all the emotional support you need? There will always be some people who have the innate desire to love a real child, but social robots will be one more factor that people consider when they decide whether to have a family. And if they do have a child, how will people develop if during their childhood they have been looked after by a social robot? There is a possible future of a rapid decline in numbers of humans, where young immigrants are welcomed with open arms and where the production of children is paid as a benefit to society.

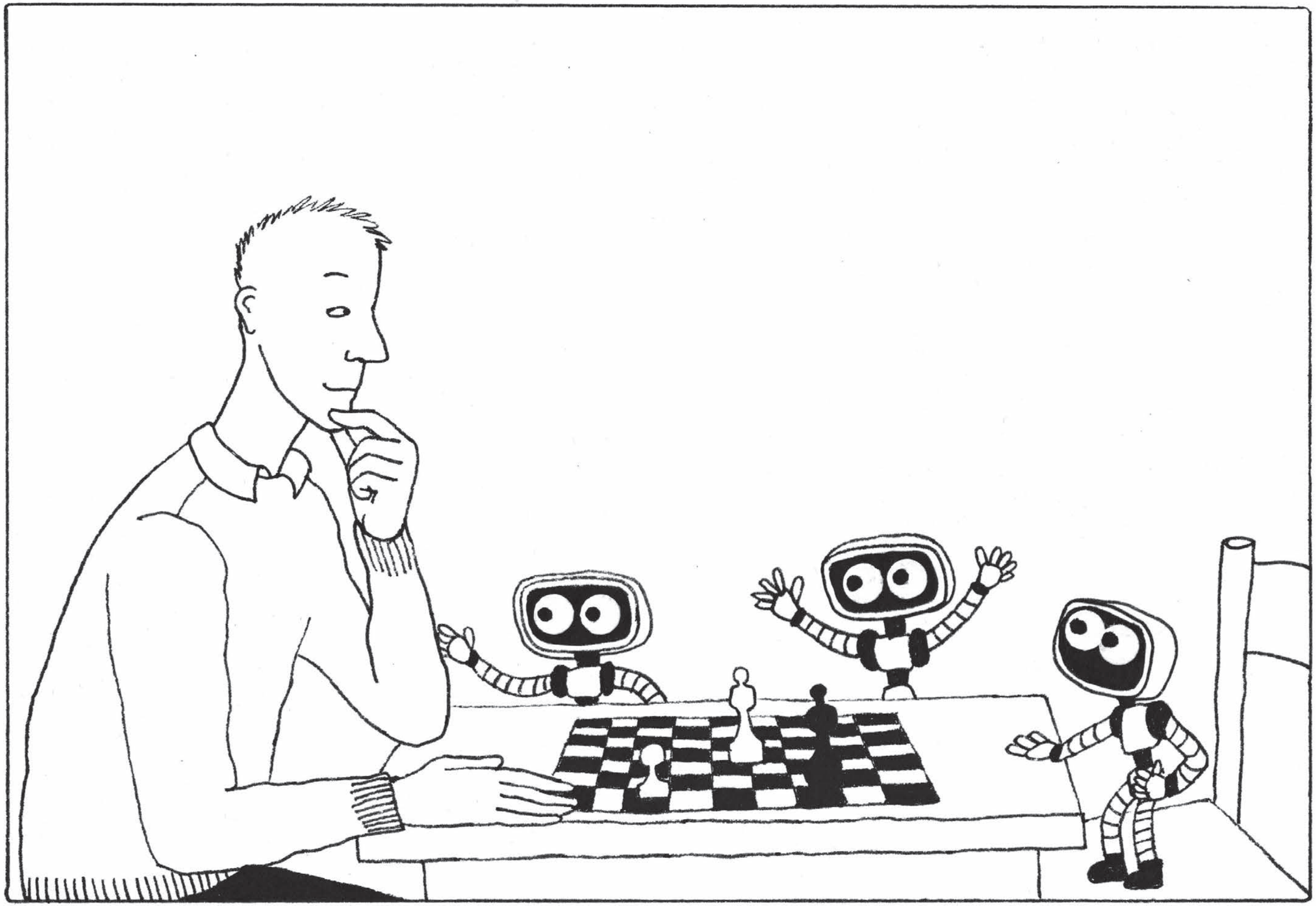


ILLUSTRATION 10.2 Fred having a night in with his young friends (date 2124).

Extinction of a species

The Neanderthals did not die out due to climate change (Timmermann, 2020). They became extinct because their fertility rate was too low. In fact, Neanderthals haven't disappeared completely, as about 3% of Neanderthal genes exist in many modern humans (Reilly et al., 2022). Nevertheless, anatomically modern humans are the last hominids on the planet, with several other prehistoric hominid species having become extinct. Ten thousand years from now, the population problem may be very different from what it is now. Environmental pollution contributes to infertility (Canipari, De Santis, & Cecconi, 2020). Will AI contribute further to a trend that could lead to the extinction of the human species? Evidence of increasing inexperience of heterosexual relationships in both Japanese males and females (Ghaznavi et al., 2019) is a clue to what may happen in the future. Japan is an important country to watch, as social trends in how people react to technology seems to happen there first.

Aldous Huxley's book *Brave New World* (1932) is set in a future where pain has been eliminated and everyone is happy because their behaviour is controlled by principles of positive reinforcement. Huxley envisaged a world where psychologists had created an 'ideal' society. The 'world controller' Mustapha Mond, one of the characters in the book, can be interpreted as a psychologist. The term 'brave new world' is used initially in a positive sense and then in a negative, ironic sense when it becomes clear what an empty and meaningless life this form of happiness produces. Huxley described his book as a negative utopia. The question that needs addressing is whether the development of AI will create a brave new world in the positive or negative sense? Will it create a utopia or dystopia? The development of social robots, which is almost certainly going to happen, raises the possibility of a world where social robots are programmed with algorithms that make their owners feel valued and loved, and where the intuitive understanding of real humans (see previous chapter) is a thing of the past. The development of social robots makes possible a world without empathy for real people, where caring for others in a true sense is absent and the fertility rate is dropping. On the other hand, social robots may be able to provide solutions to the many day-to-day practical problems that humans face without the adverse effects of unintended consequences. If you are elderly person living alone, why not have a helpful social robot? Only the future will tell what the fourth industrial revolution will bring: and we are only at the beginning.

Huxley wrote his *Brave New World* in 1932 because of concern about rising totalitarian societies, both fascist (in Germany) and communist (in Russia), that promised happiness but were in fact empty shells because control came at the expense of freedom. He wrote at a time when behaviourism was dominant. Like J. B. Watson's children, the children of Huxley's brave new world were raised without love. This and the preceding chapters have shown how psychology has changed. Over the course of its history, the theories of psychology have changed, and psychologists have developed a better and better understanding of the consequences of context and environment on human behaviour and happiness. That understanding is needed because AI is in the process of changing society and human experience. It can contribute or prevent the rise of authoritarianism that is a feature of the modern world (Berberoglu, 2020). AI is the fourth industrial revolution and the first industrial revolution since the birth of psychology. Psychology provides not only a science of the individual. It can also play an important a role in shaping society. Huxley's psychologists created a dystopia. By contrast, modern psychology has the potential to guide governmental decisions in a positive direction during the continuing development of the fourth industrial revolution.

Summary

The idea that 'the whole is greater than the sum of its parts' is the guiding principle of gestalt psychology. Gestalt psychologists showed how patterns, colour and the purpose of objects were perceived holistically rather than through an aggregation of their elements. Gestalt principles include figure-ground, closure, continuity, similarity and proximity. The colour brown is not in the rainbow but is a colour people can perceive. Principles of gestalt psychology were applied to learning, demonstrating the phenomenon of insight learning (all or none) rather than incremental learning. Field theories introduced the idea of reciprocal causation between situation and behaviour and this interactional perspective underpins theories of ecology. Research has ecological validity only if the findings in the laboratory apply to real life. Network theories in the 1940s and 1950s led to connectionist psychology in the 1980s and the development of artificial intelligence (AI). Life is made possible because of a network structure. Connectionism and modularity are two different views of the way the brain is organised. Information in a network is encoded in the connection strengths between the nodes of a network. AI systems can recognise patterns when a simulated network structure has been trained by feedback and the connection strengths between the nodes adjust gradually using the method of back propagation. Machine learning enables the machine to do things that have not been programmed by a human. AI is the fourth industrial revolution: it helps people control their lives but also allows people to be controlled by commercial and governmental organisations. The development of social robots is already underway. Social robots will influence the way people interact with each other and may influence fertility rate. The impact of AI on society is uncertain: it could be beneficial or contribute to humans becoming extinct.

Essay questions and discussion topics

1. What were the main achievements of the gestalt movement?
2. What is the meaning of ecological validity?
3. What is the difference between a living organism, a dead organism and a lump of clay?
4. What is machine learning?
5. What are the differences between modularity and connectionism and how these differences relevant?
6. Will social robots of the future be good for humanity?
7. How can psychology help create a more humane and better society in the future?
8. How is AI affecting democratic societies and how is it affecting autocratic societies? What may happen in the future?
9. What appearance, accent and personality would you choose for your social robot, who will help with the chores around the house as well as being an excellent companion? Or would you decide not to have one?
10. Which aspects of this lesson for life do you agree or disagree with, and can you explain why? Can you think of other lessons that might be drawn from this chapter?

> *Choose how you would use the technology of artificial intelligence. Consider what its effects would be on you and others around you. Be aware how others may try to influence you in ways that are helpful for them but not for you.*

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