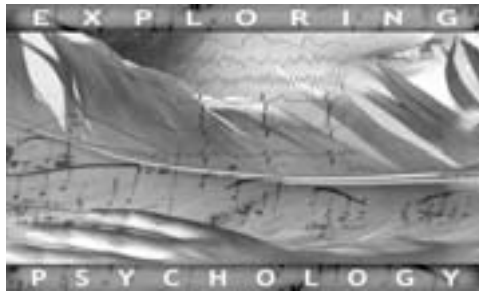# Mapping Psychology 1

We would like to dedicate this course to the memory of Brenda Smith, Psychology Staff Tutor and member of the course team, who died during the final year of the course's production. She had been a Psychology Staff Tutor since 1995, first in Scotland and then most recently in Ireland, but her close association with the Open University stretches back much further than this. She was an Open University student herself and then later returned to teach and was a tutor who enthused and supported very many students throughout their social science studies. At her funeral one of these students spoke very movingly of her warmth and energy and of the fact that she had really 'made a difference' to their lives. She certainly also made a difference to our DSE212 course team, where her commitment to education for mature students was clear in everything that she said and did, and her immensely hard work influenced many of our plans for the teaching and learning strategy of the course and the content of the texts. She contributed enormously at both a professional and personal level, particularly to the early work of the course team, and we hope that her influence on the course will shine through, helping it in turn to 'make a difference' to the lives of all the students who will study it in the coming years.

EXPLORING

PSYCHOLOGY

Mapping Psychology 1

Edited by Dorothy Miell, Ann Phoenix and Kerry Thomas

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Psychology in the 21st century

Ann Phoenix and Kerry Thomas

Contents

1   Orientation

Psychological ideas are popular in everyday life because the subject matter of psychology is people and, hence, ourselves. Even if you have never studied any psychology before, it is likely that you will have encountered psychological ideas in the media or in discussions with other people. Psychological research findings and their practical and professional application are regularly in the newspapers, on television, radio, and on the Internet. For example, the possible evolutionary origins of behaviour, emotions, consciousness and the brain, and the impact of various therapies, are all recurrent debates in the media in many countries. These public debates help to make psychology a very visible part of everyday life and culture.

   Yet, all this media coverage can confuse anyone wanting to find out what psychology is about because psychological knowledge is presented in a variety of ways. For example, 'common-sense' psychological ideas have long been presented in the media. A good illustration of this kind of common sense might be the topic of 'leadership', something that is commonly talked about in everyday language. Television, radio and newspapers often raise questions or offer un-researched opinions on leadership qualities, failures of leadership, why a historical figure was a charismatic leader or why some people seem to have the power to influence cults to engage in dramatic and often self-destructive behaviours. The media also can present rather dubious interpretations of psychology drawn upon largely to support the arguments journalists wanted to make in the first place, as when reporters contact psychologists hoping to get a ready quote about why holidays are stressful or why men hate shopping. More recently, however, and for our purposes more usefully, in many countries there are now books, articles, radio programmes and quite substantial television series dealing in a serious manner with psychological research and debate.

Activity 1

Try to think of examples of psychological topics you have encountered recently in the media. Write these down. Note your reactions to the way they were presented. Do you think they were handled in a serious, balanced way, giving relevant evidence, or were they treated in a superficial and perhaps journalistic manner? Have another look at these notes when you reach the end of this introductory chapter and see if you have changed your views.

As you work through this book you may find support for some of your ideas about psychology, but find that others are challenged because, not surprisingly, psychology is not entirely as it is portrayed in the media. We would like to welcome you to the study of psychology, and hope that by the time you have read this book you will be able to evaluate commonly presented psychological issues in an informed way.

Those of us who have written this book are excited by our subject matter. You will see as you go through the chapters that we have different areas of expertise and interest within psychology. One of the major aims of the book is to introduce you to that diversity and to invite you to share our enthusiasm. A discipline that encompasses such diversity and continues to be dynamic in producing new knowledge and new ways of looking at the world and human beings has much to offer.

1.1 Psychology has wide appeal

Some people will be doing this psychology course to consolidate earlier study and experience and to build a career. Others will be quite new to psychology as a formal research-based discipline. Some will have been stimulated to take a course in psychology by the well-publicized examples of research findings or psychologists at work that are presented in the media. Some will be coming to this course because of experiences in their own personal lives. This may be because they have been touched by especially difficult circumstances which they want to come to terms with, or because they feel the need to understand psychological topics such as identity, personality, relationships, intergroup relations or unconscious motivations. Others may have become curious about basic psychological questions such as how we perceive, the nature of memory, why we forget, and how we can understand the processes of learning. Psychologists working professionally, whether doing research or in their psychotherapeutic practices, can help us to think about such everyday issues.

Whilst no psychology course can promise definitive answers to all the questions in which you personally may be interested, the material in this first book, and the rest of the course, will increase your knowledge and your awareness, and provide ways of thinking about psychological issues of many kinds. In this introductory chapter we want to indicate how we have arrived at the contemporary, multifaceted discipline of twenty-first-century psychology and discuss some of the issues which psychologists debate and study.

Activity 2

Consider the suggestions we made about why people might be starting this course and then list *your own* reasons for studying psychology. Think about this question in some depth; don't stop at just one reason. Try to bring into mind anything that might be of relevance to you, especially at this particular point in your life. If you can, keep these notes until you reach the end of the course and then consider if, and how, the psychology you have studied has illuminated these original goals.

1.2 Psychology has social impact

The relevance of psychology to everyday concerns, and the ease with which it can be popularized and used, mean that psychological knowledge – some of it dubious, some of it accurate – is continually absorbed into culture and often incorporated into the very language we use. Examples of psychological concepts that have entered popular discourse include the notion that we are predisposed, both through evolution and through the functioning of our brains and nervous systems, to behave in certain ways and to have intellectual and emotional capacities and limitations. In many cultures psychoanalytic ideas are commonplace; for example, the centrality of sexuality and its repression, and the idea that Freudian 'slips' – mistakes of action – reveal unconscious motivation. Many people speak of having short-term and long-term memories and recognize that they use different strategies for remembering details of recent and more distant events. And a lot of people now know that it is possible to be fooled into perceiving illusions as real and that things as routine as face-recognition or behaviour-in-groups are extremely complex. Many people have absorbed and take for granted the psychological notion that what happens to us in childhood has an influence on our psychological functioning over the rest of our lives. Ideas about the importance of parenting and parental styles of child rearing have also become part of ordinary talk, with the result that some children now complain about not getting enough 'quality time' with their parents.

   These examples demonstrate also how psychological concepts have an impact on the ways in which we think life should, ideally, be lived. Such ideas, and many others, have been influenced by psychological research, even when they are ideas that are not widely recognized as psychological. Furthermore, psychologists are increasingly being called on to give expert evidence on questions as disparate as legal decisions and design issues. It would, therefore, be true to say that psychology has an impact on our beliefs about ourselves and how life ought to be lived as well as on our everyday behaviours.

So far we have highlighted a pathway of influence *from* psychology *to* society. But this is not a one-way street. It is certainly the case that psychological research quite often addresses questions that originate in common-sense understandings. And this direction of influence between psychology and ordinary, everyday knowledge about people has led some to suggest that perhaps psychology is no more than common sense. However, as a field of enquiry, psychology is about much more than common sense, particularly in the way it investigates its subject matter.

Psychological knowledge advances through systematic research that is based on consciously articulated ideas. And psychology is evidence-based. Psychologists may *start* from the knowledge they already have by virtue of being people themselves. This can be knowledge about people and psychological processes that are common in the culture or it may come from personal experiences of dealing with the world. It is these kinds of knowledge that are often called *common sense*. For example, one tradition in the study of personality began from the ordinary-language adjectives that everyone uses to describe other people's characteristics; this will be discussed in Chapter 5 ('The individual differences approach to personality'). And many psychological researchers have chosen research topics and studied them in ways that seem to reflect their own life concerns; you will find a clear example of this in the next chapter on 'Identities and diversities' (Chapter 1).

However, evidence-based research findings quite often contradict the common-sense understandings of the time, and can produce new understandings that themselves eventually become accepted as common sense. For example, in the middle of the last century, it was widely accepted in Western societies that infants should not be 'spoiled' by being attended to every time they cried. Consequently, they were expected to learn to spend time without adult attention. But a wealth of psychological research from the 1960s onwards has reported that even very young infants are able to interact with other people in far more sophisticated ways than had been thought. And it has been found that they develop best when they receive plenty of stimulation from the people around them and their environments more generally. The idea of leaving infants to cry or to spend time alone is now much less accepted than it was. Instead, the notion that they need stimulation has become part of ordinary knowledge about child rearing and generated a multimillion dollar industry in the production of infant educational toys.

Although psychologists may begin from 'ordinary' knowledge or their own preoccupations, they usually start formulating their research questions using the existing body of psychological knowledge (the literature) and the evidence-based research that their colleagues and co-workers are engaged in (see Box 1). Sometimes technological developments can lead to entirely new

research directions. These new directions might not have been envisaged through the application of common sense or using older evidence-based methods. One example of such a technology-driven new direction is *neuropsychology* and the increasing application of brain-imaging techniques as a way of furthering understanding of behaviour and mental processes. Other examples are advances in genetics and the decoding of the human genome, as well as computer-aided analysis of videotaped observations.

1   Using evidence: the cycle of enquiry

What do we mean when we say that psychology is an evidence-based discipline? The basic principle is that it is necessary to have some means of evaluating the answers to psychological research questions. Sherratt and her colleagues (Sherratt *et al.*, 2000) devised a 'circuit of knowledge' as a way to help students examine evidence and move away from common-sense reactions to psychological questions. We have used a version of this that we call the cycle of enquiry (see Figure 1).
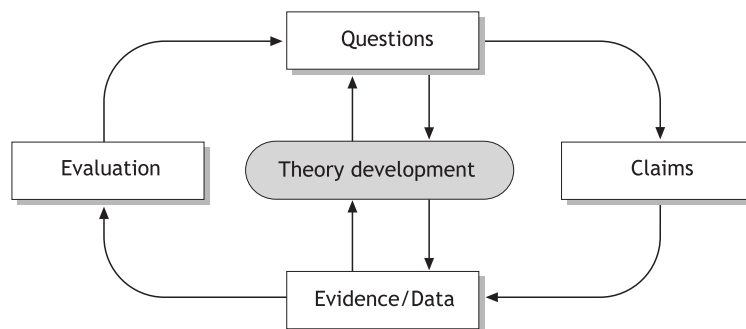
Figure 1   The cycle of enquiry (Source: based on Sherratt *et al.*, 2000, pp.17–18)

There are four elements in the cycle of enquiry:
1   Psychological research starts with the framing of appropriate, answerable *questions*.
2   The answers to these questions are *claims*. These claims have to be clearly identified so that they can be thoroughly assessed.
3   Assessing claims requires the amassing of information called *data*. The word 'data' is a plural word for the building blocks that make up the *evidence* that is presented in support of a claim.
4   The evidence then has to be interpreted and evaluated. The process of *evaluation* often generates new questions to be addressed as well as providing support for, or disconfirmation of, the original claims.

1.3 The diversity of psychology

Since psychology is concerned with the full range of what makes us human, it is not surprising that the scope of the discipline is extensive. Psychology has always been a diverse, multi-perspective discipline. This partly results from its origins. Psychological questions were asked first by philosophers, then increasingly by biologists, physiologists and medical scientists. The diverse origins of psychology are visible if we consider four 'founders' of psychology – all of whom produced influential work at the end of the nineteenth century and who will be mentioned in later chapters.

Charles Darwin, 1809–1882

Wilhelm Wundt, 1832–1920

William James, 1842–1910

Sigmund Freud, 1856–1939

In 1877, Charles Darwin, the biologist who later put forward the theory of evolution, was doing the first scientific infant-observation study, observing and writing about his son's behaviours and emotions in descriptive psychological terms. Darwin was trying to make inferences about what his baby's internal mental states might be, based on what he could observe 'from the outside'. Darwin went on to become a renowned biological scientist whose methods were essentially the painstaking collection, description, categorization and cataloguing of biological diversity. These were the data that later provided the evidence for his theory of evolution.

Wilhelm Wundt is considered by many to have started psychology as a formal discipline when he opened the first psychological laboratory in 1879 in Leipzig, Germany. He was interested both in philosophical and physiological questions and, as a result, advocated a range of methodological approaches to collecting evidence. His own methods included use of the *scientific experimental method*, *introspection* (asking people to think about and report on their inner feelings and experiences), and *ethnography* (observations of human culture).

William James, an American professor trained in philosophy, medicine and physiology, who published the influential *Principles of Psychology* in 1890, also advocated a multi-method approach that included introspection and observation. Sigmund Freud, the first psychoanalyst, was a medical doctor and research physiologist who opened his psychology consulting room in Vienna in 1869. Freud, working at the same time as Wundt and James, pioneered a method that involved listening closely to people's personal *accounts* of their symptoms, emotions, and their lives more generally, asking insightful questions and attending to the particulars of language use and unconscious phenomena.

The methods established by Darwin, Wundt, James and Freud – observation and description, experimentation, introspection and a focus on language – provided psychology with the beginnings of its diverse traditions. Some of these continue to be influential, whilst others have lost favour or been substantially developed.

Although psychology has diverse roots, psychologists with different approaches and methods have not always happily coexisted. There have been many heated debates about the scope of the subject matter and methods that can be claimed to be psychological. Many of the clashes have been about what can be thought of as 'real' or 'legitimate' evidence. But it has not just been individuals with their own inspirations and beliefs who have introduced particular ways of doing psychology. Different historical periods, cultures and countries generate their own assumptions about what to study and how knowledge, including psychological knowledge is, therefore, situated in time and place.

A graphic example of this concerns the impact of the Second World War on the development of Western psychology. Many Jewish German psychologists and others from German-occupied territories fled, some to Britain (for example, Freud), but most to the USA. These eminent psychologists brought their substantial influence – their ideas and European way of thinking about psychology – to universities in the USA where psychology was expanding. And then the horror at what had happened in Nazi Germany led some psychologists to direct their research to issues like authoritarianism, conformity, prejudice, leadership, small-group dynamics and attitudes.

It is not only cataclysmic events that have led to change and development in psychology. There have also been gradual cultural shifts in ways of thinking about how knowledge should be gained and evaluated. It is perhaps not surprising that different historical periods can produce dominant trends in psychology that occur almost simultaneously in different countries – no doubt influenced by international contacts between psychologists. It is striking, for example, how *laboratories* devoted to systematic psychological research were initially founded in several Western countries within about 10 years of each other (see Table 1). But the climate of thought can also be very different in different countries and the topics and methods of psychological research, at a given time, may be very different across different countries.

Table 1   **Foundation of early psychological laboratories**

Germany:	1879 (Wundt opened the first psychological laboratory in Leipzig)
USA:	1883 (American Psychological Association founded in 1892)
Denmark:	1886
Russia:	1886
Japan:	1888
France:	1889
Italy:	1889
Canada:	1890
Belgium:	1891
Switzerland:	1891
United Kingdom:	1891 (British Psychological Society founded in 1901)
Netherlands:	1892

Source: adapted from Zimbardo et al., 1995, p.6

In psychology, different historical times have also been characterized by the dominance of different methods and theories. For example, dissatisfaction with the limitations of introspection as a method of enquiry – resulting from the difficulty of reporting on conscious experience – gradually developed in the early twentieth century. This difficulty with the method of looking inward into the conscious mind and with the kinds of data that can be collected by this means led to the rise of *behaviourism*, which became dominant in the 1940s and 1950s. Behaviourism insists that psychologists should study *only* behaviours that are observable from the outside and should make no inferences at all about mental states and what might be going on inside the head.

Then, in the 1960s, there was a 'cognitive revolution', a rather dramatic phrase which describes what was indeed an important shift in thinking about psychology. Many (although not all) researchers in psychology began to take a greater interest in what goes on in the mind. This change of perspective led to what is known as *cognitive psychology*. The shift began with the study of learning, as you will see in Chapter 3 ('Three approaches to learning'), but became established as the study of information processing associated with mental activities such as attention, perception and memory. Researchers in cognitive psychology did not return to introspective methods but devised other ways of testing their ideas about mental processes. They have, for the most part, continued the tradition of using experimental methods but have adapted them to investigate what goes on in the mind; for example, by finding out how well people remember words presented in lists of related words (e.g. 'Fox' in a list of animals), compared with words presented in lists of unrelated words. A clear behavioural measure (the numbers of words remembered) can be used to make inferences about how the lists have been processed and how memory works. This scientific experimental method continues to be dominant within psychology.

More recently, there has been a second cognitive revolution; this time the shift being a broadening of focus from mental processes to studying how meaning is understood through cultural practices and language. As a result there are a variety of methods available to psychologists who want to study language and culture. And many psychologists who conduct experimental investigations of cognitive or social processes now also attend to participants' own accounts of their experiences.

All areas of psychology are increasingly concerned with investigating issues relevant to people's everyday functioning and their social and cultural contexts. The practical and professional application of psychology is important in many areas of life. Psychologists work as professional advisors, consultants or therapists in a range of settings such as education, the workplace, sport and mental health; and they increasingly research

areas of immediate practical concern such as dyslexia, stress, police interviewing of eye-witnesses, and autism. For many people, one of the most salient aspects of mental life is our awareness and experience of our own consciousness. In the last three decades there has been a revival of interest in our awareness of consciousness and the whole mysterious phenomenon of consciousness itself. It is proving to be a topic that can be studied from several different perspectives. For example, some approaches to consciousness are essentially biological, such as neuropsychological investigations of brain processes, some are cognitive, exploring mental processes, some are social, some are from humanistic psychology and some are from psychoanalysis.

So, whilst earlier traditions like psychoanalysis or behaviourism still contribute and produce important innovations, the discipline of psychology has continued to develop in ways which have fostered an ever broader range of perspectives. No one approach is either 'right', or adequate for answering all psychological questions. As a result, psychology is now seen as legitimately multifaceted, with many traditions working in parallel, and also drawing on other disciplines and their methods for inspiration. The chapters that follow in this book demonstrate this psychological diversity by covering identities, evolutionary psychology, learning, biological psychology, personality, perception and attention, experimental social psychology, memory, psychoanalytic psychology and humanistic psychology.

The second book in the course (*Challenging Psychological Issues*) covers a selection of topics in psychology (such as consciousness and language) that present a challenge for psychologists to study and that have been usefully examined from a number of different perspectives. The third book (*Applying Psychology*) presents examples of applied psychological research.

1.4 Exploring psychology: context and history

Since psychology is diverse, and has changed and continues to change, it is helpful for an understanding of the discipline to map these changes over time and illustrate the patterns of influence of people and events. For this reason we have constructed an interactive CD-ROM to accompany the course. We have called this *EPoCH* (i.e. 'Exploring Psychology's Context and History'). *EPoCH* is designed as a resource to give you an indication of the historical period and place in which the psychologists you study were working and provide some details on the individual people concerned. Making use of *EPoCH* should help you gain a sense of their historical location, the cultural influences on their thinking, how they group together in terms of direct contact and influence on each other, and also the impact

of traditions of psychology. *EPoCH* is essentially an exploratory resource. You will be able to navigate your own way through, following your own particular interests or researching a specific question. In this way you will be able to develop your understanding of how psychology has come to be what it is today. This resource will be especially useful to you as you read and study the commentary sections – the editorial discussions that follow Chapters 1 to 9 in this book.

Summary Section 1

- In many societies and cultures psychology is now a very visible part of everyday life.
- This book aims to increase your knowledge of psychology and provide you with the tools to think about psychological issues.
- In many countries psychology has an impact on policy, practice and culture in general.
- Psychological research and knowledge may sometimes be developed from common sense, but, as a discipline, psychology is different from common sense in that it is evidence-based and the result of systematic research.
- Psychology has diverse roots – in medicine, philosophy, biology, psychoanalysis and ethnography.
- Psychological knowledge, like all knowledge, is a product of different cultures, historical periods, ways of thinking, developing technologies and the acceptability of different methods and kinds of evidence.
- There is no single 'right' way to answer psychological questions: psychology, at the start of the twenty-first century, is a multifaceted discipline.

2   The breadth of psychological research

We have seen that psychology is an evidence-based enterprise and we have also seen that disputes about what *should* count as evidence have had an important impact on the development of psychology as a discipline. For example, the rise of behaviourism was driven by the idea that only observable behaviour is legitimate data for psychology because only data that can be observed by others, and agreed upon, can be

objective. Many other disciplines have had less trouble with this issue, partly because they have fewer choices about which methods to use, what kinds of data to collect and what kinds of evidence to accept. Think, for example, of mechanical engineering, chemistry or geology and compare these with psychology. The range of choices open to psychologists arises from the complexity of their subject matter – understanding and explaining humans and, to a lesser extent, other species.

Psychology is unusual because its subject matter (ourselves) is not only extremely complex but also reactive, and because we are inevitably involved in it, personally, socially and politically. This involvement is part of what fuels debates about how to do psychology and what counts as legitimate data.

This section will give some examples of how the unusual nature of psychology as a subject influences the practice of research. We shall look at the impact of our 'involvement' on how research questions are formulated, at the various kinds of evidence that could be used, and at the range of methods that are available to collect the evidence and to evaluate findings.

2.1 Researching ourselves

Psychology aims to provide understandings of us, as humans. At a personal level this closeness to our private concerns draws us in and excites us. However, since psychologists are humans, and hence are researching issues just as relevant to themselves as to their research participants, they can be attracted towards researching certain topics and maybe away from others. This is perhaps more evident for psychological research that is most clearly of social relevance. At a societal level all kinds of social, cultural and political pressures, explicit or subtle, can influence or dictate what kinds of psychology, which topics and which theories, are given priority and funding. Until relatively recently, for example, it was difficult to obtain funding for research that was based on qualitative methods. This was because there was an erroneous belief in psychology, and in the culture more generally, that qualitative research could only help in gaining very specific and idiosyncratic understandings of particular individuals and could not make any useful contribution to broader understandings of people and psychological processes.

At a more personal level, what might psychologists bring to their theorizing and research? Think about Freud. Many writers have speculated on what might have influenced Freud's work. One of his basic propositions was that all small boys, at approximately 5 years of age, are in love with and possessive about their mothers, seeing their fathers as frightening rivals. He called this the 'Oedipus complex'. We don't have to

think too hard to realize that there could be a link between Freud's idea that the Oedipus complex is universal (applies to all male children in all cultures) and Freud's own childhood. He was the eldest son of a young and reputedly beautiful second wife to his elderly father. In the next chapter in this book, Chapter 1 ('Identities and diversities'), you will meet another example, where the early personal life of the influential psychologist, Erik Erikson, may have affected his later theorizing about the difficulty of finding an identity during adolescence. This kind of personal basis for theorizing is why we have included biographical information on *EPoCH* and biography boxes in some of the chapters.

Freud and his mother (1872)

It is possible also that our desires, beliefs and ideologies define not only *what* we want to study but also *how we interpret our findings*. Bradley (1989) alerts us to this possibility in relation to the study of children when he argues that different theorists have found support for their own theories from their observations of children. This indicates that personal values and beliefs are important in influencing the ways in which we view the world. Suppose you were engaged in an observational study of the effect on children's aggressive behaviour of viewing aggression on television. If you felt strongly about this issue, your observations of the way that children play after watching aggressive programmes might be biased by what you believe. It would be difficult to be objective because your own feelings, beliefs and values (your *subjectivity*) would have affected the evidence. Personal prejudices, cognitive biases, 'bad days' and unconscious factors can affect what we 'see' when we observe other people. We shall see later in this chapter and throughout the book how the experimental method has endeavoured to minimize this kind of subjectivity, whilst other approaches – those concerned essentially with meanings and with people's inner worlds – have used subjectivity (people's reflections on themselves) itself as a form of data.

2.2 A brief look at different kinds of data

For a long time there has been a very important argument about what are the 'legitimate data' of psychology – what can and should be used as evidence. We have already seen that, from the very beginnings of psychology as a formal discipline, psychologists have used experimental methods, observations and introspection. In one form or another these methods continue to be central to psychology. The experimental method, adapted from traditional science, has most consistently been considered the dominant psychological method, providing data which can be 'seen from the outside' (outsider viewpoint) without recourse to introspection or people's own accounts of their mental states (insider viewpoint). However, as the research questions asked by psychologists have changed over time, research methods have broadened to include a range of different methods that produce different kinds of data. *Outsider viewpoints* gained from experiments and observations and *insider viewpoints* from introspection, interviews and analyses of what people say (and how they say it) all flourish as part of psychology in the twenty-first century. What *are* the legitimate data of a multi-perspective psychology? What can different kinds of data usefully bring to psychology?

A simple scheme can be used that divides the varieties of *data* into four categories.

Behaviour

First, for many decades, 'behaviour' has provided the most dominant kind of evidence – what people and animals can be seen to do. Behaviour can cover a very wide range of activities. Think about examples such as a rat finding its way through a maze to a pellet of food, a participant in a memory experiment writing down words five minutes after having done a memorizing task, a small group of children who are observed whilst they, jointly, use a computer to solve a problem, a teenager admitting to frequent truancy on a questionnaire. Some of these examples are behaviours that are very precisely defined and involve measurements – how fast the rat runs, how many words are remembered. This would be classed as quantitative research (i.e. with measurements and probably a statistical analysis). Other behaviours, such as the children learning to solve a problem using a computer, are less well defined but can be observed and described in detail, qualitatively (i.e. not measured and subjected to statistical analysis), or sometimes quantitatively (for example, when the frequency of particular actions can be counted up). The truancy example involves a *self-report* about behaviour that is not actually seen by the researcher. These particular examples of behaviours as data come from quite different psychological research traditions which you will learn about in the chapters that follow. The important point here is that behaviour is, in principle, observable – and often measurable in relatively objective ways – from the outside.

Inner experiences

A second kind of data is people's inner experiences, including their feelings, beliefs and motives. These cannot be directly seen from the outside; they remain private unless freely spoken about or expressed in some other way. Examples of these inner experiences include feelings, thoughts, images, representations, dreams, fantasies, beliefs and motivations or reasons. These are only accessible to others via verbal or written reports or as inferred from behaviours such as non-verbal communications. Access to this insider viewpoint relies on people's ability and willingness to convey what they are experiencing, and it is always problematic to study. This is because we often do not have the words to say what we experience, or we are not sufficiently aware of what we are experiencing, and/or cannot describe experiences quickly enough or in ways that others would understand. And parts of our inner worlds may be unavailable to consciousness. The psychoanalytic approach (which you will meet in Chapter 9) suggests, for example, that much of what we do is driven by unconscious motives, making it difficult

or impossible to give accounts of our motivations. An example of the kind of data that comes from the insider viewpoint is people's answers to the question 'Who am I?', which you will meet in the next chapter as a method for studying identity. Notice, however, that there is a paradox here. Although the data are essentially from the inside, the very process of collecting and interpreting the data inevitably introduces an outsider viewpoint. Sometimes the researcher can focus as far as possible on the subjectivity of the data – its meaning for the individual concerned – in effect, trying to see and think about the data 'through the eyes of the other'. This is what happens most of the time in psychoanalytic sessions. But for other purposes the researcher may stand further back from the individual and impose 'outsider' categories and meanings on the data. This, too, happens in psychoanalytic sessions when the analyst makes an interpretation of the patient's account from an outside, theoretical or 'expert' position.

Material data

A third kind of data is 'material' and provides more direct evidence from bodies and brains. This comes from biological psychology and includes biochemical analyses of hormones, cellular analyses, decoding of the human genome and neuropsychological technologies such as brain-imaging techniques. The data that can be collected from the various forms of brain imaging provide direct evidence about structures in the brain and brain functioning, enabling direct links to be made with behaviours and mental processes. For example, in Chapter 8 ('Memory: structures, processes and skills') you will read about different kinds of failure of remembering, each of which can be shown to be associated with injury to particular locations in the brain. A familiar example of material evidence is the lie-detector technique where the amount of sweat that is excreted under stress changes the electrical conductivity of the skin.

Psychologists at Birkbeck College, University of London, have pioneered a method of studying brain activity in infants as they attend to different pictures

The actual raw data are the measures of the amount of current that passes through the skin, but these data are a direct indication of the amount of sweat produced, which in turn is an indicator of stress and so assumed to be evidence of lying.

While participants are in a brain scanner, psychologists (or doctors) view their brains on a linked computer

Symbolic data

The fourth kind of data is essentially symbolic – symbolic creations of minds, such as the texts people have written, their art, what they have said (recorded and transcribed), the exact ways they use language and the meanings they have communicated. These *symbolic data* are the products of minds, but once created they can exist and be studied and analysed quite separately from the particular minds that created them. These kinds of data are used to provide evidence of meanings, and the processes that construct and communicate meanings. You will meet an example of this kind of data, and how it is used, at the end of the next chapter where the language – the actual form of words – used to describe an identity is shown to give a specific meaning to that identity. And the aim of the research is to understand the process of meaning-making rather than

understand the inner world of the particular person who spoke the words. The point about these approaches is that they see language as constructive – the speakers (or writers), those with the inside viewpoint, are not always aware of what they are constructing. In general we could say that this fourth kind of data is analysed from an outsider viewpoint that attempts to take the insider viewpoint seriously, but does not privilege it.

2.3 A brief look at psychological methods

We have looked briefly at the kinds of data that psychologists use as the basis for their evidence and we now offer an overview of the *methods* used to collect these data. Learning about methods is a skill necessary to building up psychological knowledge and moving beyond the base of common-sense knowledge about people that we all use. This section will outline the fundamentals of research procedures and provide you with a terminology – the beginnings of a research language that will help you to understand psychology as well as to evaluate research findings presented in the media.

   You will learn a great deal more about methods as you proceed with this book and the other parts of the course. There will be opportunities to try out methods in some of your assignments, and at the Residential School; and you will put together a 'methods file' of your project work and other material concerned with research methods. The first set of these methods materials will introduce the range of research methods typically used by psychologists, discussed in more detail than we can here. The course 'workbook' will also give you opportunities to consolidate your knowledge of the research process.

The beginning of the research process

What distinguishes psychological research from common sense is that psychologists approach information and knowledge in a systematic and *consciously articulated* way. They use rules and procedures about how to build and apply theories, how to design studies to test hypotheses, how to collect data and use them as evidence, and how to evaluate all forms of knowledge. (See Figure 1, 'The cycle of enquiry' in Box 1.)

   The start of the research process requires a gradual narrowing of the field. A topic has to be chosen, concepts have to be defined and the aims of the research have to be clearly specified. The process of

choosing a topic or area to research will be influenced by one of several factors that usually interrelate. In practice, researchers come to a field of study already constrained by many factors. They bring with them their personal concerns. They may be part of a research group where the topic is already defined and the project is under way. They are likely to be working with a particular set of theoretical assumptions by virtue of their location – in time and in a culture, a society, a particular university, and a particular interest group. Certain types of research question are fashionable; some attract funding, some don't. Researchers generally already have ideas about what would be an 'appropriate' theory. In other words, they have preconceptions about 'the nature of people', what would be a suitable question, and what would be acceptable evidence. What all this means is that research is done within a context that is made up of assumptions about the subject matter and the ways in which it should be studied. This kind of context is called a *paradigm*.

Researchers have to ensure that research is relevant and establish what research has already been done on the topic by examining the existing literature. This helps to ensure that they do not unintentionally repeat what has previously been done or found to be a dead end.

The research question itself has to be answerable; many questions about human psychology that might seem to make good sense could not usefully be researched. For example, the question 'Why do we remember?' is potentially interesting but it is not sufficiently precise to be the basis of a research project. It does not, for example, distinguish whether we should look for parts of the brain that are associated with memory, or consider the mental strategies that facilitate memory, or investigate the social and emotional motivations that make it more likely that we will remember some things rather than others.

However, we can ask a more specific question, such as 'Are different areas of our brain involved in remembering familiar, compared with unfamiliar, faces?' This question serves to guide us towards using the technique of brain imaging in an experimental setting – recording images of brain activity whilst the research participants try to remember either familiar or unfamiliar faces. It is then possible to formulate a *hypothesis* (a testable claim) about the relationship between brain functioning and memory for faces. We may, for example, hypothesize that more areas of the brain will be involved in remembering familiar compared with unfamiliar faces. Then we have to work out exactly what is going to count as a familiar, as opposed to an unfamiliar, face; for example, close family members in an ongoing relationship as opposed to people never before encountered. We also have to work out how the raw data of the brain images will be interpreted and how they will be used – will it be a

comparison of locations of activity or a measurement of the extent of brain activity? This process of defining concepts and making them useable in practice is called *operationalizing* the research problem.

Many areas of psychology require that researchers generate hypotheses before they start the process of research investigation. These are usually the areas of psychology and the traditions where research is already well-established. But in a new area or in a tradition where exploration and detailed description is itself the research goal, research begins without specific hypotheses. Darwin's work of describing, cataloguing and categorizing species is an example of research in what was then a new area, before any theory was devised and therefore without hypotheses. Since that time, his theory of evolution has generated many hypotheses which have been tested; some of these will be discussed in Chapter 2 ('Evolutionary psychology'). On the other hand, in Chapter 1 you will read about research on identities, some of which aims to understand how people think about their identities rather than test hypotheses about identity.

Once the research question has been devised and the problem operationalized, researchers then need to decide on the people they are going to include in their research – the *participants*. For the 'memory for faces' question mentioned above, the possible population for the research could be everyone in the country and it is obviously impossible to study them all. It is, therefore, necessary to work out what the *sample* should be. The researcher may, for example, have negotiated permission to ask for volunteers from a particular company. She may then define the sample as 'one volunteer in every 20', chosen at random. Since the volunteers will be undergoing brain imaging, each participant would be brought into the specialist hospital for access to the imaging technology. For this study, it is clear that brain imaging will be the method used to collect data and the data will be the actual images produced, although these images have to be 'read' and interpreted and converted into evidence.

The example above uses direct imaging which is a neuropsychological technique, but it is used as part of an experiment (i.e. comparing the effect on brain activity of viewing familiar and unfamiliar faces). The most commonly used psychological methods are experiments, questionnaires, interviews, psychological tests, observations, and meaning and language-based methods.

Experiments

Experiments, the most common psychological method, are used to try
to discover if there are causal relationships between *variables* (so called
because their values can vary). If, for example, the variable we
are interested in is the time taken for drivers to react to an emergency,
we may devise an experiment where we *manipulate* the noise levels
in their cars to see whether this has any impact. In this case, the noise
level in the car will be the *independent variable* and the driver's response
time (a behaviour which we hypothesize is dependent on in-car noise
levels) will be the *dependent variable*. This sort of experiment may take
place in a driving simulator in a laboratory or on private roads. In an
experiment, there are often two groups of participants: a *control group*
that is not subjected to the manipulation of the independent variable
and an *experimental group* that is subjected to the manipulation. In the
example here, the control group may not be subjected to any in-car noise
at all. Findings from experiments are analysed statistically. Psychologists
using experimental methods have a number of techniques at their
disposal to ensure that they do not simply find what they expect or what
they want to find. These include *random allocation* to groups where
the researcher does not choose whether a participant goes into the
experimental or control group, and '*blind scoring*', where those who
score a participant's behaviour do not know which group the participant
belongs to.

Questionnaires and interviews

If we are interested in what people think or feel, or in behaviours that are
difficult to observe in humans, we need to *ask* people about themselves.
This is a variant on introspection, in that researchers are not looking inside
themselves but are using the best possible means to obtain other people's
introspections. Psychologists do this through both questionnaires and
interviews. Many of you will have filled in questionnaires from market
researchers on the street or at home. *Questionnaires* are written questions
designed to elicit short answers or choices between options. They can be
completed whether or not the researcher is there and so can be used with
thousands of people in a study. For this reason they are usually tightly
structured, with questions asked in an invariant order and often with the
range of possible answers worked out in advance so that the data can
easily be entered into a computer for statistical analysis.

　　Interviews are face-to-face conversations between a researcher and an
interviewee or group of interviewees. Since they are face-to-face, samples
used are usually smaller than for questionnaires. Interviews can be
tightly structured (as for questionnaires) or more open-ended. They can,

therefore, be analysed either quantitatively and statistically, or qualitatively, where researchers transcribe tape-recordings of the interviews, read them repeatedly and analyse their themes.

Examples of questionnaire and group interviews

Psychological tests

The most commonly used *psychological tests*, such as intelligence tests
and personality tests, are highly structured forms of self-report where
participants have to solve problems or choose from fixed alternatives on a
questionnaire. Researchers then work out a score for each participant that
gives information about their intelligence or personality. These tests are
different from ordinary questionnaires in the way they are constructed and
pre-tested. They are tried out on large numbers of people before being
used as research or diagnostic tools. This gives a picture of how the test
scores are distributed across the population for which the test is designed.
It is, therefore, possible to compare a particular individual's test scores
with the average from the population and to make statistical comparisons
between different groups. You will learn about these tests in Chapter 5
('The individual differences approach to personality').

Observations

Observations are the most direct method of getting information about
people's behaviour. In everyday life we all frequently observe other
people. Psychologists have devised a range of methods for systematically
observing other people. These range from participant observation through
to highly structured and targeted observations. In *participant observation*,
the researcher is part of what is being observed and writes up notes
whenever possible. Sometimes these notes include an insider viewpoint
account of how the researcher is feeling. A well-known example is that
of Rosenhan and seven collaborators in the 1970s who, although not
ill, feigned mental illness and managed to get themselves admitted to a
psychiatric hospital (Rosenhan, 1973). Once in the hospital they behaved
'normally', i.e. as they would in the outside world. They kept notes of all
they observed (outsider viewpoint) and what they experienced (insider
viewpoint), including the experience of having their 'normal' behaviour
and talk interpreted as evidence of their mental illness. (They had a lot of
trouble getting discharged from the hospital.) The data from observations
such as these are analysed qualitatively, paying attention to meanings and
to the place of the researcher in the observation.

   In more *structured observations*, researchers may have clear categories
of behaviour on which they know they want to focus. They may choose a
specific individual such as a target child in a school, perhaps counting the
number of times that child makes a friendly approach to another child and
noting down what is said. They may also observe through a one-way mirror
so that they are not visible to the people being observed and, hence, do
not interfere with whatever is being observed. These kinds of observations
can be analysed either quantitatively and statistically, or qualitatively.

Meaning and language-based methods

In recent years many psychologists have become interested in language as an important human 'product' (the symbolic data described in Section 2.2 above). There are various ways in which psychologists analyse conversations, data from interviews and written texts. One of the most popular methods is *content analysis*, which involves counting up the prevalence and sequencing of certain words, sentences, expressions, metaphors, etc. in texts such as newspaper articles or transcripts of interviews. It can also be used to identify the types of explanations people give for their own behaviour or use in order to persuade people to support them or agree with their argument. It is predominantly a quantitative method.

Another popular method is *discourse analysis*. This is a qualitative method that provides detailed analyses of exactly what language is used and how it is used. For example, discourse analysts would try to identify the rhetorical devices by which we all as speakers seek to persuade each other of our arguments, and the functions served by various discourses. Discourse analysts do not aim to find 'the truth' about how people use language. They are more interested in the processes whereby people construct meanings socially and individually. Most discourse analysts are interested in subjectivity – people's own sense-making – and often include an analysis of the researcher's own subjective understandings as part of the analysis of data, thus using a mixture of insider and outsider viewpoints. Discourse analysis is an example of a *hermeneutic* approach. Hermeneutic approaches focus on meaning-making; that is, the work of interpretation. People are treated as meaning-producers, with the task of the psychologist being to interpret meanings. Hermeneutic approaches, therefore, tend to use qualitative methods (rather than measuring variables, taking group averages and drawing conclusions with the help of statistics as in experimental and other quantitative methods). The data they produce tend to relate to particular individuals in specific contexts, rather than generalizing to a population as a whole.

Different paradigms and different methods

These different methodologies alert us to the fact that psychology is not just one enterprise, but a series of interlocking enterprises in which psychologists have different views about the best ways to try to understand or explain people and their behaviour and experience. These are arguments about *epistemology*; that is, what questions to ask, what sort of evidence to look for, what sort of criteria to use to evaluate explanations, and what sort of methods to use.

All knowledge and all efforts to gain knowledge operate in a context, a set of connected and compatible assumptions about what exists and the way to gain knowledge of it. And we have already seen that research is done within a paradigm, which is a philosophical framework made up of assumptions about the subject matter and the ways in which it should be studied, including the methods and the kinds of data that are considered to be legitimate. The doing of psychology within a given paradigm will, in this book, be referred to as a *psychological perspective*. The coexistence of different perspectives means that there are debates between psychologists operating in different paradigms, as Peter Barnes explains:

> *By now you will have gathered that there is no one approach to the study of psychology – each approach has its advocates and each has attracted its critics. At any one time some approaches are in the ascendant while others are in the doldrums. Different views exist on what subjects are worthy of investigation – and even on whether it is possible to investigate them – and these, too, have fashions.*

> *(Barnes, 1985, p.28)*

The chapters which follow build on this brief review of methods, in that each chapter highlights and discusses particular 'featured methods' that are important to the area of psychology being written about – at the same time as providing detail of studies that have contributed to the area. These featured methods will allow you an opportunity to get to grips with the kinds of methods that are characteristic of different paradigms in psychology.

Research methods will be taught elsewhere in the course, including booklets in your methods materials, on video, in your statistics book (Dancey and Reidy, 2002) and in the workbook. There are research projects so that you can try different methods as part of your assignments and at the Residential School. You should keep your methods materials all in one place in a ring binder.

2.4 Ethical considerations

Since psychological research is mostly done on people and animals, it is often the case that the observations or experimental interventions that a psychologist might want to make have the potential to harm participants and hence raise ethical issues. Furthermore, consequences that might not be directly undesirable for the participants might raise more general ethical principles to do with moral standards and values. Psychologists have increasingly become aware of ethical issues and recognized that psychological research has sometimes been ethically questionable.

An example from the middle of the last century illustrates this. Between 1959 and 1962 Professor Henry Murray, a personality theorist, carried out a series of experiments on 22 undergraduate men at Harvard University in the USA. These were designed to measure how people respond to stressful interpersonal confrontations during mock interrogations. The aim appears to have been to understand which types of men were likely to be able to withstand brainwashing and interrogation in situations of war. Murray had been engaged in work relevant to this issue during the Second World War. Participants were volunteers who were given a small fee and simply asked if they would be willing to contribute to the solution of 'certain psychological problems'. They were placed in brilliantly lit rooms, filmed through a hole in the wall, and were connected to electrodes that recorded their heart and respiratory rates. While the students had been told that they would be debating their views with another undergraduate, they were actually faced with an older, more sophisticated opponent who belittled their values, making the students feel humiliated and helpless, and rousing them to a great deal of anger. After spending approximately 200 hours as research participants, they were still not clear what the research was about. Chase (2000) suggests that even 25 years later some of the participants recalled how unpleasant was the whole experience. More seriously, however, one of the participants in these experiments was Theodore Kaczynski, who became a student at Harvard in the spring of 1958, when he was only 15 years old. He was later to be nicknamed 'the Unabomber' for mailing or delivering 16 parcel bombs to scientists, academics and others over a 17-year period, killing three and injuring 23. Obviously, it is not possible to say what effect, if any, taking part in Murray's study had on Kaczynski. However, one of his major resentments against scientists was because he felt that they were trying to develop techniques for controlling people's behaviour.

It is not clear whether or not Murray's research has been applied to the control of behaviour by any governments. However, in the 1970s, Tim Shallice (an influential British cognitive psychologist) argued that psychological research on sensory deprivation has been used by governments (including the British government in Northern Ireland) to devise successful methods of preparing prisoners for interrogation. In sensory deprivation experiments, psychologists study the effects of depriving people of sensation by, for example, confining them in isolation in a bed or suspended in a warm water tank. Participants may be kept in the dark or in a room with either no sound or constant 'white noise' – which sounds rather like a radio turned on, but not tuned into any station. Most participants become anxious and disoriented after between 3½ and 10 hours in these conditions, with some reporting nightmares afterwards. According to Shallice, such research proliferated because it has been funded by the military. Shallice (1972, p.385) argues that there should be 'more stringent

editorial control of papers on sensory deprivation in order to reduce the chances' of their being misused to break the resistance of prisoners. There have, therefore, been areas of psychological research whose application raises difficult ethical issues.

In the Murray study, and arguably in sensory deprivation experiments, the potential psychological benefits of the study are far from clear. However, ethical concerns have been raised about two rather more famous US experiments, the findings of which many psychologists see as invaluable. In the 1970s, Zimbardo set up a mock prison in his psychology department. He then randomly assigned Stanford student volunteers to 'guard' or 'prisoner' status. In an experiment designed to last two weeks, the 'guards' became so harsh and the 'prisoners' so distressed that the

Stanford prison experiment: dejected 'prisoner'

experiment was terminated after six days. This experiment is discussed further in Chapter 5 ('The individual differences approach to personality'). Follow-ups over several years showed no apparent long-term ill effects of the experiment (Zimbardo *et al.*, 1995). Although the experiment is often praised for its dramatic demonstration of how easily people could fall into 'bad gaoler' or 'victim prisoner' roles in socially produced situations, the question of whether it is ethically defensible to put people into such situations is still hotly debated. For example, would it be possible to arrive at these findings in other ways?

Similarly, Milgram's classic 1963 experiment, on the relationship between obedience to authority and aggression, continues to stimulate ethical debate. His study was an attempt to research a complex social behaviour, compliance with orders to be aggressive to another person, by taking it out of a real-life context and bringing it into the psychological laboratory. This is an example of research informed by a concern to understand the atrocities committed during the Second World War. Participants were told that this was an experiment to test the effect of punishment on learning. The person to whom they believed they were administering shocks was actually Milgram's confederate who pretended that he was being shocked. The real participants (who were non-student men) were 'instructed to "move one level higher on the shock generator each time the learner gives a wrong answer"' (Milgram, 1974, pp.20–1). Of the 40 participants, 26 continued obeying the orders of the experimenter to the point where

Stanley Milgram, 1933–1984

they had administered what they believed were potentially fatal shocks (by pushing two switches labelled 'XXX' on the control panel which were beyond the switch labelled 'Danger: Severe Shock'). The participants were told afterwards, in what is known as a *debriefing* session, that they had not inflicted any pain, but many of them, after realizing the implications of what they had been doing, became extremely upset. However, Milgram (1974) sent a follow-up questionnaire to his entire sample and 92 per cent of them returned it. Only 1 per cent of them reported that they were sorry to have participated in the study.

The ethical dilemma raised by this study concerns whether its potential benefit in helping us to understand how human beings can commit atrocities against each other outweighs the stress and pain it may have caused. Milgram believed that the participants in his series of experiments demonstrated a parallel psychological process to Nazi guards' obedience to authority in Germany in the Second World War. He considered that his studies were 'principally concerned with the ordinary and routine destruction carried out by everyday people following orders' (Milgram, 1974, p.178).

The dramatic findings from both Zimbardo's and Milgram's studies suggest that it is all too easy for negative aspects of human behaviour to be demonstrated. However, they also show the force of the experimental setting and the power of authoritative researchers to control the behaviour of participants. The experiments brought to light very important issues about the ethics of psychological studies. They raise the major, and difficult, issue of whether the findings of studies justify the possible ill effects which they produce on participants.

Milgram's study informed decisions by both the American Psychological Association and the British Psychological Society to make ethics central to their prescriptions about research. In Britain there was a further impetus in the late 1970s. A psychology department was prosecuted for allowing a postgraduate student to observe the predatory behaviour of cats on canaries when the department had never had a licence to keep canaries for research purposes. There is no doubt that psychological research can lead to harmful effects on humans and animals. Ethical debates, the explicit consideration of the ethics of each research project and the provision of ethical guidelines are the ways in which psychologists attempt to address these problems. The move in the late 1990s by the British Psychological Society (and a little earlier by the American Psychological Association) to change the term used for those who take part in studies from 'subjects' to 'participants' reflects a greater concern for ethics in terms of respect of individuals.

The British Psychological Society (BPS), along with psychological societies around the world, has produced ethical guidelines for the conduct of research. (You will receive a full copy of the BPS *Code of Conduct, Ethical Principles and Guidelines* to keep in your methods file.) Any psychologist who breaks these guidelines is subject to disciplinary action. Box 2 provides an extract adapted from a recent version of these BPS ethical principles for work with human participants. The British Psychological Society and The Experimental Psychology Society have together agreed guidelines for research with animals. It is usual practice now for all psychological research to require ethical approval from an appropriate group.

2   BPS Ethical Principles for Conducting Research with Human Participants

- The experimenter should consider the ethical implications of their research and the psychological consequences for their participants. In order to do this, they may need to consult people who belong to the group from which their participants are to be drawn (bearing in mind gender, ethnicity and age, etc.). Ethics committees or colleagues used to considering ethical principles should assess the risks and the costs/benefits of research.
- Wherever possible, investigators should inform their participants of their objectives and all aspects of the research that might reasonably be expected to influence their willingness to participate, especially any potentially negative consequences.
- Investigators must ensure that they obtain informed consent and ensure that if anybody cannot give informed consent (because they are too young or learning impaired), their parents or guardians give informed consent. Participants should be told that they can withdraw from the study at any stage and that this includes the right to have their data destroyed after the data are collected.
- The experimenter should consult with experienced and impartial colleagues about any proposed deceptions or encroachments on privacy.
- Deception or withholding information from participants should only be used when other means would damage a study that is likely to produce valuable results. Impartial advisors should assess whether the potential value of the study justifies the deception.
- The experimenter should consider the risks of stress or encroachments on privacy; and should emphasize the participant's right to withdraw from the experiment should they so wish at any point in the study.
- Data obtained from participants must be treated as confidential.
- Studies on non-volunteers (e.g. those who are observed in public places without their knowledge) must respect their privacy and their psychological well being.
- The experimenter should maintain the highest standards of safety. Participants must be protected from physical and mental harm caused by research. The risks to a participant should never be greater than any they would normally encounter in their everyday lives.
- Participants must be able to contact the researcher after they have participated in a study to report any stress they have experienced. In such cases, the researcher must take steps to avoid causing similar stress to other participants.
- Research on children should only be carried out with the informed consent of the children if they are able to give it and with informed parental consent.
- If a participant asks advice on psychological problems, care must be exercised in giving answers and if necessary the participant should be referred to professional advice. Researchers should not exceed their professional

competence (e.g. by giving advice if they are not therapists or experts on the advice needed).

- Participants should be debriefed properly and informed about findings etc.
- Research should not help to produce social inequities. It should, therefore, not stigmatize or patronize people on the basis of age, social class, gender, sexuality, disability status, 'race' or ethnicity.
- The researcher must ensure that all their associates, employers or students comply with these standards.
- Any psychologist who believes that another psychologist is breaking the above rules should try to make the other rethink their ideas and, if necessary, consult other psychologists.

Source: adapted from British Psychological Society, 2000, pp.8–11

Note that the last but one item in the extract above states that *students* must comply with these standards. This includes you. All Open University students, during their project work at home and at Residential School, must comply with the BPS ethical principles.

Psychology has changed since the 1960s and 1970s when Murray, Milgram and Zimbardo conducted their studies. Today, however, psychologists are still faced with ethical issues, many of which are subtle and difficult to foresee.

For example, in a research project on mothering, one of the authors of this chapter conducted an interview where the mother's husband was present. While this was not ideal because the interview was meant to be only with mothers, it was very difficult to obtain interviews in this study and so the researcher felt that every opportunity had to be seized. The session seemed to go very well and the mother appeared frank and forthcoming. However, at the next interview with the mother, a year later, the husband put on his coat as soon as the researcher appeared. When the mother asked where he was going, he explained that he was not going to stay to hear her 'winding him up again'. The previous interview had clearly raised issues for their relationship. With hindsight, it may have been ethically preferable for the researcher not to have done the interview with the father present – even though the mother had been very keen to continue. Or, rather than only concentrating on the mother, it may have been better to include the father in the interview since he was there. However, any interview can raise unanticipated ethical questions since just talking about topics can raise unexpected issues for participants in research.

To take another example, suppose you are doing a non-participant observation of an infant with his/her mother, in a naturalistic setting (the

home) where the older sibling is also in the room, playing. What happens if the mother puts the infant in the crib and then goes into the kitchen but the older child immediately comes over and rocks the crib so violently that the baby is in danger of falling out? What do you do? It would be usual to intervene to avoid harm to the baby and probably that is what you would do. But then you would no longer be a non-participant observer – you would have entered the action and would be affecting what you were supposed to be recording. This could constitute an ethical dilemma. Alternatively, what should a researcher observing a family do if, having promised confidentiality to a mother, she sees a child obviously drunk and carrying a vodka bottle? It is normal good practice, in research and therapy, to assure the participants or clients of confidentiality, but with the explicit proviso that the researcher or therapist has a duty of care if the participants or clients are seen to be in danger of serious harm or harming others.

The above examples may seem simple in that they were not directly caused by the psychologist but were problems that arose within the research setting. (Note, however, that the mother in the infant observation example may have left the older child with the infant only because there was another adult in the room, who, the mother presumed, would intervene if necessary.) But these examples also illustrate that psychologists have to consider ethics when they make research choices about what to do, how to do it and how to analyse it. In other words, psychologists face ethical dilemmas in all aspects of how they conduct their research. For example, psychologists' approach to working with animals has changed enormously; when the authors of this chapter were students it was not uncommon for undergraduates to do research with animals. While this has become generally unacceptable, and many psychology departments no longer have animal laboratories, animals are still used for some research on learning and on brain functioning – although advances in neural imaging and computer modelling of brain functioning have made the use of animals in psychological experiments much less necessary. When animals *are* used now, ethical guidelines require that psychologists demonstrate that they could not do the same research without using animals and that the animals used are not subjected to any more pain or discomfort than is absolutely necessary. However, some people undoubtedly find any use of animals in psychological research unacceptable.

The question of deception often raises ethical dilemmas. Yet, it is not always ethically indefensible for psychologists to deceive the participants in their studies (as is clear from the British Psychological Society ethical guidelines). For example, it is common for memory researchers not to tell their participants in advance *what* they will be expected to remember during the tasks they are given or even that they are taking part in a memory experiment. This is because telling participants what they will be

asked to remember is likely to change the way they approach tasks and, since this minor deception does not result in harm, psychologists generally consider it acceptable for this form of deception to continue. But memory researchers now consider it ethically important to reveal any deception that has been used to the participants after the study, during a process of debriefing.

Similarly, experimental social psychologists frequently do not tell their participants exactly what is being studied or the basis on which they have been selected. For example, in a well-known experiment (which you will read about in Chapter 1), Henri Tajfel and his colleagues (1971) randomly assigned boys to groups. However, they told the boys that they were being divided on the basis of their liking for the paintings of either Klee or Kandinsky, to make the participants think that amongst them there were 'two sorts of people'. This is not usually considered ethically problematic. However, some social psychological experiments raise potentially more troubling ethical issues. For instance, some psychologists stage minor accidents (such as someone tripping up and falling over in apparent pain) in order to observe helping behaviour. While there may be important benefits from understanding what influences helping behaviour, the psychologists doing the research have to weigh up whether the potential benefits of the study outweigh the distress that may be caused to passers-by. And all psychological research should offer, or be ready to offer, professional support for participants who might become distressed. This also applies to the researchers, who may in some situations require support themselves. It is important that researchers think about, and take care to remain within, their own competence levels, thus not exposing their participants or themselves to situations which they, the researchers, may not be able to deal with.

Activity 3

Look back at the description of the Murray study at the beginning of Section 2.4. Using the ethical guidelines presented in Box 2, note down how the Murray study contravenes current ethical principles. Having done this, consider how the interview described in the mothering study above might fail to fit with the guidelines. The fact that this interview situation is not a clear-cut example should help you to see some of the difficulties involved in making ethical decisions in psychological research.

Psychologists have also become increasingly conscious of ethical issues in professional practice. The importance of ethics has been underlined by the large number of psychologists who now work with patients or clients in the helping professions, business settings, forensic psychology or other roles (see the third course book, *Applying Psychology*). In the consulting

room, patients or clients are often in distressed or in dependent states and are particularly vulnerable. Ethical issues around confidentiality, data protection and the legal status of case notes also now contribute to the level of awareness that professional psychologists need in order to work within their professional guidelines and their national codes of conduct. Since ethics are important to psychology, we have highlighted examples of the ethical issues raised by psychological research in the chapters that follow. Try to keep the British Psychological Society's ethical principles in mind as you think about the studies you encounter.

Summary Section 2

- Because the subject matter of psychology (ourselves and non-human animals) is complex and reactive, psychologists have to choose from amongst a wide range of methods.
- Psychologists make use of methods that aim to maximize objectivity; they also use methods that focus on and explore subjectivities and meanings.
- Depending on the topic they are researching, psychologists can choose to adopt an outsider viewpoint or an insider viewpoint.
- During the research process, psychologists collect data and use it to arrive at evidence for their claims. Four different types of data are used by psychologists from different paradigms: behavioural data; personal accounts of inner experiences; material data such as biological and neuropsychological data; and symbolic data.
- The research process starts by isolating a sufficiently specific and answerable question. In some studies it then involves choosing an appropriate method(s) which will provide data to test the claim or the hypothesis underlying the research.
- Some research projects do not begin with a specific question or a specific hypothesis but are about understanding meanings.
- The most commonly used psychological methods are experiments, questionnaires, interviews, psychological tests, observations, and meaning and language-based methods.
- Psychological research is conducted within a paradigm – a framework made up of assumptions about the subject matter and ways it should be studied, the methods and data that are considered to be legitimate.
- Contemporary psychologists work in different paradigms: the doing of psychology within a given paradigm will be referred to in this book as a psychological perspective.
- Ethical issues are a major factor in psychological investigations and practice.

3   Mapping psychology

The above sections will already have made clear to you that psychology is a diverse, multifaceted discipline, with numerous sub-disciplines that draw on different traditions and whose boundaries and definitions change over time. And these different areas of psychology are, to varying extents, interconnected. This all adds to the excitement of studying psychology and the experience of gradually seeing the pieces of a jigsaw fall into place. But the first step towards creating a coherent picture may seem a little daunting. Building a jigsaw into a meaningful whole requires a strategy. How can we *start* the process of mapping the discipline of psychology?

This section describes the strategies we have used in this first book as we set out to *map* the discipline. The second book in this course (*Challenging Psychological Issues*) takes five important topics in psychology and examines how different perspectives used in psychology can, each in their own way, contribute to our understanding of these complex issues. The third book (*Applying Psychology*) illustrates the practice of psychology in professional settings and shows how psychology can be used to understand problems such as stress, bullying at work, and detecting lying in legal evidence.

3.1   Navigating your way through the chapters in this book

The first step for us as authors was to choose a set of topic areas. Each of those we have chosen is important in its own right within the discipline of psychology; and as a set they address a range of the complexities of people and how they are studied. The particular topics we have chosen also provide an opportunity to discuss a number of more general themes and issues that are important across psychology. We have selected nine topic areas (such as learning, personality, and memory) for this first book, and each is allocated a chapter (Chapters 1–9). These are not meant to be the sum total of what makes up psychology, but this selection is a substantial and representative sample of the variety of psychological topics. So *the first aim of the book* is to introduce you to the diversity of psychology by presenting, chapter by chapter, the findings – the established knowledge – on a variety of topics central to psychological enquiry.

These particular nine topics taken together also introduce most of the major perspectives in psychology; this is *the second aim of the book*. By

the end of this book you will have encountered cognitive psychology, experimental social psychology, biological psychology, evolutionary psychology, behaviourism, sociocultural psychology, personality measurement, psychoanalytic and humanistic psychology. Two other areas of what might be considered the 'core curriculum' of psychology are covered elsewhere: language is one of the topics in our second book; and child development is the subject of another Open University level 2 course, although there is material on development over the lifespan in our second book. Different perspectives, as well as different topics, tend to be associated with different methods, so the set of topics we have chosen for the current book demonstrates a substantial range of methods for obtaining data and evaluating evidence – this is *the third aim of the book.*

Overall, a consideration of the nine topics provides you with the tools for understanding very varied psychological concerns and the methods psychologists use. But chapters have to be presented in sequence, at least in the first instance. So how, as authors, did we set about placing these nine topics into a coherent story? We have set out to present the material in an order that enables you to build up your knowledge gradually. For that reason we have taken care to start from common, everyday experiences and, wherever possible, to illustrate theories with examples you are likely to recognize from your own experience. Since psychology is an evidence-based discipline, it is important that you learn about psychology both as a body of knowledge and as a discipline that constantly changes through research. We therefore want you to understand and appreciate the diversity of questions that psychologists ask and the variety of research methods they use to gain evidence with which to evaluate their questions and answers. The ordering of the chapters is designed to teach you, in manageable steps, not only about current psychological knowledge but also about *how psychologists do psychology.*

In putting the nine topics into a sequence, we have also been careful to keep hold of important strands of psychological thought, old and new. But this is *not* a story driven by history. When a historical approach is used it can mistakenly make it sound as if psychologists are making steady progress from their early, sometimes rather clumsy, attempts at studying particular aspects of people towards a single 'right answer' exemplified by what has been studied most recently. Instead, we weave the topics into a story of how psychologists have tried to understand the complexity of the subject matter. The list of topics and chapter titles is shown in Table 2.

Table 2   **The sequence of chapters in Book 1: Mapping Psychology**

Introduction: Psychology in the 21st century

Chapter 1: Identities and diversities

Chapter 2: Evolutionary psychology

Chapter 3: Three approaches to learning

Chapter 4: Biological processes and psychological explanation

Chapter 5: The individual differences approach to personality

Chapter 6: Perception and attention

Chapter 7: Perceiving and understanding the social world

Chapter 8: Memory: structures, processes and skills

Chapter 9: Person psychology: psychoanalytic and humanistic perspectives

The order we have chosen is an exploration beginning where you as a person already are and asking the fundamental question: 'What is it is that makes you the individual that you are?' This is the study of 'Identities and diversities' (Chapter 1), which is concerned with understanding what makes us uniquely ourselves. The chapter discusses a range of theories and methods social psychologists have used to address this issue. It starts from your understandings of your own identities before presenting the work of identity theorists.

In Chapter 2 we move on to the question of what makes us as humans both different from and similar to non-human animals by focusing on the burgeoning area of evolutionary psychology. This chapter ('Evolutionary psychology') moves from considering how we are unique as individuals to how humans came to be unique as a species. It focuses on how understanding of our evolution as a species, over an enormous period of time, can illuminate current, everyday human behaviour. As a result, some of the methods it uses are rather different from those used in other areas of psychology.

Whilst evolutionary adaptation and change are extremely slow, adaptation and change also happen within each of us in our lifetime – through the process we call learning. In Chapter 3 ('Three approaches to learning') we look at different aspects of learning in humans and animals, and consider how we are similar to and different from animals.

In Chapter 4 ('Biological processes and psychological explanation') we explain and illustrate how a biological perspective is essential to understanding behaviour. New developments in neuropsychology made possible by the development of brain-imaging techniques, as well as more established methods for studying the brain and nervous system, are discussed.

The notion of measuring and mapping differences and similarities between people, in particular their personality traits, is explored in Chapter 5 ('The individual differences approach to personality'), introducing and evaluating the methods used to do this. In Chapter 5 we build on the material in Chapter 4 by considering possible biological origins of personality and by addressing the question of the heritability of personality. And, as in Chapters 2 and 3, the crucial role of environments is explored, in this case the impact of people's environments on the development and expression of their personalities.

The next three chapters (6, 7 and 8) present psychological knowledge that has been gained primarily through the use of experimental methods. In these three chapters the focus is on the processing of information and on cognition. Chapters 6 ('Perception and attention') and 8 ('Memory: structures, processes and skills') present the perspective known as cognitive psychology. Chapter 7 ('Perceiving and understanding the social world') bridges social psychology and cognitive psychology, presenting a topic called social cognition. Chapter 6 helps to build up psychological ideas about how we see the world. It focuses on the structures and processes that underlie our essentially similar (universal) abilities to attend to and perceive (by hearing and seeing) the world. Chapter 7 continues the theme of perception, but, whereas Chapter 6 examines the general processes of perception of the material world, Chapter 7 looks at how these processes operate when we perceive other people. It considers what happens when we try to work out why other people behave as they do, and when we perceive aspects of the world that are emotionally loaded or require complex judgements.

Chapter 8 introduces research on memory structures and processes. It demonstrates how remembering is fundamental to everyday learning, to constructing our identities and making sense of others. This chapter also shows how processes of remembering are dependent on the way the brain works; and that memories are reconstructed and not necessarily accurate or complete. The chapter considers both what we share with other people (the processes of memory) and how our own memories can be unique.

The last chapter of the book, Chapter 9 ('Person psychology: psychoanalytic and humanistic perspectives') is rather different from all the others in the extent to which it places its emphasis on whole individuals and their motivations and experiences of being themselves. It reconsiders aspects of both personality and identity introduced earlier in the book, and looks at the influence of both conscious and unconscious parts of our minds through a discussion of psychoanalytic psychology and humanistic psychology. By doing this it returns to the question 'Who am I?' with which we began in Chapter 1, but from different perspectives and using different methods from the other chapters in the book.

3.2 Issues and debates in psychology: the editorial commentaries

The nine chapters that follow are written either by single authors or by several authors working together. These authors have presented and evaluated their topics, choosing their material and demonstrating the methods that are typically used and the kinds of data that are typically collected. But between the chapters you will find additional, short commentary sections. These editorial 'commentaries' will have three functions, designed to help you to build an overall map of the discipline.

The first function of the commentaries is to highlight a range of theoretical debates arising from the different perspectives and their traditions, as they appear in the chapters. References will be made to the *EPoCH* CD-ROM which you can explore in order to set the historical traditions in their contexts.

The second function of the commentaries is to explore issues around the methods psychologists use in their studies. Three particular method-related issues are discussed as they feature in the chapters:

1   The tensions between holistic approaches to people (as in the study of identity) and a focus on more specific psychological processes (like perception).
2   The uses of insider or outsider viewpoints and the kinds of data that are collected.
3   Issues about which level of analysis to use to explain particular psychological phenomena. For example, the phenomenon of memory can be studied at different levels of analysis. It can be approached from the level of neuropsychology, or cognitive processing, or cultural practices – or perhaps all of these – each giving its own, different insights.

Finally, the commentaries will carry and discuss *themes* that are set up in the early chapters but are relevant to all the chapters of the book, themes that underpin the different ways we explain humanness. One of these is: What makes us distinctively ourselves in comparison with other humans? Another is: What makes us different from other animals? Should we see people (and non-human animals) as relatively fixed or as essentially flexible, with the capacity to adapt to circumstances and to develop and change? Yet another theme is a familiar psychological issue, closely related to that of our adaptability: How – in what ways – are we the product of *nature* (our genetics and biology more generally) *and nurture* (our experiences in environments – physical, social and cultural)?

These three functions of the commentaries help to build up a map of the discipline of psychology in its diversity and its connectedness, showing

how the perspectives in each chapter interrelate with those in other chapters.

By the time you have finished this book you should have made a good start on mapping the diversity of psychology and understanding that it is possible to subdivide psychology in a range of ways. We hope that you enjoy the journey.

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during the development of this chapter in particular, and wish to thank all members of the team for their valuable contributions. Where similar issues and debates have been discussed in earlier courses, the strengths of these previous formulations are built on, and so we would also like to thank the previous course team (DSE202: *Introduction to Psychology*) and its Chair Ilona Roth for making material, and their reflections on it, available to the current team.

CHAPTER **1**

Identities and diversities

Ann Phoenix

Contents

▉ Aims

This chapter aims to:

- consider what is meant in psychology by the concept of identity
- present three types of psychological identity theory
- introduce the concept of embodied identities
- outline the reasons for divisions into 'personal' and 'social' identities in some theories
- indicate why a focus on identities requires a reciprocal focus on diversities
- introduce some of the methods used to study identities.

1 Introduction: identity as an everyday psychological issue

Identity is an area of psychological study that is centrally concerned with understanding people and their everyday lives. An interest in identities and how to understand them is far from new. More than a century ago, William James (1890) produced a psychological theory of identity. However, identity is now a popular topic of discussion in many contemporary societies, in everyday talk, in the media and in several academic disciplines. Yet, since it is used in a range of different ways, it is frequently not entirely clear what it means. Psychological theories of identity aim to define identity and to explain the processes that produce it.

1.1 The scope of the chapter

Identity often seems to be an obvious and everyday issue and there are some simple methods for researching it. Yet, psychologists have found that identity is more complex than it seems to be. As a result, they have devised various theories to help them understand it. This chapter considers some of the main research methods and theories that psychologists use to help them think about identities.

   The rest of this section introduces a technique, the Twenty Statements Test, that can easily be used to study identities. Section 2 considers how the fact that we all have a body is likely to affect our identity – sometimes without our being conscious that it does. The chapter then moves on to

consider how we can understand identities by discussing three influential psychological theories. Section 3 is concerned with theories that have addressed personal identity in social context, referred to as psychosocial theories. Section 4 presents a theory of social identity: Social Identity Theory. Section 5 examines theories of the social construction of identities, which make no distinction between personal and social identities. The final section (Section 6) considers how well the theories of identity considered in the chapter can help us to understand the identities of people with physical impairments.

1.2 Describing ourselves

It is likely that all of us at some point will think about who we are. Although it can be difficult for us to define ourselves with precision, we each have implicit ideas about the behaviours that typify 'me'.

Activity 1.1

Without thinking about it first, quickly jot down 10 words or phrases you might use to answer the question 'Who am I?' When you have done that, note how you think one of your close friends would describe you and then, if you have time, how a family member and then a distant acquaintance would describe you. Give yourself 10 minutes to do this activity.

Keep your notes, as you will return to these later in the chapter and again in Chapter 5.

Comment

When you compare the different words or phrases you have written, you may notice some similarities between the way you would answer the question about who you are and the ways in which you think others might describe you. You may also notice that you seem to be a different person in different contexts and depending on who you are with. Indeed, you may be struck by contradictions between who you seem to be in one situation and who you seem to be in another. This may have led you to wonder which of the characteristics you put down are the 'real' you, or you may, alternatively, have felt confident that there are clear and consistent answers to the question 'Who am I?' If your answers included 'I am not ...', this links with the arguments of identity theorists who generally agree that an understanding of who we are also requires an understanding of who we are not. When you look at your answers, you may be surprised at the wide range of characteristics you ascribe to yourself. Whether we have one real identity or many and whether or not identity is consistent from situation to situation are both issues which psychologists debate.

This exercise may have raised questions for you about what the difference is between 'self', 'identity' and 'personality'. Psychologists view these terms as interrelated. The process of categorizing the 'self' (which you have just done) can be said to be a building block of identity; for if we consider that we fit into a particular category, that aspect of the self becomes part of our identity. Identity can be understood as our own theory of ourselves, created from many sources. These include what we consider to be our characteristic ways of acting (our personalities) and our relationships with other people who react to us in particular ways and give us indications of how they think of us. Personality is frequently measured without reference to how people actually describe and see themselves, whereas identity requires that psychologists take account of this.

The exercise you have just done employs a similar method to one used by some psychologists to help them gain insights into how people think about themselves (see Box 1.1).

1.1 **FEATURED METHOD**

The Twenty Statements Test: an introspectionist method for studying identity

Nineteenth-century psychologists considered that it was the ability to reason and think that differentiated human from non-human animals. They therefore wanted to study people's minds. Because no-one can read other people's minds, they had to find a way of gaining indirect access to mental processes through their own and other people's verbal reports. This method, called **introspectionism,** was used by both William James and Wilhelm Wundt (two 'founders' of modern psychology). However, introspectionism fell out of favour because it is difficult for any of us to be entirely conscious of all our mental processes, to remember them or to put them into words accurately so that they can be clearly understood by others.

Introspectionism
Method for gaining indirect access to people's mental processes through their verbal reports.

Yet, since it is psychologically informative to understand what goes on in people's minds, many psychologists have continued to devise methods to gain access to what people are thinking. One such method, referred to as the 'Twenty Statements Test', was devised by Kuhn and McPartland (1954). This was a simple pen-and-paper method designed to make explicit people's thinking about their identities. Kuhn and McPartland gave the participants in their study 12 minutes to write down 20 answers to the question 'Who am I?' They then divided the answers into categories based on the most common responses. People doing the Twenty Statements Test often give answers that can be categorized into:

- *characteristics* such as gender or age;

- *social roles* in terms of relationships to other people (e.g. 'I am a father'; 'I am a secretary');

- *personality* (e.g. 'I am a happy person');
- *interests and tastes* (e.g. 'I am a fan of popular music');
- *attitudes* (e.g. 'I am in favour of free health care');
- *current state* (e.g. 'I am tired').

Using this system, Kuhn and McPartland were able to identify the most commonly used self-descriptions that appeared to be important to people's identities. They could also work out the percentage of their sample that answered in a particular way. Since the 1950s, numerous psychologists have refined this method.

The advantage of this method is that it quickly allows insights into how people think of their identities. It is possible to obtain data from a whole roomful of people at the same time and to analyse their answers fairly rapidly. In addition, it allows people to disclose several identities without giving them time to censor their responses by changing what they have written after thinking about it. The disadvantages are that it can reduce the richness of people's thinking about their identities to the categories devised by the researcher; it allows little time for participants to reflect deeply; and it pays little attention to the exact words participants use to describe themselves or the reasoning behind their choices.

Although the Twenty Statements Test is very popular amongst some identity researchers, it has two shortcomings that mean that it cannot be the only method psychologists use to study identity. First, it can only study those identities that people can bring to mind. Yet, there may be many aspects of our identities that we take for granted and never think about except if they go wrong. For example, people who become disabled, either physically or by losing their memories, are often more conscious that their bodies affect their identities than those who do not experience such impairments. Second, the Twenty Statements Test cannot explain why we have the identities we do. We need theories *of identity to help us explain this.*

Summary Section 1

- Identity is a popular topic that has been studied by psychologists since the discipline began.
- The apparently simple, everyday exercise of making 'I am ...' statements about ourselves forms the basis of a commonly used psychological method of studying identity.

- Kuhn and McPartland (1954) devised the Twenty Statements Test which allows researchers to collect data quickly. Refinements of it have been used continually since then.
- The Twenty Statements Test cannot study identities that people do not think of. Nor can it help us to understand why we have the identities we do.

2 Embodying identities

In recent years, some psychologists and other academics have turned their attention to the importance of **embodiment**. Since our bodies are central to our lives, it would be surprising if they were not important to our identities. However, the term 'embodiment' signals more than simply that we live in our bodies. It suggests that bodies are physical and biological as well as social and psychological. We use our bodies to look at, talk to, touch and avoid other people, and to signal the kinds of people we are and the groups we consider ourselves to belong to. At the same time, our bodies have an impact on our identities. What our faces look like, how tall we are, how well or badly our bodies (including our brains) work – all affect our identities through how we feel, what we can do and how other people treat us.

Embodiment
Indicates that we live in and through our bodies and that we simultaneously experience our bodies physically and biologically as well as socially and psychologically.

For centuries, people have attempted to change their bodies to fit with culture, fashion and individual tastes. Clothes, wigs, control of food intake, and decoration (through painting, tattoos, scarification, etc.) have long been used. More recently, the availability of plastic surgery techniques and knowledge about body building have made the body a resource that can be transformed to suit our identities. It is even possible to change height, weight, shape, gender and colour. Bodies, therefore, have been, and continue to be, social symbols of identity. As such, they are often sources of worry and dissatisfaction as well as pleasure for their owners.

The performance artist Orlan remains conscious during plastic surgery operations as part of her art

It is because bodies are a public presentation of identity, interpreted by other people, and amenable to

limited change that they are often 'projects' which people attempt to mould to suit their identities (Woodward, 2000). This is most evident when groups of people adopt similar styles of dress and hairstyle, forming group identities for themselves. Body projects are part of what Michel Foucault (1988) called 'technologies of self' – the ways in which we use our bodies to produce identities for ourselves. Of course, no body is entirely malleable. Nor are all means of changing the body affordable for everybody. Therefore, body projects can create and reproduce inequalities (Shilling, 1997).

The clothes we wear and the styles of fashion we adopt are part of our 'technologies of self'

It is not only the visible body that affects our identities. **Neuropsychological approaches** have added to our understanding of embodied identities by demonstrating that there are many different ways in which identity can be altered when the brain is damaged. An aspect of brain functioning that is essential to our identities is our memories. Take the following example from a 31-year-old man, Philip Fletcher, who sustained a head injury which resulted in his forgetting everything that had happened to him since he was 17 years old:

> *I didn't know my name or my job. I didn't recognize me, my wife, or my children. I had no recollection of ever being married for 12 years or of having a family. I had no identity ... I was desperate for a set of younger clothes. I also detested the family car ... It felt like I'd walked into someone else's family and taken on a different identity.*
>
> *(Sims, 2000, pp.91 and 92)*

In a rather different way, people with damage to the frontal lobes of their brain sometimes lose their memories about themselves but make up fictional memories that they entirely believe (Conway and Fthenaki, 2000). Such examples show that some aspects of identity can best be understood by studying cases where identity has broken down.

You may have included something about your body in answer to the 'I am ...' activity in Section 1. On the Twenty Statements Test, people sometimes mention their body shape, perception of their attractiveness, colouring, fitness or lack of it, dress style, etc. However, it is often easier to be conscious of the importance of our bodies to our identities when our bodies do not work well. Since the 1970s, the campaigns of what has come to be known as the 'disability movement' have provided insights into how embodiment and identities are interlinked. Those who have campaigned to shift views of disability argue that people with physical impairments experience 'individual limitation', but that disability is a 'socially imposed restriction' (Oliver, 1990).

This **social model of disability** argues that the everyday experiences of people with physical impairments are not simply the consequence of biology. Instead, they result mainly from the limitations imposed by other people and by environments (Swain *et al.*, 1993). They thus demonstrate the importance of embodiment (that bodies are simultaneously physical, biological, social and psychological). An example with which many people are familiar concerns access to buildings for those using wheels rather than legs. If there are adequate ramps or flat entry points, sufficient space in which to turn wheelchairs, lifts and suitable lavatory facilities, people with

Neuropsychological approaches
These study brain function by examining damaged brains, the structure of the brain and neural activity.

Social model of disability
A model that considers that people with physical impairments are as disabled by the limitations imposed by society as by their impairments.

disabilities are enabled, rather than disabled, in the negotiation of space. Their disability relates to being unable to negotiate space for themselves in buildings not designed with disability in mind. The argument, therefore, is that people with physical impairments are often made conscious that embodiment affects their identities because their needs are not catered for in society.

Although embodied identities are clearly important and are increasingly being studied in psychology and other disciplines, theories of identity have relatively little to say about them. The final section of this chapter will draw upon the accounts of people with physical disabilities in order to consider how well the theories of identity presented here fit with what they say.

Summary Section 2

- Embodiment is important to our identities because it is simultaneously physical, biological, social and psychological.
- Many people engage in 'body projects' to produce particular identities.
- Identities and brain and body functioning are interlinked.
- The importance of embodiment to identities is most evident when people have physical impairments.

3 How can we understand personal identity?

At the heart of many theories of identity is the notion that knowing who we are requires that we know who we are *not*. Kroger (1989/1993) argues that identity represents 'the balance between self and other'. Identity therefore has both individual and social elements. This section considers the contributions to thinking about identity made by Erik Erikson and James Marcia who view identity as **psychosocial** (simultaneously psychological – that is, personal – and social) and as a bridge between the identity that is most central to us (our **core identity**) and the social context.

Psychosocial
Psychosocial identity recognizes the influence of both personal and social factors on identity development.

Core identity
The central identity that individuals have to achieve from different aspects of their identities if they are to be psychologically healthy.

3.1 Erikson's psychosocial theory of identity

As a psychoanalyst, Erikson developed his theories from clinical and naturalistic observations as well as his analyses of the biographies of great men. Erikson was the first theorist to view identity as psychosocial, meaning that the community in which children and adolescents live helps to shape their identity. Identity for Erikson consisted of 'a conscious sense of individual uniqueness ... an unconscious striving for continuity ... a solidarity with a group's ideals' (1968, p.208). In other words, identity involves the development of a stable, consistent and reliable sense of who we are and what we stand for in the world that makes sense for us and for our community. It is this 'core identity' that gives us a sense of continuity with the past and a direction for the future. Erikson also considered it important for people to feel that their social group views them as the same over time.

Erikson's clinical work with veterans of the Second World War led him to conclude that when life is going well, identity is taken-for-granted and we are unselfconscious. However, the importance of identity is most obvious and definable when it is no longer possible to take for granted that we shall continue to exist and experience ourselves as unique individuals, as is the case for soldiers fighting wars or when people become aware that they will eventually die. In Erikson's view, identity crisis was central to the period in which he lived. This is because he lived through two world wars, which, not surprisingly, led many people to think about their own mortality and so generated identity confusion.

Erikson's focus on continuity did not mean that he considered that, once achieved, identity never changed. Instead, he saw the achievement of identity as a lifelong developmental process involving a progressive resolution of conflicts or normative crises between individual needs and social demands and between positive and negative developmental possibilities. He considered these conflicts to be common to most people and hence typical, rather than abnormal. This is what he meant by 'normative crisis'.

Erikson identified eight stages of identity development in which each stage builds on what has gone before, but goes beyond the previous stage to provide the foundation for the next. These start with the infant's developing sense of time and end in old age. Erikson considered that the final period of human life (stage eight) was one where older people struggled to find integrity against the risk of despair caused by problems with body functioning and the prospect of death (see Table 1.1).

Table 1.1   **The place of identity development in Erikson's eight developmental stages**

Age/Stage	Normative crisis	Possible outcomes
1 Age birth–1 year	Trust vs mistrust	Trust or mistrust of people
2 Age 1–3 years	Autonomy vs doubt	Self-control or self doubt
3 Age 3–6 years	Initiative vs guilt	Sense of purpose or low self-esteem
4 Age 6–11 years	Industry vs inferiority	Competence or helplessness
5 Adolescence	Identity achievement vs role diffusion	Identity achieved or uncertainty
6 Early adulthood	Intimacy vs isolation	Personal relationships or loneliness
7 Middle adulthood	Generativity vs stagnation	Care for others or self-absorption
8 Late adulthood	Integrity vs despair	Fulfilment or disappointment

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BIOGRAPHY   *Erik Erikson 1902–1994*

Erik Erikson, 1902–1994

Erikson was a psychoanalyst who made major contributions to the field of psychology with his work on child development and on 'identity crisis'. He had a rich and dramatic life and a consideration of some of the events in his personal history provides an insight into how the interests and interpretations of scholars are often interlinked with the theories to which they become attached.

Born in Frankfurt, Germany, to Danish parents who were not married and separated before he was born, he was raised by his Jewish mother and Jewish-German stepfather. He was brought up as Erik Homburger – the name of his stepfather. One biographer has suggested that it is possible that some of his later interest in identity came from his feelings of puzzlement at being raised by two dark-haired Jewish parents when he himself was blond and blue-eyed.

Erikson's adolescence was turbulent. Later, he came to conceptualize adolescence itself as necessarily a time of 'crisis'. He spent seven years travelling through Europe trying to establish himself as an artist and later acknowledged that he had been deeply neurotic (and close to psychosis) in his

adolescence. Throughout his life, he wanted to know who his birth father was and he spent a long time in unsuccessful searching.

In 1927 Erikson met Freud's daughter, the Austrian psychoanalyst Anna Freud, in Vienna and was psychoanalysed daily by her for six years. With her encouragement he began studying at the Vienna Psychoanalytic Institute, where he specialized in child psychoanalysis. In 1933 he left Austria because of the Nazi threat and went to the USA, where he became interested in the influence of culture and society on child development. He was a pioneering child psychoanalyst in Boston. He made up the Danish and Christian (as opposed to Jewish) name Erikson after becoming a US citizen in 1939.

Erikson considered that what happened to individuals depended on what was happening in society during the historical period in which they lived. His studies of Native American children led him to relate personality growth to parental and societal values. As he continued his clinical work, Erikson developed the concept of 'identity crisis'. This he saw as an inevitable conflict that accompanies the development of identity in late adolescence.

Sources: Microsoft Corporation, 1996; Gardner, 1999; Kroger, 1989/1993; Stevens, 1983

Although Erikson viewed the development of identity as a lifelong process, he considered it to be particularly important during the fifth psychosocial stage, adolescence, in which the achievement of identity was the major developmental task. For Erikson, adolescence is a period in which several life decisions have to be faced and, by the end of which, **ego identity** (a secure feeling of who and what one is) has to be achieved. For example, sexual relationships, employment and independence from parents all have to be negotiated (even if they are not embarked upon). As a result, commitments and beliefs that have hitherto been taken for granted are questioned as young people consider not only who they are, but also who they can be in the future.

Erikson saw adolescence as a period of **psychosocial moratorium**, because young people could postpone making definitive social choices while working out the various elements of their identity. In this period, young people can, for a while, try out various identities without commitment before finding their own niche in society. The word 'moratorium' means an officially approved period of delay. Erikson used it to indicate that, in this period, it was socially approved for adolescents to delay taking on adult responsibilities so that they can be helped to make the difficult transition to adulthood. However, by the end of adolescence, Erikson considered that healthy development required a clear sense of who we are and what we stand for. For Erikson the term 'ego identity'

Ego identity
Erikson's term for a secure feeling of who and what one is. It suggests the psychosocial nature of identity.

Psychosocial moratorium
A socially approved period in which young people can try out different social roles and so find their own niche in society.

indicated the coherent whole that results from this process of integrating perceptions of the self into a central identity which is both psychological and social (i.e. psychosocial).

Erikson observed that some young people find it impossible to make commitments to adult roles and that many experience some difficulty. This, he argued, was because they were at war with themselves. Hence, it is a period characterized by **identity crisis**. The nature of the 'identity crisis' to be faced depends on the society and historical period in which young people grow up. In Western societies, this often takes the form of drifting between different social roles and occupations or, more extremely, drug taking and suicide. Erikson called the failure to achieve a secure ego identity **role diffusion**. He was probably influenced partly by his own turbulent youth and by his friend and analyst Anna Freud's (1958) belief that it was 'abnormal' to be 'normal' during adolescence.

Erikson's theory explains why young people are often very involved with their social groups. He considered that solidarity with a group's ideals is important in the development of identity. Since adolescent identity crisis is potentially frightening, Erikson argued that young people might temporarily over-identify with cliques and crowds. As a defence against feelings of loss of identity, they are sometimes particularly nasty to those they consider outsiders. They may be 'remarkably clannish, intolerant, and cruel in their exclusion of others who are "different", in skin color or cultural background, in tastes and gifts, and often in entirely petty aspects of dress and gesture arbitrarily selected as the signs of an in-grouper or out-grouper' (Erikson, 1968, pp.132–3). Erikson also argued that people whom we consider to be very different from ourselves can threaten our sense of identity and that this can lead to aggression. This issue was, not surprisingly, one with which he was concerned since the fact that he was born Jewish put him at considerable risk in Austria prior to the Second World War.

Erikson's ideas about young people's 'clannishness' can help to explain current social issues such as the prevalence of bullying in schools. However, the notion of 'identity crisis' in adolescence has not received widespread support. Studies on adolescents who are not in clinical treatment generally find that they do not experience the period of crisis Erikson suggested. Instead, many studies find that there is a tendency for the self-esteem of young people to increase steadily over the adolescent years (Coleman and Hendry, 1990). In his biography of Erikson, Lawrence Friedman (1999) argues that only a person with a troubled identity could see identity crisis as universal.

Identity crisis
A period in which some young people find it impossible to make commitments to adult roles and many experience some difficulty.

Role diffusion
The failure to achieve a secure ego identity.

�$\blacktriangledown$ *Activity 1.2*

Erikson's theory suggests that the development of identity involves conflict. Does it seem to you that you have ever been caught up in what Erikson would define as an 'identity crisis'?

- If so, was this during adolescence, earlier or later?

- Would you say that it was caused by your life stage or by a specific event?

- Did you 'achieve' your identity in that period or has your identity achievement been more continuous over the course of your life?

- If you currently know anybody who has recently been an 'adolescent', do they appear to have experienced an 'identity crisis'?

▼ *Comment*

Many people now suggest that Erikson overemphasized both the importance of adolescence as the period when identity is achieved and the idea that adolescence is a time of crisis. For example, the notion of a 'mid-life crisis' is now in common currency. Although your own experiences (as a sample of only one) cannot provide confirmation of a theory, consideration of your experiences may help you to understand how you feel about Erikson's theory. It can also give you further insight into the place of introspection in psychological theory development. Psychologists have frequently used different people's hunches and feelings as the basis for theory generation and evaluation. Remember also how Erikson's own identity (see biography box) appears to have been important to the theory he developed, and note that psychologists often work on issues that are important to them.

3.2 The identity status model

Erikson was a visionary thinker whose work has influenced a whole genre of research that continues today. The work of the US clinical psychologist and psychotherapist James Marcia (pronounced 'Marshia') has been particularly influential because it has provided a method that allows Erikson's ideas on identity to be measured. Marcia (1966, 1980, 1994) focused on Erikson's fifth stage (adolescence) and proposed a variant on Erikson's theory which could be used to assess how adolescents' identity changed over the long period of adolescence – which many people consider lasts from 13 to 25 years of age. Marcia developed the Identity Status Interview to study development in 18 to 25-year-old college students (using only male samples until 1970). This **semi-structured interview** (see Box 1.2) has been used in hundreds of studies and is probably the most popular instrument for studying identity in adolescence (Kroger, 2000). It has also been adapted to questionnaire formats.

Semi-structured interviews
Interviews designed to cover particular themes that allow flexibility in how questions are asked.

FEATURED METHOD

The semi-structured interview

Semi-structured interviews are designed to cover particular themes and to do so they include relevant questions. However, they allow the researcher to ask questions in a different order and to use participants' own words rather than those written on the interview guide. This enables researchers immediately to follow up participants' ideas and stories using unscripted and probing questions. Also, semi-structured interviews do not constrain the range of possible answers respondents can give. Researchers are therefore able to cover all the issues they consider important to their study with every participant, but to explore these in different ways with each person. The interview has the feel of a conversation between the researcher and the participant. This is not the case when participants have to respond to a questionnaire with questions presented in an invariant order with preset choices for how they can respond.

Semi-structured interviews are often tape-recorded so that researchers can listen to what participants say rather than writing down what is being said. Tape-recording also allows researchers to refer back to the transcript or tape when doing their analysis. These interviews can be analysed quantitatively and/or qualitatively. For quantitative analysis, researchers often code what the participants say into categories and then look at the percentage of the sample who give particular types of answers. They can also do statistical analyses to see if there are systematic differences between the types of answers given to different kinds of question or by different participants. Also, because participants have been allowed to talk fairly freely, it is possible to analyse their accounts qualitatively by identifying themes, concepts and ideas in each participant's account.

A major advantage of using semi-structured interviews is that they allow researchers to collect a great deal of rich data from a range of participants and to analyse it in different ways. However, it is more time-consuming to do each interview than it would be to give participants questionnaires to fill out. For this reason, samples can never be as large as they could be for questionnaire studies. Analysis can also be very time-consuming since tapes either have to be transcribed or listened to several times, and much care and perseverance are needed to interpret the data.

Marcia's semi-structured Identity Status Interview explores the extent of commitments or crises for 18 to 25-year-old US college students in relation to occupation, religion, politics, sexual behaviour, friendship and, in later versions, female identity. It takes approximately 30 minutes for researchers to get answers to all the questions. To explore commitment to particular roles, Marcia asks questions such as: 'How willing do you think you would
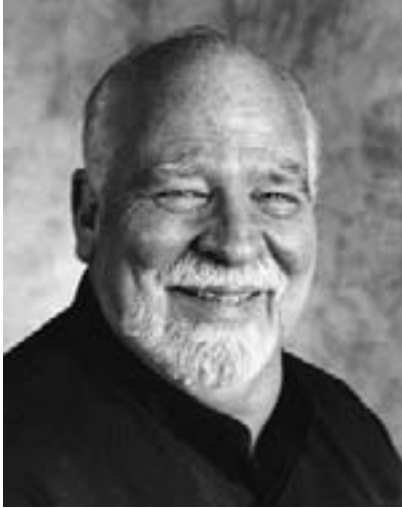
James Marcia

be to give up going into [career or job X] if something better came along?'; 'Have you ever had any doubts about your religious beliefs?'

Marcia wanted to examine the extent to which young people make active choices between possible alternatives before making commitments to particular roles. For Marcia, active choice involved making efforts to learn about the opportunities open to them – that is, by engaging in exploration. Commitment and exploration are the two dimensions on which he categorizes young people (as high or low). From the combination of their position on exploration and on commitment Marcia categorizes young people into one of four possible identity statuses (see Box 1.3). For any particular sample of young people studied, it is possible to see how many fit into which identity statuses. These statuses are related to personality, in that each young person will have a specific way in which they usually experience and deal with the world. For Marcia, identity status at adolescence has an impact on later identity and how young people will go through future life stages.

1.3 *Marcia's four identity statuses*

In **identity diffusion** (low commitment and low exploration), young people have not yet experienced an identity crisis and are not committed to a consistent set of values and goals. They tend either to have carefree, uncommitted lifestyles or to give the appearance of being rather empty and dissatisfied. Because they do not have a firmly established sense of identity, they are very impressionable and very easily change opinions about themselves in response to feedback from others. For Marcia, this is the least developmentally advanced status, although it can be adaptive if it is difficult for young people to explore their identities because they are in difficult circumstances. A young person in identity diffusion may answer many of the questions on the Identity Status Interview with 'Well, I don't know, it doesn't make much difference to me. I can take it or leave it'.

Identity foreclosure (high commitment and low exploration) happens when young people commit themselves to identities without having explored other options. Foreclosed young people are often self-satisfied, have authoritarian, fixed views about what is right, and consider their identity coherent. Some young

Identity diffusion
Period in which young people are neither exploring social roles nor committed to a consistent set of values and goals.

Identity foreclosure
Period in which young people commit themselves to identities without having explored other options.

people will explore other identities later, but others reach identity resolution with a single set of values and goals that often come from their parents. Muuss provides the following example: 'When a young man is asked what he wants to become, he may answer, "I want to be a dentist," and when asked why, he may respond, "Because my father is a dentist"' (1988, p.71). Marcia sees this as a less developed stage of identity development than the next two identity statuses.

Moratorium
An active process in which young people search for the identity to which they want to be committed.

Moratorium (low commitment and high exploration) is an active process in which young people search for the identity to which they want to be committed. (Marcia used almost the same term as Erikson – who used 'psychosocial moratorium' – to indicate the same process.) It can last for several years. Those in moratorium are preoccupied with exploring options (occupational, ideological and interpersonal) and with working towards commitment. They are often uncertain of themselves, but overcritical of others and institutions. They are active, but ambivalent and anxious about their struggles for identity. They do not make commitments in intimate relationships, although they may recognize what commitments would be like. Marcia considered moratorium an essential prerequisite for identity achievement. The response (to a question about religious commitment) 'I'm not at the point where I'm ready to commit myself to one thing – I'm more open-minded in everything at the moment' is indicative of moratorium (Kroger, 1989/1993, p.180).

Identity achievement
Young people have experienced and resolved their adolescent identity crisis by going through a period of moratorium.

Identity achievement (high commitment and high exploration) is Marcia's most developmentally advanced status. Young people who have achieved identity have experienced and resolved their adolescent identity crisis through a period of moratorium. It is a status in which they have strong, coherent identities. As a result, they are more independent, flexible, self-confident and intellectually creative than are young people in the other statuses. Those in this status are thoughtful, introspective, function well under stress and can manage interpersonal relationships. Allen gives the following example:

Interviewer: Thinking back to the time you decided on a career, what information did you have about what kinds of occupations were options?

Young woman: At that time, I didn't know a lot ... I had to do a lot of research. I had to question, ask a lot of people. All I knew then [was] that I wanted to be in the business field. What part, I didn't know until I started talking with people.

(Allen, 1999)

Numerous pieces of research using Marcia's research method suggest that we should not view identity statuses as permanent qualities because some young people change between statuses before they achieve their identity. Some studies have also found that young people can have different identity statuses for different aspects of life such as employment and sexual relationships.

Although Erikson and Marcia view identity as psychosocial, they have concentrated more on the individual, personal aspects of identity than on group identities. The next section discusses a theory of social identities that focuses on group, rather than personal, identities.

Summary Section 3

- Erikson developed the psychosocial theory of identity from clinical work, naturalistic observations and probably his own experiences.
- Social and personal identities are interlinked. This is partly because we all need other people to show that they view us as the same over time, and partly because, for Erikson, identity requires that we feel solidarity with a group's ideals.
- Different identities are produced in different historical periods and different cultures.
- A sense of continuity, uniqueness and worth is important for a positive sense of identity.
- We all have a variety of sources of identities, but integrate them into a coherent whole.
- The development of identity is related to how people see both their past and their future.
- The achievement of identity is the central task of adolescence (Erikson's fifth psychosocial stage of development) and is necessarily accompanied by normative 'crisis'.
- Threats to identity lead to over-identification with cliques and/or aggression.
- Marcia adapted Erikson's theory and devised the Identity Status Interview as a method of studying the four identity statuses he identified: identity diffusion; identity foreclosure; moratorium and identity achievement. For Marcia, the ideal trajectory is from moratorium to identity achievement.

4   A focus on group identities

Social Identity Theory (SIT) addresses two sets of issues identified as problems with psychosocial identity theory. First, although Erikson thought of personal and social identities as interlinked, he and Marcia treated them as separate systems. As a result, large-scale social identities (e.g. of 'race', gender, disability and social class) were neglected until recently in this approach. Second, Social Identity Theory is designed to address the social processes by which people come to identify with particular groups and separate themselves from others. Erikson's theory dealt with this by focusing on how we achieve our individual identities, rather than how we develop group identities. Social Identity Theory focuses on identities associated with 'we' and 'us' rather than those associated with 'I' and 'me' as in psychosocial theory.

4.1 Social Identity Theory

As a result of the Second World War and the Holocaust, more psychologists than previously wanted to understand relationships between groups and the causes and effects of prejudice (Hogg and Abrams, 1999). Henri Tajfel was a European Jew who had managed to survive Nazi persecution and was interested in understanding its possible causes and effects. He devised a theory of social identities and intergroup relations, which was specifically designed to produce a social, rather than an individualistic, theory of identity. This theory was termed Social Identity Theory (SIT) by two of Tajfel's students (Turner and Brown, 1978).

Tajfel divided identity into two relatively separate sub-systems: personal identity (related to personal relationships such as a friend, parent, child, etc.) and social identity (related to wider social relations such as English, a man, white etc.). Central to SIT is the notion that social identity is largely composed of self-descriptions which derive from the characteristics that we believe define the social groups to which we belong. A social group for Tajfel was two or more individuals who shared a common identification or who saw themselves as members of the same social category. A category is only a category in comparison with another

Henri Tajfel, 1919–1982

category or categories (e.g. black/white; man/woman; working class/ middle class). So in this theory, as in Erikson's, knowing who we are requires knowing who we are not and, hence, recognizing difference and diversity. The act of self-categorization provides us with labels for ourselves and with a set of appropriate attitudes and behaviours that can guide our actions. If a particular social identity is important to us, then we will express that identity in our attitudes and behaviours through a process of self-stereotyping and acting in accordance with that stereotype. It is the subjective feeling of belonging to a group which is important in SIT rather than membership as defined by outsiders or simply sharing some characteristics with other group members (Turner, 1987).

Tajfel used a quite different research method from those used by Erikson and Marcia – the **experimental method** (see Box 1.4). With his colleagues he conducted a range of laboratory studies on artificially created 'minimal groups' which addressed the question of whether being a member of a group is enough *in itself* to promote identity with the ingroup and hostility against the outgroup.

Experimental method
The most commonly used psychological method. It examines causal relationships between variables by controlling factors that may affect the results.

1.4 The classic 'minimal group' experiment

The classic study by Tajfel *et al.* (1971) was done on 14- and 15-year-old schoolboys in Bristol. The boys were divided randomly into two groups, but told that they had been divided according to whether they preferred paintings by the artists Klee or Kandinsky. Each boy then worked alone in a cubicle and was asked to allocate points (which they were told could be converted to money after the study) to a member of their own group and to a member of the other group (but not to themselves). They had to choose one of three strategies for allocating the points. They could give the member of their own group as many points as possible provided that they also gave fairly high points to the member of the other group. Or they could give equally high rewards to boys from both groups. Alternatively, they could choose a strategy that favoured their group (the **ingroup**) and gave the maximum difference between the ingroup and the other group (the **outgroup**), even though this would result in the member of their group actually getting fewer points than if they had chosen one of the other strategies.

Ingroup
People who belong to the group to which we consider we belong.

Outgroup
People who do not belong to our group.

The task was therefore arranged so that a strategy of equal sharing would be most advantageous (in monetary terms) to the boys' own group. However, boys consistently maximized the difference between the groups to their own group's advantage. They chose to maintain as large as possible a gap between the points available to their group and to the other group.

In later experiments, participants were told that they had been randomly assigned to groups but this produced the same results. Since membership of

Minimal groups
Groups set up in Social Identity Theory research to identify the minimum conditions necessary for group identities to form.

these groups was arbitrary (hence they were **minimal groups**), participants had no practical purpose or reason for being in a group and there was no 'real' conflict of interest between the groups. Yet, membership of such groups still seemed to generate intergroup discrimination, in that, when faced with the task of allocating rewards to members of their own group and of the other group, people repeatedly gave preferential treatment to members of their own group.

Tajfel interpreted the findings from the minimal group experiments as indicating that simply categorizing individuals into groups is sufficient to generate prejudice between the groups. This was a dramatic but robust finding (meaning that the findings are the same when this experiment is repeated). The creation of artificial social groups by experimenters appeared to be enough to induce discrimination in favour of the ingroup and against the outgroup. It provided the minimum conditions necessary for social differentiation to take place and for people to consider that they were similar to members of their own group and different from non-members. But what is the point of discrimination in this context since individuals do not gain from denying benefits to the outgroup?

Tajfel (1978, 1981) explained these findings in terms of subjective, psychological benefits. He argued that people build social identities from their group membership and have basic psychological needs for satisfying social identities. In order to create satisfactory social identities, we need to have a sense of belonging to groups that have a positive image and high status in comparison with other groups. This leads individuals to attempt to maximize the differences between their ingroup and outgroups on those dimensions that favour the ingroup. They therefore try to maintain positive social identities in comparison with members of other groups.

Although the minimal groups experiment is based on trivial differences between groups, SIT applies the findings to large-scale social differences. It argues that society is composed of **social categories** that have different amounts of power and status in comparison with one another. Social categories refer to the division of people on the basis of gender, 'race', nationality, class, occupation, religion, etc. According to SIT, the drive towards a fulfilling social identity is at the root of prejudice and discrimination. Prejudice bolsters self-esteem because it allows outgroups to be conceptualized as inferior. It is, therefore, inevitable. The converse of this is that minority groups that experience prejudice and discrimination will always try to improve their position. So, while prejudice is inevitable, so is resistance to it.

Social categories
The division of people on the basis of characteristics, such as gender, 'race', nationality, class, occupation, religion, etc., that have differential power and status.

Unlike psychosocial theories, SIT explicitly discusses how social differences in power affect identity. It allows for change in social identities

by explaining how socially subordinate groups may seek to improve their social position, and so make their social identity more positive, in relation to dominant groups. According to SIT some members of subordinate groups use **social mobility** (e.g. through promotion in employment) to improve their position by leaving behind their (previous) social group. Alternatively, people can work for social change. This is particularly relevant if social group boundaries are not easily permeable (e.g. gender or 'race').

Social change occurs in two ways – through **social creativity** and/or **social competition**. An oft-cited example of social creativity is the 'Black is Beautiful' slogan produced by the US Black Power movement of the 1960s and 1970s. This promoted a positive redefinition of the social identity of black people (the subordinate group). Social creativity can also involve promoting positive views of one's own devalued group through comparison with another devalued group. Examples of this include homophobia expressed by some working-class people. Social creativity differs from social competition because it does not attempt to change existing social relations. For example, the 'Black is Beautiful' slogan promotes a positive view of black people but does not demand racial equality. However, social competition advances social change through strategies that demand alternative social arrangements based on new ways of thinking about social groups (i.e. cognitive strategies). Examples of this include Mahatma Gandhi's passive resistance to colonialism; Black Power; civil wars and revolutions.

Social mobility
Process by which members of groups improve their status by leaving behind their (previous) social group.

Social creativity
A process of positive redefinition of a devalued social group in order to improve the social identity of its members.

Social competion
Strategies that advance social change by demanding alternative social arrangements based on new ways of thinking about social groups.

Some psychologists criticize SIT on the grounds that it treats groups as if they were individuals and so is not as social a theory as Tajfel intended. This is because, in SIT research, participants are generally asked to react to individuals. They are then assumed to be reacting to the groups to which individuals belong (rather than to the individual they can see or have been told about). Their reactions are also assumed to result from their own group membership. Yet, their reactions may have nothing to do with the group identities the researcher is investigating.

This problem arises partly because SIT has been developed from laboratory-based studies that have to simplify complex social processes and so are not like everyday contexts. As a result, some people argue that SIT trivializes important social differences, such as those of (dis)ability, gender and 'race', by treating them as equivalent to the differences found between groups set up on the basis of minimal differences instead of as major inequalities of power (Henriques, 1998).

4.2 An intergroup 'natural experiment': blue eyes against brown eyes

In 1968, Martin Luther King (a prominent black civil rights leader) was assassinated. The television discussion of this event led Jane Elliot (a teacher of 7-year-olds in Riceville, Iowa, USA) to put into practice an exercise that she had frequently contemplated. Elliot wanted the children to learn the meaning of the Native American maxim: 'Oh Great Spirit, keep me from ever judging a man until I have walked in his moccasins.' Since all the children in Riceville were white, she decided to divide them according to eye colour. On the first day of her exercise she introduced segregation against the blue-eyed children (easily identified by the wearing of collars). She told the class that blue-eyed people were stupid and badly behaved and denied them privileges. Within a day, the blue-eyed children became depressed, sullen and angry and their schoolwork suffered. In contrast, the brown-eyed children's school performance improved, but they discriminated against their former friends in ways that very much surprised Elliot, calling them 'dirty blue-eyes', refusing to play with them and (for the boys) also fighting them. On the second day, Elliot explained that she had lied and that the blue-eyed children were better than the brown-eyed children who now had to wear the collars. The effects on school performance and behaviour switched round. After debriefing the children, all their school performance improved and,

When children in the 'class divided' exercise wore the collars and were discriminated against, they were unhappy, but they enjoyed not wearing the collars and being in the privileged group

years later, they claimed that this exercise had made them closer friends and better people who, unlike their parents, were not racially prejudiced.

Elliot repeated this exercise for several years and did variants of it with workers in the Iowa penal system and other adults. The exercise was filmed and several television programmes as well as a book (*A Class Divided*, Peters, 1987) were produced.

There are similarities between Jane Elliot's exercise and the minimal group experiment. For example, the intervention is a trivial and arbitrary categorization into discrete groups based on eye colour. The results demonstrated ingroup solidarity and hatred of 'outgroups' shown in viciousness and name-calling that disrupted friendships. There are, however, also important differences from SIT. For example, in her intervention, Elliot, an authority figure, imposed notions of dominance and subordination on the children. She introduced what may be seen as 'realistic conflict' since racism continues to be prevalent in US society. Unlike SIT, this intervention aimed to change the children's attitudes. The results were also different from those generally reported in SIT in that, when debriefed, the children in Jane Elliot's intervention focused upon the emotional effects of the exercise (e.g. saying they felt like a 'dog on a leash', a 'prisoner in chains', or 'like dumb people'). However, participants in SIT research do not generally report that they have been upset by the procedure. At best then, this 'natural experiment' provides qualified support for the minimal group experiments, but equally it lends support to other psychological theories.

Jane Elliot's intervention is not what psychologists generally think of as an experiment, in that it was not possible to control for all the factors that might influence the results. For example, we cannot be sure whether the results she obtained were because of prejudice, because the children felt themselves to be in competition for privileges, or because Jane Elliot – an authority figure – dictated how each group was to be treated.

All research raises ethical issues. Do you think that this intervention would fit with BPS ethical principles? Jane Elliot is not a psychologist and so is not bound by psychologists' ethical codes. However, her exercise raises a number of difficult questions. It can be seen from the TV programmes that the children were clearly hurt and angry. Is this acceptable even if Jane Elliot's social policy aim of reducing discrimination was realized? Is it likely that the lesson of the exercise will transfer from colour of eyes to colour of skin? Could the children learn something unintended such as that anything to do with 'race' is necessarily unpleasant and should be avoided?

Summary **Section 4**

- SIT developed from the work of Henri Tajfel, a Holocaust survivor who wanted to understand the processes that led to prejudice.
- Tajfel studied intergroup relations in order to understand social identity, which he differentiated from personal identity.
- A major feature of SIT is the finding that if people categorize themselves as belonging to a group, they will be prepared to discriminate in favour of their group (the ingroup) and against others (the outgroups).
- Tajfel and his colleagues found that intergroup discrimination occurred even if differences between groups were minimal.
- SIT suggests that the status of the groups to which we belong affects our feelings about our personal identity. Therefore, social identity has emotional consequences for self-esteem.
- According to SIT, intergroup discrimination occurs because we all need to belong to groups that are distinctive from other groups and have high status.
- Individuals and groups can use strategies of social mobility, social creativity and social competition to improve their social status in relation to other groups.
- The 'class divided' exercise can be seen as providing limited support for SIT in a natural setting. However, it raises ethical questions.

5   The social construction of identities

A third, burgeoning field of work on identity within psychology has a rather shorter history than both the Eriksonian psychosocial tradition and SIT. It can broadly be defined as 'social constructionist'. Unlike the previous theories discussed in this chapter, there is no one originator of social constructionist theories. This is partly because social constructionists consider that ideas are socially produced and, hence, not originated by a single person. It is also because social constructionist ideas have diverse origins in a number of disciplines and there are many social constructionist perspectives.

5.1   The meaning of 'social construction'

Social construction
Theory that the ways in which we understand the world are not just 'natural', but are 'constructed' between people in everyday social interactions.

The term **social construction** itself gives a good pointer to the most important ideas in social constructionism, so it is helpful to begin by

focusing on each of the component words. If we take 'construction' first, this suggests that the ways in which we understand the world and the things we consider true are not just 'natural' ways of understanding reality. Instead, they are 'constructed' between people as they go about their everyday lives and interact with each other. This may sound unlikely. However, if we think about a concrete example, it becomes clearer. For a long time in Western societies, many people thought that it was 'natural' for women, rather than men, to do all the housework. It was not surprising that it seemed 'natural' because it was what usually happened and had happened for as long as people remembered. Yet, once feminists argued for equality with men, it became clearer that it was not 'natural' for women to do all the housework. It was an example of a construction that was taken for granted as 'natural' because it was the accepted pattern for a long time. The idea that it is not 'natural' is itself a more recent construction.

What about the 'social' part of social construction? This tells us that construction is a social process. Everything that we know is constructed in and through social relations, including the language available to us, our interactions with other people and the ways in which our society treats particular groups of people. Even the information we get from the books we read and the television programmes we view is social because they are produced by people for other people. How we understand them is influenced by our histories and the histories of the cultures in which we live.

5.2 Everyday identities are constructed through language and social relations

The same thing can be understood in different ways

The implication of the idea that we socially construct our worlds is that there are many different ways of understanding the same issue. An often-used example (e.g. in Potter and Wetherell, 1987) that illustrates this is whether we call someone a 'freedom fighter' or a 'terrorist'. Although these two terms can refer to the same person, each constructs a different way of viewing that person and the world. It follows from this that the language we use justifies particular responses to people and to situations. It also constructs what are called 'power relations' between people because how we treat people depends on how we view them. Nelson Mandela, the first president of post-apartheid South Africa, provides a famous example of this. When he was defined as a terrorist by the white South African state under apartheid he was imprisoned. However, as the anti-apartheid movement grew throughout the world, he was increasingly defined as a

hero and a symbol of freedom. Eventually, those who continued to construct him as a terrorist did not have sufficient power to make enough people accept their construction and had to give way to those who constructed Mandela as a freedom fighter. In 1990, he was released from gaol, greeted as a hero and became the president of South Africa and a greatly respected world statesperson.

We actively construct identities through everyday social relations

Kenneth Gergen

If constructing the same person differently by calling them either a terrorist or a freedom fighter has implications for how we view the world, it follows that language is fundamental to the processes of social construction. We use language to talk with others, to think, and to communicate generally. The ideas that we take for granted, how we treat each other and are treated, and power relations in society are all constructed through language. It provides the categories and concepts from which we create and maintain our ideas and beliefs and is crucial to our interactions. This means that, according to social constructionists, when we talk or write, we actively construct ways of understanding things.

Social constructionist theories of identity are based on the idea that our identities do not simply unfold. Instead, people actively construct their identities through social relations. The US psychologist Kenneth Gergen, who has been a major social constructionist theorist since the 1970s, gives an everyday example which helps to make clearer what this means:

> I grew up with fountain pens. As a child they were as 'natural' to me as my family. My father's pen seemed to produce an endless stream of mathematical scribbles that somehow transformed themselves into papers in journals. Meanwhile, my mother's musings gave way to bursts of inspirational writing – short stories, travelogues, and the best letters a boy away from home could ever receive. The pen was destined to become my life. And so it did, as I slowly worked my way toward a professorship in psychology. I loved to ponder and to write; the sound of the pen on paper, the flowing of the ink, the mounting columns of 'my thoughts' – all

produced a special thrill. And wonder of wonders, I could be paid for it! But now the pen is gone. Some years ago I was informed there would be no more secretaries to transform my handiwork into solid print. I was to write by computer. I loathed the idea. Writing was a craft, not a technology; I needed to touch the paper physically; feel the words flowing from fingers to shaft and shaft to 'my being made visible.' The act of writing was very close to physical contact with the reader. In contrast, the computer was a wedge between us – a piece of brutish machinery separating our humanity. I refused to purchase a computer. Finally, in frustration, the college administration delivered one as a gift. A goose quill now sits nearby on the desk to remind me of my roots. I use my pen only for signing letters.

This machine has virtually transformed my life. It's not simply the ease of writing; there are possibilities for endless experimenting, storing of random ideas, and the like. It also delivers electronic mail and opens the vast horizons of the World Wide Web ... Dozens of times daily I receive messages ... from around the world.

(Gergen, 1999, p.1)

How is Gergen's account relevant to the social construction of his identity? Well, for as long as he could remember, Gergen's identity had been associated with 'the pen' and writing. Asked to fill in the Twenty Statements Test, he may well have included 'I am a writer by pen' among his answers. Yet this identity cannot be said to have unfolded 'naturally' over the course of his life. Rather, Gergen had constructed for himself an identity as an academic whose writing with a pen was central to his identity.

Furthermore, it is clear that Gergen constructed his identity from his social relations. His apparent admiration of his parents led him to value writing by pen. But his identity as someone who wrote by pen was not simply copied from his parents although his statement that 'The pen was destined to become my life' might suggest this. Instead, the pen became important to his identity because he valued what his parents did, saw that they gained social status through publishing their writing, worked to become like them and found that he could become a successful published academic. Other social relations facilitated his identity as a writer by pen. His university provided him with secretarial support to type up his handwriting. Gergen's identity as a writer by pen may well have seemed natural and 'destined' to him. However, he actively constructed for himself this beloved identity through social processes. He clung on to it even when his university administration removed his access to a secretary to type up his writing. This changed the social relations that supported his identity as a pen writer so that it required more effort than previously to sustain such an identity.

Identities change over time and as society and our relationships change

It is clear that Gergen's identity underwent a marked and fairly sudden change. Having been given a computer by the university administration, he says 'This machine has virtually transformed my life'. His identity, therefore, changed dramatically in response to social and technological changes. This illustrates another aspect of the way in which social constructionists theorize identities: the identities available to us and that we take up are affected by our social histories, social positions, relationships and experiences, as well as by social and technological changes (Connell, 1995; Hollway and Jefferson, 2000). As in Erikson's theory, the historical period and culture in which people live are considered to affect the identities they can construct. Identities are, therefore, said to be historically and culturally specific.

We reflect on our own identities and choose particular ways to tell our stories

There is another way in which the example from Gergen helps to illustrate social constructionist theories of identity. It is Gergen himself who tells us about his identity and how it changed. In social constructionist terms, his interpretation of who he is and how that changes is central to the construction of his identity. In order to see why this matters, it is helpful to recognize that Gergen could have told his story in a way that constructed his identity differently. He could have told us that he took pen use for granted in his life – treating it as a utilitarian tool that he rarely thought about until new technology and cuts in university funding made it almost redundant. We would still have got a sense of the importance of pen writing to Gergen's identity, but we would have thought of it as an implicit identity that he was not conscious of until it had to change. Alternatively, he could have told us that, despite his newfound competence on the computer, he would always remain a pen writer at heart – his identity had not changed although he was now forced to use computers.

So while Gergen may not have been aware that there are many ways in which he could tell his story, the story that he has told about himself nevertheless constructs his identity in a particular way. This is what social constructionist theorists mean when they argue that language is central to the construction of our identities. Bruner (1990) suggests that we 'make ourselves' and our identities through the stories about ourselves that we tell others and ourselves (our autobiographical narratives).

Activity 1.3

For this activity you should make brief notes, but you should try not to spend more than 10 minutes doing it. Think about an important event in your life that happened some time ago. Have the stories you tell about it changed over time?

- If so, can you pinpoint how?

- Do you tell different versions of this story to different people? If so, what changes do you make for different audiences?

- Whether or not you have told different versions of the story, do you think that the telling of your story constructed your identity?

On the basis of your answers, consider whether you feel convinced by social constructionist ideas that identities are fluid, changing over time and from situation to situation.

Identities are constructed differently in different cultures

The way in which we talk about things includes not only the vocabulary we use and our actual words, but also our tone, sentence construction and non-verbal signals. All of these carry meanings and sometimes contradict each other. The conventions of how to express ourselves and the ways of talking about things are different in different cultures. It follows from this that how we construct our identities depends on the ways of thinking and talking (**discourses**) about identities currently available in our society. This idea is supported by the fact that various researchers have found differences between countries in the way that people respond on the Twenty Statements Test, according to whether their society is rated as more individualist or more collectivist (Smith and Bond, 1998). People living in Japan and China (which are considered predominantly collectivist) are more likely to respond in terms of their relationships to other people, their place in society and a specific context (e.g. 'I am a student at Beijing University'). By way of contrast, people living in the USA (which is considered predominantly individualist) are more likely to respond in more personally meaningful ways without mentioning the contexts in which their identities occur (e.g. 'I am a student').

Discourses
The ways of thinking and talking about issues currently available in our culture – that is, the processes by which people construct meanings.

Identities can be changed and so are provisional and dynamic

Since there are always different ways of talking about the same thing (as in the terrorist/freedom fighter example at the beginning of Section 5.2), we can change the ways in which we construct our identities. Social constructionist theories view identities as always in the process of being formed and so as provisional and dynamic, rather than achieved and fixed. The same people can produce different narratives of the same episodes as

Michael Jackson

Katharine Hepburn

Liv Ullman

W.H. Auden

People's appearance changes a great deal over their lifetimes. Psychologists disagree about whether their identities also change or mostly stay the same after adolescence

their identities change. But since identities are socially produced, we can all produce different versions of the same story for different audiences. This may partly explain why you may have found that you appear different to different people in Activity 1.1.

There is no distinction between personal and social identities

All the theories discussed in this chapter assume that consideration of who we are requires consideration of who we are not. This idea is crucial to social constructionist theorists, however, because they argue that identities can never be produced in isolation from social relations and that we have different identities when we interact with different groups or individuals. This means that, unlike other theories, no distinction is made between personal and social identities – all identities are social.

Identities are resources we use to negotiate everyday interactions

Just as the ways in which we construct other people affect how we treat them, so our construction of our own identities affects the ways in which we view ourselves and act in the world. Sue Widdicombe (1998) suggests that identities are resources that we all use and negotiate in everyday interactions. If we think back to the Gergen quotation above, we can see that he used his identity as a pen user as a resource to help him to resist using a computer. At a relatively simple level, we are all more or less skilled at negotiating and shifting identities as speakers and listeners. Knowing consciously what we need to do to be effective speakers and listeners, and temporarily taking on those identities in conversation are crucial to being able to converse with others.

We may not even consider that we are negotiating shifting identities in conversations (although being 'a good listener' or an 'amusing conversationalist' may be part of our identities). However, we also regularly negotiate more complex identities in interactions. For example, Derek Edwards (1998) points out that if we construct ourselves as 'married-with-kids', we take up a different identity position from married parents who do not explicitly construct themselves in this way. We can, for example, use it to signal that we are comfortably settled in relationships with responsibilities or, instead, that we are weighed down with responsibilities and need light relief. Identity is not, therefore, just an achievement (as in psychosocial theories), it is also a resource that we can use in interactions.

5.3 Differences between people who apparently have the same identities

SIT proposes that people have a range of identities, which become salient in different contexts. However, social constructionist theorists of identity argue that there are also differences *within* social categories. This way of understanding identities has been much influenced by feminist debates which have had to grapple with the fact that the category 'woman' is not characterized by any single essence: women are not all the same but differ in many ways. Many feminist theorists have written a great deal about how women are differentiated by 'race', ethnicity, sexuality and social class as well as more personal characteristics (Brah, 1996). This means that generalizations about women (or any other category) can never be entirely true because women (and all other social groups) differ. The following concrete example helps to clarify these somewhat abstract points:

> In 1991, President Bush, anxious to restore a conservative majority to the US Supreme Court, nominated Clarence Thomas, a black judge of conservative political views. In Bush's judgement, white voters (who may have been prejudiced about a black judge) were likely to support Thomas because he was conservative on equal-rights legislation, and black voters (who support liberal policies on race) would support Thomas because he was black. In short, the President was 'playing the identities game'.

> During the Senate 'hearings' on the appointment, Judge Thomas was accused of sexual harassment by a black woman, Anita Hill, a former junior colleague of Thomas's. The hearings caused a public scandal and polarized American society. Some blacks supported Thomas on racial grounds; others opposed him on sexual grounds. Black women were divided, depending on whether their 'identities' as blacks or as women prevailed. Black men were also divided, depending on whether their sexism overrode their liberalism. White men were divided, depending, not only on their politics, but on how they identified themselves with respect to racism and sexism. White conservative women supported Thomas, not only on political grounds, but because of their opposition to feminism. White feminists, often liberal on race, opposed Thomas on sexual grounds. And because Judge Thomas is a member of the judicial elite and Anita Hill, at the time of the alleged incident, a junior employee, there were issues of social class position at work in these arguments too.

> (Hall, 1992, pp.279–80)

Social constructionist methods focus on the everyday

As we have seen, key principles of social constructionism are that identities are part of our everyday practices, produce particular ways of acting on the world and are constructed as we go about our daily life. They can therefore be studied in all aspects of what people do and say and are best studied in 'natural' settings rather than in laboratories. Kenneth Gergen's and Stuart Hall's accounts are therefore good ways with which to gain access to an understanding of the ordinary social construction of identities.

Multiple, de-centred identities

Hall's example illustrates something that has come up in all the theories discussed above – that understanding identity requires that we understand diversity and difference. However, it presents a good illustration of the social constructionist idea that different identities can be constructed in response to the same event in everyday life. In this case, news reports led people to take sides for or against Anita Hill or Clarence Thomas on the basis of how they identified with what they saw as important characteristics of each.

Hall analyses some ways in which 'race', gender and social class affected people's construction of their identities in relation to the Hill–Thomas incident. He suggests that people who are often considered to belong to the same groups, in terms of 'race' and gender (e.g. white women; black women; black men; and white men), differed in the identities they constructed. Others, who are usually considered to belong to different groups, shared identities in terms of support for, or opposition to, Hill and Thomas. This fits with social constructionist identity theorists since they argue that there is nothing fundamental (i.e. essential) to being black, white, a woman, a man, or from any particular social class. Instead, people construct for themselves the meanings of any groups to which they consider themselves to belong.

Unlike psychosocial theories, social constructionist theories reject the notion that people have one, core identity that is at the centre of who they are. Instead, they suggest that people have many different identities that are de-centred because they always operate in relation to other identities. This means that, however important any particular identity may be, it cannot completely occupy the 'centre' of our identities, since there are always other identities in evidence. In the quotation above, Hall talks of some identities prevailing over others for particular people with respect to Hill and Thomas. This allows us to think about

another aspect of social constructionist theory – that people's different identities are potentially contradictory. For example, some black women's identities as black people may have contradicted the identities they held as women.

You may feel unconvinced about social constructionist theories of identities because they suggest that everybody has multiple, de-centred and changeable identities while you might feel that you have a core, centred identity that has been stable for as long as you can remember. Social constructionists would respond by suggesting that we can acquire and maintain a distinctive and continuous identity by constructing an autobiographical narrative of ourselves as having one core, centred identity. They would argue that, in order to maintain a life story that fits with this, we reconstruct the past in ways that help us to understand the past, present and where we expect to be in the future (Hall, 1996).

The argument that our identities are multiple, de-centred and changing but that we construct unified autobiographical narratives is difficult to disprove. It is possible to see this either as a strength or as a shortcoming of social constructionist theories of identities.

Identities involve power relations

Social constructionist theories suggest that all identities involve power relations because they are constructed in relation to other people within social contexts that involve relationships of power. In the Hall example, if a black, working-class woman identified as black, she may have been more likely to support Clarence Thomas than if she identified as working-class. This is because particular identities produce different power relations and hence different ways of viewing social issues and other people. This demonstrates a further social constructionist idea – that power is relational. In other words, power is produced as people relate to each other and nobody has absolute power over anybody else. In the Hill–Thomas dispute, for example, white, middle-class people (who are powerful in many ways) were divided about how to respond and had little power over how other people responded.

Activity 1.4

Look again at the 10 'I am ...' statements you noted down at the beginning of this chapter for Activity 1.1.

- Would you say that the statements suggest that you have multiple identities or that you have one core identity?

- Take one identity and try to think of the power relations that are associated with it. For example, if you wrote 'I am tall', there is an implicit comparison with people who are shorter. Is being tall more or less powerful than being short? Is this the same in every situation and for all people?

Summary Section 5

- Identities are socially constructed (as opposed to occurring naturally) as we go about our everyday lives.
- We all construct our identities within networks of social relations. They are, therefore, relational and necessarily social.
- No distinction is made between personal and social identities in social constructionist theories.
- We construct our identities in language and they are affected by the discourses available within society.
- Identities can be viewed as resources for interaction.
- Identities shift over time and from context to context. They are, therefore, provisional, dynamic and historically and culturally specific, rather than fixed.
- There are similarities as well as differences in the identities of people who are constructed as belonging to different groups. Likewise, there are differences as well as similarities in the identities of people constructed as belonging to the same groups.
- Identities are multiple, de-centred and changeable rather than singular, centred and stable.
- Identity positions involve power relations.
- A variety of identity positions are available to everybody. These can be contradictory.

1.5 Similarities and differences between the theories of identity

Identity is a commonly used term whose meaning can be studied quickly and simply using the introspectionist test of identity called the Twenty Statements Test. However, identity is a complicated concept that includes embodiment as well as how we evaluate ourselves. This chapter has considered three types of psychological theory of identity: psychosocial identity theory originated by Erikson and developed by Marcia; a theory of group social identity introduced by Tajfel; and social constructionist theories which have no single author. Each uses different research methods.

There are several shared features of the theories presented in this chapter:
- All are influential and vibrant, with research and theoretical work helping to address criticisms.
- All consider that identities are historically and geographically located and produced through social relations.
- To some extent, all agree that people are active in the construction of their identities.
- All recognize that diversity is important to identity and that there are several aspects to our identities.

The theories differ, however, in the degree to which they consider identity should be viewed as:
- singular or multiple
- achieved and fixed or provisional and dynamic
- particularly formed in adolescence and part of a developmental process
- influenced by our biographies or achieved in current social relations and contexts
- a resource for negotiating interactions
- constructed through language
- related to power relations
- involving intragroup and intergroup differences.

Activity 1.5

Look at the ways in which the theories of identity differ (in Box 1.5). Note which of the three theories discussed in the chapter fits which features of the theories discussed in Box 1.5. This activity will help you to revise the theories so do look back over the chapter.

6 Can the theories help to explain the identities of people with physical disabilities?

6.1 All the theories are relevant to a consideration of embodiment

All the theories discussed in this chapter continue to generate studies that help to refine the original theories. However, theories are only useful if the abstract ideas they propose make sense when applied to concrete issues. This section will consider how the different theories we have examined might help us to understand the embodied identities of those with physical impairments. Since the theories focus on different aspects of identity, there is no suggestion that any one theory provides all the answers.

Theories are generally tested in two sorts of ways: by applying them to real-life issues or by using them to predict what is likely to happen and then seeing if the predictions are correct. In this section they are applied to accounts provided by people who have physical impairments

The theories all treat embodiment as important to identity. They do this, however, in very different ways. For SIT, the importance of embodiment is implicit in its concern with intergroup discrimination which allows it to consider, for example, identities associated with people who have physical impairments. Some social constructionist theories are concerned with how embodiment allows the construction of particular identity positions and how people negotiate embodied identities. The psychosocial theories of Erikson and Marcia are explicitly concerned with bodily aspects of identity since the body affects the psychosocial issues we face (e.g. in old age when the body does not work as well as it did).

In recent years, many have campaigned for those who are 'non-disabled' to stop thinking of people with physical impairments as 'the disabled'. Allan Sutherland explains the reasons for this in the introduction to his book on the issues raised by disability:

> *Throughout this book I shall be using the phrase 'people with disabilities' rather than talking about 'The Disabled'. That is a phrase which many people with disabilities, including myself, find extremely objectionable,*

because it both depersonalizes us and writes us off as individuals by implying that our disabilities are our identity.

(Sutherland, 1981, p.13)

Sutherland is making the point that the term 'the disabled' treats people with disabilities as less than human. In the decades since Sutherland wrote this, many of those who themselves have disabilities have chosen to use the term 'disabled people' as a positive, collectively agreed, term.

The implicit assumption that disability is the only identity possible for people with impairments has been challenged by theorists of disability and by groups for people with impairments. They argue that the wide variation between types of impairment and within groups of people who have the same impairments mean that they are not a single group, but have multiple, diverse identities (Keith, 1994). There is, therefore, no such thing as a 'disabled identity' or any one identity shared by people with physical impairments. A 14-year-old boy argues: 'I am not my disability, I'm me. I have dyslexia and I've had polio, but I'm not a "dyslexic" or "a cripple", I'm me' (Swan, 1981, p.84).

A drawing by a child (Wong Sai Ming) with physical impairments indicating that those with and without disabilities are equal

Since many people with disabilities have campaigned to change how others refer to them, this seems to support the common theme in psychological theories that identities require positive recognition from others. It also highlights the importance of diversity to identities, in that differences between groups as well as differences between people who are

If the social environment is suitable, people with physical impairments are able fully to participate in a range of activities

within the same group all affect identities. In addition, the concern to alter the ways in which language is used to exclude or define people with physical impairments provides support for the social constructionist notion that the discourses available help to construct identity positions (see Box 1.6).

1.6   *Tomorrow I'm Going to Rewrite the English Language*

The following poem, by disabled writer Lois Keith, takes an ironic look at the power of language:

Tomorrow I am going to rewrite the English Language.
I will discard all those striving ambulist metaphors
Of power and success
And construct new ways to describe my strength.
My new, different strength.

Then I won't have to feel dependent
Because I can't stand on my own two feet.
And I'll refuse to feel a failure
When I don't stay one step ahead.
I won't feel inadequate if I can't
Stand up for myself
Or illogical when I don't
Take it one step at a time.

> I will make them understand that it is a very male way
> To describe the world.
> All this walking tall
> And making great strides.
>
> Yes, tomorrow I am going to rewrite the English Language
> Creating the world in my own image.
> Mine will be a gentler, more womanly way
> To describe my progress.
> I will wheel, cover and encircle.
> Somehow I will learn to say it all.
>
> *(Keith, 1994, p.57)*

6.2 The importance of continuity, 'crisis' and adolescence to identity

Erikson argued that a sense of continuity is important to identity. Those who face threats to their lives would, therefore, be particularly conscious of identity. This may help to explain why people who suddenly become physically impaired often report profound consciousness of their embodied identities (e.g. Dandeker, 1994; Morris, 1993). To some extent this fits with social constructionist theories, which argue that our identities are multiple and change throughout our lives but that we often construct an illusory sense of continuity through our autobiographical narratives. SIT provides a rather different, but equally plausible, explanation of the consciousness of identity for those who became physically impaired in adulthood. It would suggest that it is the change of belonging to a group of lower social status (and hence to being treated as a member of a devalued category), rather than just change in itself, that leads to consciousness of identity.

Erikson and Marcia are the only theorists discussed in this chapter who argue that the development of identity is accompanied by normative 'crisis' and that the achievement of identity is particularly the task of adolescence. This view is supported by the following quotation from a woman, Micheline Mason, who describes a period of 'identity crisis' in early adolescence when she really understands for the first time that her physical impairments are permanent:

> *The first time the doubt that I belonged to this particular planet struck me, was a glorious, calm, blue-skied day when I was twelve years old. ... I was thinking about growing up. Until that moment I think I had somehow believed that when I grew up I would become 'normal', i.e. without a disability. 'Normal' then meant to me, 'like my big sister',*

pretty, rebellious, going out with boys, doing wonderful, naughty things with them, leaving school and getting a job, leaving home, getting married and having children. That momentous day I suddenly realized that my life was not going to be like that at all. I was going to be just the same as I had always been – very small, funnily shaped, unable to walk. It seemed at that moment that the sky cracked ...

The next two years seemed like a dark roller-coaster ride, sometimes happy, often plunging into despair. My main preoccupation seemed to be desperately trying to deny the awareness of my difference which had started on that day.

(Micheline Mason, in Campling, 1981, pp.23–4)

It seems that embodied identities can also become crucially important in adolescence for young people without physical impairments. It is in that period, for example, that youth subcultural styles are most prominent and that eating disorders are most likely to occur.

However, Erikson and Marcia's emphasis on identity achievement as central to adolescence somewhat limits the fluidity of identities since, if a crucial part should ideally be achieved early in the life course, this makes later change less possible. Yet, most of those who have campaigned for shifts in social perceptions of people with physical impairments are adults – some of whom became physically impaired in adulthood. Both SIT and social constructionist theories allow more possibilities for changes to identities throughout the life course than do psychosocial theories.

6.3 Do we choose core identities or construct and use flexible identities?

All the theories allow some agency over choice of identities. However, both Erikson's and Marcia's theories can be criticized for suggesting that we have more choice over our identities than most of us do. For example, Grotevant (1992) argues that there is a contradiction between the assumption that it is possible to have choices between our 'identity options' and the fact that some identities (such as the identity of an adopted child) are not open to choice. It would not, for example, make sense to think of Micheline Mason (quoted above) as going through an extended period of moratorium in which she could explore and choose possibilities associated with able-bodiedness.

Erikson and Marcia argue that identity has to be achieved in different areas of people's lives (e.g. sexuality, education, and relationships with parents). However, they consider that people develop one central identity from these different domains. This issue of whether people have one core

identity or several equally important identities continues to be debated
by identity theorists. A consideration of how 'race', gender and disability
intersect demonstrates that people can simultaneously have several equally
important identities – although it cannot prove that no-one has one core
identity:

> I don't remember race being an issue in the hospital where I spent a lot
> of my childhood and there were so many Asian people where I lived that
> I did not stand out as being black. It took me a long time to understand
> why people who did not know me in my neighbourhood called me
> 'spastic', 'bandy legs' or 'Ironside' and why people with disabilities called
> me 'paki' or 'nigger'. Eventually I learned that wherever I went I would
> probably stand out as being different from the majority and I had to be
> prepared to accept being called either paki or bandy legs, and sometimes
> both.
>
> ... But I've come a long way ... I've reclaimed my identity by refusing to
> accept a concept of 'normality' which tells me I must walk, have fair skin
> and try to blend in by wearing Western clothes.
>
> (Begum, 1994, pp.50–1)

The woman, Nasa Begum, quoted above seems to see her identity as
part of an active process in which she has learned to resist other people's
constructions of her as 'abnormal' because of her impairment, skin colour
or clothes. Clearly, group identities are important in her account (as SIT
suggests). Her identities are continually 'achieved' within her social context
(as psychosocial theories suggest) and they are actively constructed and
negotiated (as social constructionist theories suggest) as her understanding
(and society) changes. Her identities are, therefore, culturally and
historically specific, as all the theories suggest.

As we have seen, one of the claims made by social constructionist
theorists is that identities are not merely achieved, but are available to
be used as resources in everyday interactions. Furthermore, they argue,
identities are fluid, rather than fixed, changing from setting to setting as
well as over time. The following quotation from a study of 'life as a
disabled child' illustrates both these themes:

> Children displayed fluidity in claiming disability as an identity. They
> described how they were not always disabled. One girl talked about
> how wheelchair basketball equalized social relationships and, as she put
> it, 'in some situations I'm not, we're not, always disabled'. ... For some
> of the children in special schools, disability was normalized, and hence
> disappeared as an identity in that setting. Even when children refused to
> occupy the disability category, there could be a strategic claim of

privilege and exemption in certain school situations ('can we go early, Miss, 'cos we're disabled'.) In these examples, the difference could become a benefit.

The children's own sense of identity also became apparent through their resistance to dominant discourses about them. The ... children adopted strategies through which they attempted to assert their own agency ... In some cases this agency was read by adults as bad behaviour, and the children were labelled as having difficulty coming to terms with their impairment.

(Watson et al*., 2000, p.19)*

Social constructionist theories are able to explain the children's strategic, flexible and ironic employment of identities for their own advantage. However, the other theories we have examined can also explain this, albeit in a more limited fashion. According to SIT, for example, people use their identities in order to improve low social status or to maintain high social status by discriminating against other groups. While it is less clear how SIT would account for the flexible, situational use of identity indicated in the example above, it can account for the children's use of their group identity as 'disabled' to improve their social status.

In psychosocial theories, the use and the categorizing of identities are interlinked. For example, psychosocial researchers categorize young people's identity status according to how they act in their everyday lives. Yet, their identity status helps to *produce* particular ways of interacting with the world. This is, arguably, a circularity which makes it unclear how this theory would help in the analysis of the quotation above. However, social constructionist theories have also been criticized for suggesting that we have numerous, flexible identities, particularly since people who experience themselves as fragmented are often considered to have mental illnesses.

Summary Section 6

- Although the theories we have considered in this chapter pay relatively little attention to embodiment, all are relevant to a consideration of embodied identities as expressed in accounts written by people who have physical impairments.
- Different aspects of each theory are relevant to a consideration of the identities of people with physical impairments.

Further reading

You are not expected to read the books and chapters that are listed below. However, no chapter can present a complete picture of the work done in an area. The further reading is intended to give you an idea of how the theories presented in the chapter have been developed and applied. It describes work not mentioned in the chapter that is relevant to a wider understanding of identity. A brief look at this section will help you to get a clearer view of the psychology of identity and, if you have time and are interested – whether during the course or later – you could read any of the publications that interest you.

Archer, S. (1992) 'A feminist's approach to identity research', in Adams, G., Gullotta, T. and Montemayor, R. (eds) *Adolescent Identity Formation*, London, Sage.

Sally Archer is a feminist psychosocial identity researcher who points out that Erikson largely ignored women's identities and that his theory was Eurocentric. In this chapter she argues that identity researchers need to do more complex work on gender differences and to study the impact of relationships on identities.

Ashmore, R. and Jussim, L. (eds) (1997) *Self and Identity: Fundamental Issues*, Oxford, Oxford University Press.

This book brings together a collection of chapters from eminent identity theorists working in psychology, sociology and anthropology. It addresses two of the questions that have been explored in this chapter: Do we have one identity or many?; Is identity personal or social? It also considers the ways in which history, culture and society affect identity. In doing so, it considers some major theories of identity and discusses the authors' research.

Billig, M. (1995) *Banal Nationalism*, London, Sage.

Michael Billig was a student of Tajfel's and worked with Tajfel on the early minimal group experiments. However, he has moved away from Social Identity Theory and is now one of the foremost social constructionist identity theorists. In this book, Billig was not interested in extreme expressions of nationalism, but in more everyday forms of nationalism, which are so common that they are generally taken-for-granted as 'natural' and 'innocent'. These regularly occur in media reports including of news, sports coverage and the weather forecast; postage stamps; currency; and the symbolism of national flags and the occasions when they are used. Billig argues that for there to be a notion of who 'we' are and who 'they' are, there has to be a constant 'flagging' of the national identity through such everyday forms of 'banal nationalism'.

Billig, M., Condor, S., Edwards, D., Gane, M., Middleton, D. and Radley, A. (1988) *Ideological Dilemmas: A Social Psychology of Everyday Thinking*, London, Sage.

This book deals with research on the social construction of identities. The authors argue that, in everyday life, we all constantly face dilemmas and, hence, have to make decisions. An examination of the everyday dilemmas that people face is important to the understanding of how people negotiate the identity positions they take up.

Bosma, H. (1992) 'Identity in adolescence; managing commitments', in Adams, G., Gullotta, T. and Montemayor, R. (eds) *Adolescent Identity Formation*, London, Sage.

This chapter demonstrates how Erikson and Marcia's work on identity has influenced the construction of specially developed scales to measure identity. Harke Bosma, a Dutch developmental psychologist at Groningen University, developed one such scale – the Groningen Identity Development Scale – in order to study the process of identity development. This scale is designed to measure developmental changes in identity by asking about the content and strength of young people's identity commitments and the amount of exploration and change involved in their identity achievement.

Burr, V. (1995) *An Introduction to Social Constructionism*, London, Routledge.

This book aims to present the central tenets of social constructionism in an accessible way, by using everyday examples and recent research.

Hutnik, N. (1991) *Ethnic Minority Identity: A Social Psychological Perspective*, Oxford, Clarendon Press.

This book focuses on the identities of British young people from minority ethnic groups and assesses the relevance of various psychological theories (including Erikson's and Tajfel's) to a consideration of this. It then presents the findings of Hutnik's own study of ethnic minority identity in young British people – a major part of which involves using the Twenty Statements Test. Hutnik concludes that ethnic minority identity is not necessarily fixed and singular, but may be hyphenated (e.g. British-Asian).

Kelly, C. and Breinlinger, S. (1996) *The Social Psychology of Collective Action: Identity, Injustice and Gender*, London, Taylor and Francis.

This book reports research which takes forward the ideas proposed in Social Identity Theory by studying naturally occurring, rather than laboratory imposed, groups and by interviewing group members, rather than doing experiments on them. It investigates the relationship between attitudes, identities and collective action amongst trade unionists and members of various women's groups. The researchers found that memberships of groups could have positive effects (unlike the mainly negative effects reported in this chapter). Their findings also indicate that

people have views about their group membership and identities, and so talking to them helps to inform analyses of social identities.

Marcia, J. (1998) 'Peer Gynt's life cycle', in Skoe, E. and von der Lippe, A. (eds) *Personality Development in Adolescence: A Cross National and Life Span Perspective*, London, Routledge.

Although James Marcia has influenced hundreds of studies using questionnaires and interviews to study his four identity statuses, he himself has extended the methodology suitable for studying his statuses to an analysis of fiction. In this chapter, Marcia applied Eriksonian theory together with his own measures of identity status to an analysis of Henrik Ibsen's verse play *Peer Gynt* (based on a folk tale from Ibsen's Norway). This demonstrates how even a mythic character demonstrates the identity statuses that would be expected from Marcia's theory. The analysis of *Peer Gynt* leads Marcia to invent a new verb 'adolescing' in recognition of the fact that identity is reformulated throughout life. Thus, while he maintains the notion that adolescence is the period for major identity development, he does address criticism of his overemphasis on the achievement of identity in adolescence by making it a more lifelong possibility.

Mead, G.H. (1934) *Mind, Self and Society*, Chicago, IL, University of Chicago Press.

George Herbert Mead has been variously called a social philosopher, social psychologist and sociologist. In his posthumously published lecture notes (1934), he, like William James (a founder of psychology), divided the self into the active 'I' and the passive 'me' on whom others act, and identity into the personal and the social (as in psychosocial identity theory). Mead focused on language as the supreme symbolic system for communicating and for negotiating interactions. He argued that it allows people to carry on 'internal conversations' with themselves and anticipate other's responses. This allows people to assume social roles and to internalize other's attitudes in forming their identities. This focus on language as a symbolic system central to interaction means that Mead's ideas can be said to have anticipated social constructionist theory.

Robinson, W.P. (ed.) (1996) *Social Groups and Identities: Developing the Legacy of Henri Tajfel*, Boston, MA, Butterworth-Heinemann.

This book discusses the major contribution made by Henri Tajfel to social psychology in Europe. Many researchers who worked with Tajfel in Bristol discuss how they have been influenced by his theory and taken forward his theory and methods in various ways, including by developing Social Identity Theory.

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How to use the commentaries

The commentaries appear at the end of each chapter and are presented at two levels of detail. After a short introduction, each commentary provides a list of six important points, in a box. This is followed by a more detailed discussion of issues. You can use the six points as a guide to the detailed discussion, as a memory aid and as a summary.

Read the commentaries when you reach the end of each chapter and then return to them when you need to. We suggest that the commentaries will be useful when you are preparing assignments. The commentaries as a set will be especially helpful when you reach the end of the book and also when you are revising at the end of the course. Use the commentaries to help you to:

1 see how each chapter contributes to building up an understanding of the discipline of psychology and its historical traditions
2 understand different kinds of psychological theory
3 understand different psychological methods
4 widen your understanding of some of the themes and debates important to psychology as a whole.

■ Commentary 1: Identities and diversities

In Chapter 1 we have started to build up a picture of the discipline of psychology, fleshing out the map which was drawn in the Introduction. For example, in the Introduction we wrote that psychology is of relevance to thinking about everyday issues, but we also stressed that gaining psychological understanding of such issues is not a simple matter. Chapter 1 demonstrated this by discussing three influential psychological theories about identities and applying them to an everyday issue – the identities of people with physical impairments.

Theory

1 Psychologists take different perspectives on psychological issues, which means that they ask different questions, use different methods and data, and produce different theories.

2 There is no one answer to a psychological question. Instead of telling us the 'truth', theories provide ways of thinking about an issue and about how to test ideas. Psychology is a discipline that makes progress through debate and the putting forward of alternative viewpoints, as well as through building on ideas and research within each perspective.

Methods

3 Some psychological theories are built up from a consideration of people's beliefs, experiences and what they say – taking an insider viewpoint – whilst others make sense of human psychology from an outsider viewpoint.

4 Psychological research on identity is primarily holistic – that is, concerned with the person as a whole rather than with isolated aspects of people's behaviour or particular processes like memory or perception.

Themes

5 The area of identities is concerned with the theme of what it is that makes us unique as individuals and as humans, and so different from other animals.

6 Identity is a topic that raises questions about whether we are relatively 'fixed', staying the same all through our lives, or whether we change over time.

■ Thinking about theory

Not just one answer - different perspectives and different theories
Chapter 1 showed how psychologists have had to devise complex theories
in order to study the apparently simple topic of identity. By the very fact
that we have set out *three* theories and evaluated them, we have already
underlined the idea that no single theory provides the one 'correct'
psychological view of identity.

   At the same time, we have highlighted another crucial issue for students
of psychology. Psychology progresses not only through devising, applying,
testing and evaluating theories and building on previous research, but
also through debate about how best to understand psychological concepts
such as identity. It is because psychologists take different perspectives on
psychological issues that they produce different theories and methods.
It is this debate that has made psychology a vibrant, dynamic discipline.

   By raising this point about the diversity of perspectives and theories, we
have also provided an opportunity to think about what theories can do,
what they cannot do and where they come from. In themselves, theories
cannot tell us 'the truth' about the world or about a particular idea.
Instead, they provide us with ways of thinking about an issue and about
how to test the theory, both formally and by seeing if it makes sense when
applied to everyday life. As you know from considering the three theories
of identity (psychosocial theory, Social Identity Theory and social
constructionism) discussed in Chapter 1, those who develop theories often
focus on different aspects of a particular topic and different issues. And
they are motivated by different psychological concerns. For example,
psychosocial theorists are concerned with how the achievement of identity
fits into other aspects of development over the life course. Social Identity
Theory tries to explain why it is that prejudice is produced through group
identities; and social constructionist theories focus on how identities are
constructed in everyday life. So here we have an illustration of one topic
that has been viewed from different perspectives, and an illustration of
what we mean by the term *perspective*. Each perspective has a different
focus, a different set of methods and data and produces different theories.

Tracing traditions
The perspectives of the three theories presented here have histories
tha we can trace, and we are calling these histories the *traditions*. For
example, the psychosocial identity theory could be said to originate in at
least two traditions: that of William James's introspectionist concern with
identities; and that of psychoanalysis, since Erikson's work draws heavily
on Freud's psychoanalytic ideas. The SIT theorists work in a tradition that
can be traced back to the experimental work of Wundt. SIT research is also
part of a general perspective called *experimental social psychology*, which

you will meet again in this book in Chapter 7 ('Perceiving and understanding the social world'). Social constructionist theories of identity are part of a different psychological perspective. They are a central part of the 'second cognitive revolution' within psychology that we mentioned in the Introduction, in historical terms a relatively new tradition. This 'revolution' involved a broadening of focus in psychology from the study of universal mental processes like perception and memory to include the study of how we all understand *meaning*. Social constructionism is part of this 'second cognitive revolution' in that it focuses on the study of language and culture within psychology. It has become an important perspective in modern social psychology.

Traditions, history and context

James, Wundt and Freud started working in the nineteenth century. They have influenced many other psychologists and their influence will appear in several of the chapters of this book. Each of them was initially influenced by his own contemporary culture; and the psychologists who followed have also tackled questions generated by the ideas of their own time, place and experience. For example, we saw that Erikson considered that his period of history was characterized by identity crisis. Tajfel's work was much influenced by his experience of being a European Jew who had escaped from the concentration camps of the Second World War, and, as we saw in the chapter, Gergen's identity was affected by the social changes that followed the widespread introduction of computer technologies. You can find out more about how particular psychologists, traditions, times, places and people interconnect by looking at *EPoCH* (CD-ROM).

■ Thinking about methods

As we saw in Chapter 1, different theories *require* different methods to test them and therefore tend to be associated with different methods. This is the case even in an area such as identity where it is generally agreed that, to understand people's identities, we need to use insider accounts: that is, people's accounts of their experience of their own identities. But you will have seen that the outsider viewpoint has also been used, in research that tests SIT. If we are to understand identity, the main focus is usually going to be on the whole person, but again SIT is different: it looks at psychological processes that happen in groups without particular reference to individual 'whole people' and their experiences.

Insider or outsider viewpoints?

Psychosocial theories have developed through clinical and naturalistic observations, ethnography and biographical work. They have progressed through tests and questionnaires that tap beliefs and experiences about identity, through semi-structured interviews, as well as through analyses of

real biographies and fiction. These methods aim to gain access to individual identities in their social and historical contexts. You will remember that the two featured methods in Chapter 1 were the Twenty Statements Test and semi-structured interviews. If you look back to the Introduction, Section 2.2 ('A brief look at different kinds of data') you will recognize that these two featured methods produce the kind of data we have categorized as inner experiences. In identity research these inner experiences can be analysed very much with the intent of understanding the viewpoints of particular individuals. But they can also be analysed so as to look for commonalities that are chosen by the researcher, from an outsider viewpoint. For example, Kuhn and McPartland categorized individuals' responses to the Twenty Statements Test into categories based on the most frequently given answers. And Marcia used individuals' responses from semi-structured interviews to make generalizations about Identity Statuses. In other words, Marcia used an outsider viewpoint to analyse young people's insider accounts, in order to convert his data into evidence.

In contrast, Social Identity Theory, which was concerned with finding out what are the minimum conditions that will produce intergroup discrimination, used an entirely outsider viewpoint. It is difficult to see how asking people about their inner experiences or beliefs would provide data or evidence for this theory since it is highly unlikely that anyone would 'know' why they made prejudiced decisions. For that reason, Tajfel and his colleagues devised an experimental method that would allow them to test this by looking at behaviour (see 'Behavioural data' in the Introduction, Section 2.2) from an outsider viewpoint.

The third theory examined in Chapter 1 makes no distinction between social and personal identities and considers everyday life and language important to the construction of identities. Not surprisingly, then, it uses methods that allow the study of people in everyday life and focuses particularly on language, partly from an outsider viewpoint (see 'Symbolic data', in the Introduction, Section 2.2), but also from an insider viewpoint.

■ Thinking about themes
At the end of the Introduction we highlighted some themes that are important in psychology. In the commentaries we will pick up these themes as they appear in the chapters and use them to make explicit some of the underlying stories that psychology has to tell.

Explaining ourselves as human
Identity, the topic of Chapter 1, is clearly a particularly human issue – a preoccupation with thinking about *who we are*. A concern with our identities focuses both on what it is that makes us individuals, unique amongst other humans, and also on what separates us from other animals.

All the theories we considered in Chapter 1 are concerned with differences between people in relation to identities. They therefore address the question of what makes us distinctively ourselves in comparison with other humans.

By way of contrast, the next chapter (Chapter 2, 'Evolutionary psychology') addresses a different question. Whilst Chapter 1 deals with diversity and individuality, Chapter 2 considers the ways in which all humans are the same – what are the universal features common to all people but that, for the most part, separate us from non-human animals?

Fixity and change

Perhaps one of the main features of humanness is the sense of continuity that enables us to be conscious of 'being ourselves'. But are we conscious of ourselves as relatively fixed or can we maintain a sense of who we are whilst also experiencing changes in our bodies, our relationships and our lives in general? Chapter 1 indicated that people are active in creating identities for themselves. However, the theories differed in terms of whether they allow for changes in identity throughout the life course (e.g. social constructionist approaches) or assume that, once achieved, identity is relatively fixed (e.g. Erikson's psychosocial approach).

Some areas of psychology generally view people (and other animals) as relatively fixed, while other areas consider that they are essentially flexible, with a large capacity for adaptation to circumstances and consequent development and change. Questions around fixity and possibilities for change can be found throughout this book and we will return to this theme as the chapters progress. But remember that it is a theme that appears in several different guises and you need to keep track of these. There are issues concerning the extent to which we actively seek change and growth. For example, there are the kinds of change that we hope we can consciously promote in ourselves, perhaps through learning and broadening our education by studying a course or learning a new language. Or these could be changes of the kind motivated by a wish to 'have better relationships with people' or perhaps even thinking about having some therapy. But a great deal of change is something that happens to us relatively passively and unconsciously. To what extent are we born with genetic endowments that unfold and fix or seriously constrain who we can become? To what extent are we changed as we interact with and adapt to our environments? To what extent do we develop and grow because we are able to choose and/or modify our environments – physically, socially or culturally? As you work through this book you will see that the story of psychology is very much a story about humans, and other animals, *in their environments.*

Avoiding dichotomies in psychological thinking

Another theme that appears in many areas of psychology, and one that is related to questions about change and human adaptability, is the influence of nature *and* nurture. This shorthand phrase is in common use, very often as an unhelpful dichotomy: 'Are we the product of our genes or of our environments – physical, social and cultural?' It is important to note here that, whilst psychological debates are often presented as dichotomies (fixity *versus* change; nature *versus* nurture), these debates should *not* be seen as requiring either/or choices. The behaviour of people and other animals cannot be understood without taking account of the influence of their environments as well as their biology. You saw in Chapter 1 that identity has a basis in biology and the body, but that social and cultural environments, and each person's experiences in those environments, are also crucial.

In the next chapter (Chapter 2, 'Evolutionary psychology'), the impact of environments on what we have become as a species is approached in a very different way.

Evolutionary psychology

Brenda Smith and Richard Stevens

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Three approaches to learning

Karen Littleton, Frederick Toates and Nick Braisby

Contents

▉ Aims

This chapter aims to:

- outline and discuss three different approaches to understanding learning
- illustrate different methods psychologists use to study learning
- consider the practical implications of psychological theories and research on learning.

1   Introduction

What do we mean by the term 'learning'? This chapter is designed to show some of the ways in which psychologists think about this question.

▶ *Activity 3.1*

Stop and think of some instances when you use the term 'learning'. You might come up with some examples such as learning to ride a bicycle, learning French or learning psychology. What have these all got in common? Try to generate a statement of their common features. Are there any clear similarities and differences between these examples of learning? Could you put them into categories?

▶ *Comment*

Learning
The acquisition of new knowledge or skills.

You will no doubt have thought of many different situations in which the word **learning** is applied, and in the present chapter we hope to convey some of this variety. What you might also have arrived at is a statement that all instances of learning involve acquisition of new knowledge or skills. They all involve experience and change of some kind. The essence of learning is that a learner is changed as a result of experience. The change is one that opens up new possibilities. For example, your performance at riding a bicycle might be disastrous at first and you crash to the ground. However, persistence pays and after a few hours you are able to maintain balance and negotiate your environment effortlessly. Similarly, when you first started studying psychology you might have had only a vague notion of what it was about but, with persistence of study, your ideas will become structured and you will be able to present a coherent account of what psychology is.

Were you able to categorize different types of learning? One possible distinction that you might have formulated is that between skills and knowledge. This is not a perfectly clear-cut dichotomy but psychologists find it useful and it will be reflected in this chapter. Learning to ride a bicycle consists of acquiring a skill, which can only be revealed in behaviour. You learn how to ride a bicycle. Learning that Bucharest is the

capital of Romania is somewhat different from this. It represents the acquisition of knowledge that in principle might never be revealed in behaviour. Rather than learning *how*, it is learning *what*.

If we define learning as a process of change that opens up new possibilities, let us consider this in the context of another process of change – that of evolution, described in Chapter 2.

From a biological perspective, both evolution and learning are processes of change that permit better coping with the environment. However, a fundamental and uncontroversial difference between evolution and learning is that evolution is a very slow process whose effects are only felt over generations, whereas learning occurs within the lifetime of a given individual. Evolution is a process by means of which changes are inherited from one generation to another; thus, over long periods of time, a better adaptation is seen. Learning is a process whereby individual animals, human and others, are able to acquire knowledge or skills that equip them to cope better with the environment; for example, learning to walk, to hunt prey, or to predict the consequences of planting seeds. Another difference is that evolution appears to be the result of chance (e.g. random mutations) as described in Chapter 2, whereas learning appears to be more intentional and conscious (e.g. learning to read). However, some influential approaches suggest learning is an ongoing and emergent process that happens without conscious intention.

This chapter will concentrate on how human and non-human animals 'acquire information' as a result of experience in the environment. However, the process of learning must depend to some extent upon 'what is there already', whether we are thinking of learning later in life or learning from the moment of birth. Therefore, a complete picture depends upon understanding learning in the context of the whole person or animal, its evolutionary past, its genes and its life history. These might be such as to make some things easier to learn than others.

All psychologists would probably agree with the idea of learning being a change in response to experience in the environment. But there are differences of emphasis concerning what is important in learning and there are differences between perspectives within psychology as to what is the best way to study learning. For example, should we look at what happens 'inside the head' of a learner? Or should we look simply at the behaviour of the learner? If we take the first approach and ask what happens 'inside the head' when learning takes place, this could lead us to adopt a biological perspective and study the brain itself. Some researchers do this. But, although in principle we could try to observe the biological changes in the brain during the course of learning, it would be difficult from this

information alone to find out exactly what learning had taken place. On the other hand, consideration of 'what happens inside the head' could sidestep biology altogether and focus on hypothetical processes 'in the head' – information processing, representations of information and memory. As will be shown in this chapter, psychologists do make inferences about the events underlying learning and they do this by confining themselves to examining behaviour during and after learning. They speculate on the kinds of process involved and then see how far the speculation will take them.

The chapter is designed with three main sections that give you some feel for the diversity of approaches to learning. In each section a different psychological approach to learning is illustrated, ranging from rats learning how to press a lever to earn food, to the formation of concepts by humans. The perspectives introduced discuss very different examples of what is learned and how learning occurs. However, they are not rival claims to the truth, rather they look at *different aspects* of learning and are best understood as offering *different kinds* of insight into learning processes.

We start with an approach to learning that is based largely on the behaviour of non-human animals. We then move on to consider types of learning that are more peculiarly human.

Summary Section 1

- Learning is a process of change as a result of experience.
- In contrast to evolution, which leads to change over generations, learning in individuals can be seen as adaptation to the environment over a lifetime.
- Psychologists study some very different types of learning in different contexts.

2 A comparative approach

2.1 Introduction

Comparative approach
The study of different species of animal in order to establish general and specific features of behaviour.

Psychologists have gained insight into learning by studying non-human animals and considering human learning in the light of this. The term **comparative approach** refers to this process of looking at and comparing different species. There is not just one such approach. Some psychologists have played down the significance of differences between species,

suggesting that there are important common principles. Others have argued that each species is adapted to a particular environment by evolutionary processes, and that this will be reflected in different methods of learning.

The tradition in psychology known as **behaviourism** has emphasized common features amongst species, studying, in particular, rats and pigeons with an eye to extrapolation to humans. Behaviourism was essentially a revolt against the then prevailing ways of doing psychology. The revolt was staged in the early part of the twentieth century and was initially most closely associated with the American psychologist John Watson. (You can explore behaviourism and the researchers who worked within, or were influenced by it, on the *EPoCH* CD-ROM.) In Watson's hands, there were two prongs to the attack on established psychology. First, there was a conviction that the methods then being used by psychologists were the wrong ones. One of Watson's principal targets for attack was the idea that we can usefully gain insight by introspecting on our mental states. To Watson, this was an unscientific way of approaching the subject.

Watson wished to make psychology a science comparable to biology, physics or chemistry. He believed that the hallmarks of a scientific psychology should consist of objective observation and measurement. Other sciences dispassionately observed, recorded and measured the world 'out there' as Darwin had done (see Chapter 2) and Watson wished psychology to do the same. In the case of psychology, what is 'out there' to be observed is behaviour, hence the name 'behaviourism'. Mental states are not 'out there', they are not public data to be observed by detached scientists and so, according to Watson, they should have no place in the subject.

The second prong of Watson's radical critique of established psychology was directed at the weight given to so-called 'innate' or 'instinctive' factors. These terms refer to that with which an animal is equipped at birth and does not need to learn by experience. Watson did not deny the existence of such factors and indeed he researched them. He suggested that learning builds on innate factors. However, he argued that innate factors had been given unreasonable emphasis in psychology, which he claimed had underestimated the role of environmental factors. To Watson, human behaviour was largely at the mercy of the environment. For example, to him, saints and sinners were largely formed by early environmental influences.

As far as both prongs of the attack were concerned, ammunition was obtained from some highly significant experiments being carried out in Russia during the late years of the nineteenth century and early part of the twentieth century.

Behaviourism
The tradition that advocates that psychology should be a science of behaviour, without reference to mental states that cannot be observed.

2.2 Classical conditioning

Background

The experiments of Ivan Pavlov on conditioning have entered the popular imagination. We commonly hear expressions of the kind 'They have just been conditioned to do it – that's all.' What exactly is conditioning and what is the root of the term?

Pavlov was not a psychologist and somewhat unwittingly got himself attached to the discipline of psychology. He was a **physiologist**, a type of biologist who studies the structure and function of the body. His research concerned the secretion of juices by the body in connection with the ingestion and digestion of food. At the most basic level, the process underlying such secretions is what is termed a **reflex**. A reflex yields a relatively stereotyped reaction to a particular stimulus. Thus, for example, meat juice (the stimulus) placed in the mouth of a dog triggers salivation (the response), the process linking stimulus and response being termed the salivation reflex (see Figure 3.1(a)). Similarly, as part of another reflex, when food arrives in the stomach, it triggers the secretion of digestive juices that serve to break the food down into simpler chemical components. Up to this point, much of the story is unambiguously the business of the biological sciences, but there was a complication.

Pavlov had established what the triggers were that reliably stimulated the secretion of such juices, but sometimes the dogs were observed to behave in ways that did not fit Pavlov's physiological science. He observed that sometimes juices would be secreted in advance of the presentation of stimuli such as food in the mouth. For example, just the appearance of a particular scientist at the apparatus might in itself be sufficient to trigger the secretion of saliva. Pavlov termed such reactions 'psychic secretions' and at first regarded them as something of a nuisance, contaminating the 'proper' scientific study of reflexes. However, in time, Pavlov came to study 'psychic secretions' as a phenomenon in their own right. This is where the interests of psychologists enter the picture.

To formalize and control his study of 'psychic secretions', Pavlov presented a **neutral stimulus (NS)** just before stimuli that were known to trigger reflexes. For example, a bell or a light constitutes a neutral stimulus since neither has any intrinsic capacity to elicit the secretion of juices. Pavlov investigated the effect of *pairing* such a neutral stimulus with a 'natural physiological stimulus', such as food in the mouth (see Figure 3.1(a)). The arrangement of stimuli in a learning experiment is termed a contingency; in this case the **contingency** is between two stimuli (see Figure 3.1(b)). On first pairing with the presentation of food, the neutral stimulus did not acquire any capacity to trigger a reaction. However, after

Physiologist
A scientist who studies the structure and function of the body.

Reflex
An automatic response to a stimulus.

Neutral stimulus (NS)
A stimulus that evokes no particular response.

Contingency
An arrangement between two events.

a number of pairings the neutral stimulus on its own was able to cause the secretion of saliva. It was no longer neutral. How should we describe it?

The power of the bell or light to evoke salivation is conditional upon its earlier pairing with the food. Hence, we term such a stimulus a **conditional stimulus (CS)** (see Figure 3.1(c)). Often the term 'conditioned stimulus' is used, but 'conditioned' reflects an inaccurate translation from Russian. The procedure is termed conditioning. More specifically, since this was the first kind of conditioning to be studied scientifically, it is termed **classical conditioning** (or 'Pavlovian conditioning'). It arises from the presentation of a classical contingency.

Conditional stimulus (CS)
A stimulus, the power of which depends upon its pairing with an unconditional stimulus.

Classical conditioning
Learning arising from a pairing of two events outside the control of the animal.
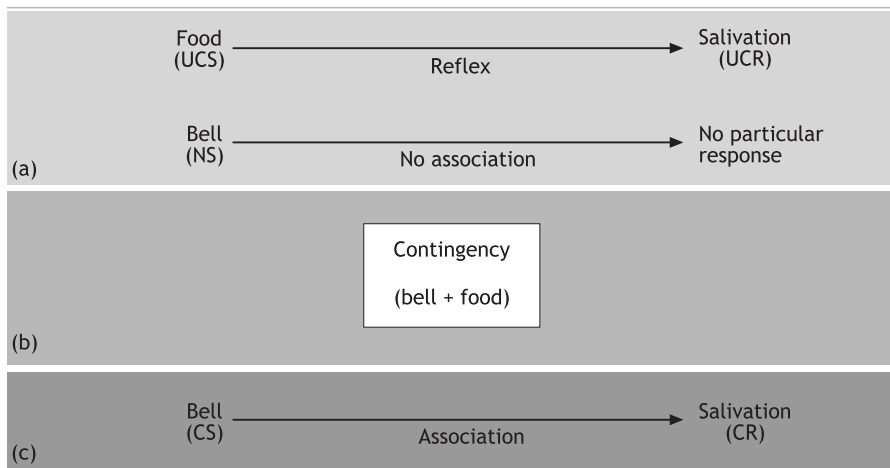
Figure 3.1   The stages in classical (Pavlovian) conditioning: (a) prior to, (b) during, and (c) following conditioning

The response of salivation that the bell evokes is termed the **conditional response (CR)** and the reflex that links the bell and the salivation response is termed the **conditional reflex**.

In relation to the notion of conditioning, the original stimulus that triggers the salivation response in the mouth also acquires a description. Food is termed the **unconditional stimulus (UCS)**. The reason for this term is that food does not need to go through a process of conditioning in order to acquire a capacity to trigger salivation. It is seen as an example of innate behaviour upon which learning can build. The salivation triggered by the food is termed the **unconditional response (UCR)**.

Conditional response (CR)
A response that is triggered by a conditional stimulus.

Conditional reflex
A reflex triggered by a conditional stimulus.

Unconditional stimulus (UCS)
A stimulus that evokes a response without the necessity for a history of conditioning.

Unconditional response (UCR)
A response that does not require learning.

Link with Watson

The experimental demonstration of classical conditioning was a godsend to Watson, incorporating everything that he felt the subject of psychology should embrace. On the one hand, the whole process was measurable. Drops of saliva could be observed and reliably measured. The intensity of

lights and tones could be quantified. One did not need mental terms such as mind and consciousness in order to account for the behaviour of the dog. If we wanted to probe what went on inside the dog, then the biology of the brain was the appropriate language to use. On the other hand, conditioning clearly embodied a change of behaviour. The previously neutral stimulus of the bell or light was transformed into a conditional stimulus having a new power. This appealed to the radical within Watson who saw human behaviour as largely the product of each person's history of conditioning.

Watson often boasted of the power of the technique of conditioning to change behaviour. The most famous example of this is with the infant called 'little Albert'. The case serves well to illustrate the meanings of the terminology that you have just met. Albert had a pet rat of which he was not at all afraid. In this regard it was a neutral stimulus. That was, until little Albert met Watson. On observing little Albert reaching for the rat, Watson banged a piece of metal behind little Albert. Subsequently little Albert reacted to the rat with fear.

Activity 3.2

In the context of little Albert, try to see whether you can define the terms neutral stimulus, conditional stimulus, conditional response, unconditional stimulus and unconditional response. Consider also what are some of the ethical issues involved in this form of experimentation. Watson would have difficulty doing such an experiment these days, as you will realize if you look back at the guidelines for ethical research included in the introductory chapter of this book.

Comment

The rat, prior to conditioning, was the neutral stimulus. The loud sound had an unconditional capacity to elicit fear in small children and so was the unconditional stimulus. The startle and withdrawal reaction triggered by the noise was the unconditional response. The pet rat became a conditional stimulus and the withdrawal reaction that it triggered was the conditional response. Again, conditioning built on something innate, in this case little Albert's fear of sudden loud noises.

Interpretation and applications

Classical conditioning is widely recognized as a fundamental process that contributes to human, as well as non-human, animals' adaptation to an environment (as described in Chapter 2). How might the process revealed by Pavlov achieve this? An animal salivates and produces digestive juices in response to stimuli that accompany the delivery of food. This means

that the food arrives in a gut that is already prepared to handle it. Similarly, by showing fear to a neutral stimulus once it has been associated with a danger signal we are prepared for the arrival of danger and can take pre-emptive action.

Phenomena that might otherwise be inexplicable can be understood in terms of classical conditioning. For example, why do drug addicts often die from drugs when they are taken in an unfamiliar environment? One theory is as follows (Siegel, 1984). Injection of a drug such as heroin not only has psychological effects but affects a wide variety of bodily systems. It represents a massive challenge to the physiology of the body and can easily halt respiration. The body responds automatically with countermeasures to the challenge of the presence of a drug in the body. These countermeasures serve, amongst other things, to protect the respiratory system. Let us call the drug an unconditional stimulus and the physiological countermeasures an unconditional response. The drug arrives in the body within an environmental context (e.g. the syringe and needle, fellow drug-users and a familiar room). These become conditional stimuli, able to evoke some of the physiological countermeasures slightly prior to the drug's arrival. However, if the drug is taken in a new context, some of these stimuli will be absent and hence the conditional countermeasures will be less strong. Objectively, the amount of drug may not be excessive by the criteria of a regular user but the effect is excessive since the body has not been forewarned by the usual cues, or conditional stimuli.

Types of classical conditioning

In the 100 years or so during which classical conditioning has been researched scientifically, the number of examples of the effect that have been studied has increased greatly.

How can we best account for the change that is encapsulated by the term 'conditioning'? What kinds of processes underlie conditioning? Consideration of these questions raises a fundamental issue. We can all agree on the reality of the phenomenon of conditioning. Conditioning entered psychology largely within the context of the behaviourist revolution, with its emphasis on observable behaviour. However, do we still need to study it only from this behaviourist perspective? After all, these days most psychologists would not subscribe to the idea that the only way to do psychology is to study behaviour itself. The study of such things as cognition and states of consciousness have a place in today's psychology. So if we broaden the psychological base, what does this say about the nature of conditioning?

Psychologists have assembled evidence that, when an animal undergoes conditioning, *there can be more than one type of change involved* (Hirsh,

1974; Mishkin *et al.*, 1984; Toates, 1998). In a given learning situation, different processes can be involved simultaneously.

In such terms, exactly *what* did Pavlov's dog learn? Was it simply a change of behaviour? Did learning involve simply forming a new reflex of the kind stimulus–response (bell–salivation); that is, learning *how*? Such a **stimulus–response association** is usually referred to using the abbreviation **S–R**. Alternatively, or in addition to such learning, did the dog learn something about the world (i.e. learning *what*); in this case, that one event (bell) predicts another event (food) (i.e. bell → food). The evidence is that, depending on the circumstances, animals can learn either of these or can learn a combination of both.

Suppose one of Pavlov's dogs was hungry and in another room, and then the bell was sounded. How would the dog be expected to react? Anyone who has ever kept a pet dog will be able to extrapolate an answer to this. Such things as the sound of a can-opener appear to create an **expectancy**: that is, the sound of the can-opener predicts food (sound of can-opener → food) and this guides the dog's behaviour. The dog has not simply formed a reflex, to salivate to the sound of the can-opener, though such a reflex is formed in parallel with the expectancy. The notion of expectancy (i.e. that the animal has acquired knowledge) is not something that can be directly observed but is an inference made by psychologists and based on the available evidence.

Don't be drawn into thinking that this kind of language (i.e. 'learning how' and 'learning what' and forming 'expectancies') means that conscious awareness is necessarily involved. A great deal of learning – perhaps most – happens without awareness. It also happens without a conscious intention to learn something. This applies to human learning as well as animal learning.

We now turn to another form of conditioning and find that a similar set of considerations applies.

Stimulus-response association
The link assumed to be formed by an animal whereby a stimulus triggers a response.

S–R
An abbreviation for stimulus–response.

Expectancy
Knowledge about a sequence of events (anticipation).

2.3 Instrumental conditioning

Background

Another form of conditioning is termed **instrumental conditioning**. It can be exemplified by the behaviour of an animal (e.g. a rat) in a maze (see Figure 3.2). If the animal negotiates the maze successfully it receives a reward at the goal box. The animal's behaviour is instrumental in the outcome, hence the name for this kind of conditioning. The contingency is arranged between behaviour and an outcome – an instrumental contingency (see Figure 3.3).

A version of instrumental conditioning was pioneered by the American behaviourist, Burrhus Frederick Skinner. In honour of him, the apparatus involved became known as a Skinner box (see Figure 3.4). In this case a rat is rewarded with small pellets of food for pressing a lever. In a form designed for pigeons, a peck on a key delivers a pellet of food. This version of instrumental conditioning is known as **operant conditioning**, since it is said that the animal 'emits' **operants**, behaviours that have some effect on the environment. If the frequency of pressing the lever is seen to increase

Instrumental conditioning
A form of conditioning in which the outcome depends on the animal's behaviour.

Operant conditioning
A variety of instrumental conditioning that traditionally has been studied in a Skinner box.

Operant
A behaviour freely emitted by an animal which can be reinforced (e.g. lever-pressing).

Figure 3.2 A simple maze. Food is found to the left, whereas to the right the goal box is empty
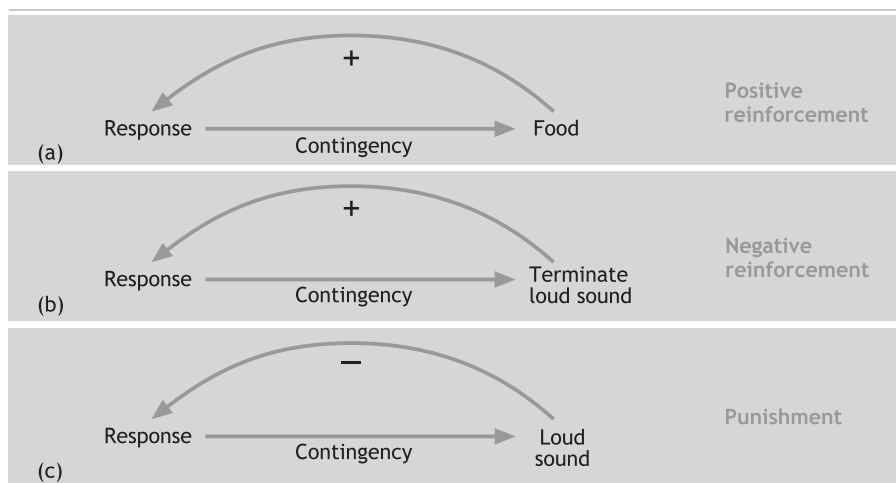
Figure 3.3 Instrumental conditioning: (a) positive reinforcement, (b) negative reinforcement, (c) punishment

as a result of the consequence of pressing (gain of food), then food is said to be (defined as) **positive reinforcement** for the animal (see Figure 3.3(a)).

To use the language of behaviourism, in an operant situation an animal freely emits behaviour (meaning that it is spontaneous). For example, all rats spontaneously sniff, investigate and manipulate their environment in a seemingly random way. The environment is such that it automatically 'provides' consequences for behaviours. In an experiment on operant conditioning, these 'consequences' are controlled and manipulated by the experimenter (see Box 3.1). The term 'reinforcement' conveys the idea that behaviour is strengthened – in other words is more likely to happen again. The adjective 'positive' denotes that the 'something' that is obtained as a result of behaviour is the strengthening agent.

How is an animal persuaded to press a lever or peck a key in the first place, such that it can be reinforced with food for doing so? Let us consider the case of a rat. The experimenter watches the rat and controls when the pellet is given. At first a pellet is given for the rat's head simply being near to the lever. Then it is given only when the animal physically contacts the lever. The criterion is made still more stringent by only reinforcing when the lever is actually lowered. Finally, the rat then has to lower fully the lever, at which point the rat triggers pellet delivery automatically. This procedure is termed **shaping**.

Positive reinforcement
Something that follows a behaviour and increases the probability that the behaviour will occur in the future.

Shaping
The reinforcement of successive approximations to a desired behaviour.
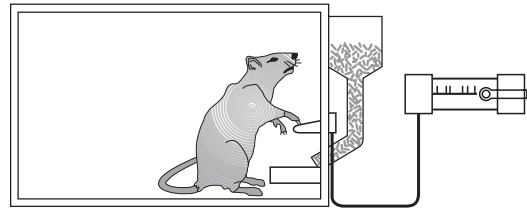
Figure 3.4   Skinner box showing lever, food dispenser and, outside box, chart with pen recording lever-presses

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3.1   *FEATURED METHOD*

Experiments I: The importance of control and manipulation

What exactly is an experiment? An experiment is an artificial set-up designed to investigate cause and effect. The experimenter aims to control all possible variables and keep all but one of them constant. This one variable (the independent variable) is then manipulated in a controlled way and its effect on behaviour is measured (the dependent variable). So the major features of experimentation are (a) the control of all variables except one, (b) the controlled manipulation of this one variable, and (c) accurate and objective measurement of the effect. These features are clearly demonstrated by the research methods of the behaviourist perspective.

> Consider the example of the Skinner Box (Figure 3.4). This apparatus is designed to control as many variables as possible. The same rat is used in the same physical environment. In a typical experiment, the diet and times of feeding of the rat are kept constant. The position of the lever and the pressure required to press it often remain exactly the same. The variable that is manipulated is the delivery of the food pellets: usually whether a pellet is delivered at all or when – that is, after how many lever-presses. This is the independent variable (the putative cause). The dependent variable (the effect) is the pattern of lever-pressing by the rat. There is no possibility of ambiguity – either the lever is pressed sufficiently to trigger delivery of a pellet or it is not; and the number and speed of presses can be automatically recorded to measure the dependent variable.

> This kind of use of a rigorous experimental setting has permitted behaviourist psychologists to arrive at a general rule – a clear statement of cause and effect that links learning and reward. The **law of effect** states that a response that is followed by satisfaction to the animal will tend to increase in frequency, whereas one followed by discomfort will tend to be less likely to occur.

Law of effect
A law that states that responses having favourable consequences will be learned.

Operant conditioning occurs in a context and researchers have investigated the role of context. For example, one might train a pigeon that a peck delivers food when the Skinner box is illuminated by green light. It does not receive food if a red light is on. Under these conditions the pigeon will come to form a **discrimination** between red and green, such that it only responds in the presence of the green light. In a sense, such learning is context dependent, in this case on the colour of the light. Human learning can also be said to be context dependent, but in a much more complex way. This will be discussed in Section 4.

Discrimination
A response made in the presence of one stimulus and a lack of response made in the presence of another.

Aversive events

Suppose that something unpleasant, such as a loud sound, is terminated as a result of behaviour. For instance, a rat might be exposed to a loud sound that is switched off in response to a lever-press by the rat. If the frequency of lever-pressing increases under these conditions, then by definition the consequence is reinforcing. Since it is arranged that a stimulus (loud sound) is terminated by behaviour, the stimulus is serving as **negative reinforcement** (see Figure 3.3(b)).

Negative reinforcement
Something that is terminated by behaviour and where the frequency of this behaviour increases.

Another term in the behaviourist vocabulary is **punishment** (see Figure 3.3(c)). To define this, consider something such as a loud sound that has been proven to work as a negative reinforcer. Suppose that the arrangement is altered so that the loud sound is now presented as a consequence of behaviour. Such an arrangement is one of punishment.

Punishment
Something normally described as aversive which follows a behaviour and lowers the probability that the behaviour will occur again.

Negative reinforcement and punishment are often confused, even in the psychology literature, but there should be no reason for this to happen. Negative reinforcement involves an *escape from* something normally described as aversive, whereas punishment involves the *presentation of* something normally described as aversive. There is symmetry here. In punishment, the thing presented (e.g. a loud sound) would typically also be able to serve as negative reinforcement if an (escape) contingency were to be arranged.

One's expectation might be that behaviour would invariably be suppressed as a result of the presentation of electric shock or something similar that is described as aversive by humans. Although the naive assumption of suppression often fits reality, it is violated in a number of cases. For instance, one might suppose that, in rats, if electric shock follows lever-pressing, it would inevitably lower the frequency of responding. In reality, and as something of a puzzle, lever-pressing sometimes increases in frequency under these conditions. Thus rats occasionally seem to switch into an automatic mode of behaving which cannot at present be understood in terms of its immediate consequences. Rather than this being an embarrassment to behaviourists, they use such evidence in favour of their argument. They suggest that one must observe behaviour and the subtle interplay of factors that determine it, rather than speculating on how things should be, based on intuition or rationality: nature is always right but theories can be wrong.

The use of even loud noise or mild electric shocks raises ethical issues. Is it justified to inflict painful stimuli on captive animals?

Comparison with evolution

Skinner drew an analogy between the process of evolution and that of operant conditioning. You should recall from Chapter 2 that, in evolutionary terms, some mutations are adaptive and are 'favoured' by the environment. They increase in frequency over generations. Conversely, some mutations are maladaptive and thereby reduce in frequency in the population over time. According to Skinner, what occurs over evolutionary time for a species is closely comparable to what happens within the lifetime of an individual. In each case what occurs in the first place is the outcome of chance. The animal comes into the world with a tendency to emit behaviour freely. The environment will (not usually by design) provide positive reinforcement for some behaviour and that behaviour will

increase in frequency. For example, it is often argued that parents reinforce disruptive behaviour by paying attention to it. This will strengthen the tendency to repeat this behaviour in future. Conversely, some behaviour will tend to (and only 'tend to') decline in frequency as a result of what is described as punishment. In both evolutionary and operant conditioning terms, Skinner argues that the natural world is such as to permit better adaptation to the environment.

Applications of the instrumental contingency

The methods of Skinner have proven their worth in changing problem behaviours, a technique termed **behaviour modification**. For example, in a study dealing with children having learning difficulties and showing classroom disruption, teachers identified acceptable behaviour (e.g. concentrating on the task in hand) and unacceptable behaviour (e.g. running around the classroom) (Jones and Kazdin, 1975). At regular intervals the children's behaviour was observed and, if it fitted the acceptable category, reward was given. This consisted of praise and a token (e.g. a plastic chip). The tokens were collected and later exchanged for other rewards, such as the opportunity to listen to music. The assumption was that desirable behaviour was reinforced in this way and thereby would increase in frequency. Indeed, using this method, an increase of desirable behaviour and a decrease of undesirable behaviour was found.

Behaviour modification
A technique of changing behaviour by means of positive reinforcement.

   What about the effect of punishment? Does punishment work to modify behaviour? Skinner was a passionate advocate of the position that punishment is both (a) unethical and (b) relatively ineffective as a means of changing behaviour. Only in a life-threatening situation would a devotee of Skinner argue that arranging a punishment contingency is justified. Punishment and aversive contingencies cannot be used to target behaviours because they arouse anxieties which can easily have an unpredictable 'spreading influence', much of which will lead to unwanted behaviours. Suppose a school child emits a particular behaviour judged to be unacceptable to others. If an aversive event is made contingent upon showing this behaviour then that behaviour might (and only might) decline in frequency. But other behaviours might also be expected to be affected. For example, punishment in school might create a general fear of teachers and lead to truancy. Positive reinforcement is a much less gross procedure and can be more finely tuned. Skinner's message was that the ills of society such as violence, vandalism and alienation arise because of society's failure to adopt a technology of *positive* reinforcement. Skinner wrote a Utopian novel *Walden Two* about a society based upon such principles (Skinner, 1948/1990). Interestingly, although written in 1945, the

book was also a plea for a more ecologically viable society in which waste
was eliminated. Not surprisingly, the Skinnerian message evokes passion
both for and against.

Critique of Skinnerian perspective

Skinner has proven to be one of the most controversial of psychologists,
triggering both unqualified admiration as an enlightened humanist and
social reformer, and bitter opposition as a scientific dinosaur and narrowly
focused scientist. To some extent the critique of Skinner is part of a
broader one directed at the whole behaviourist enterprise.

What evokes the least controversy is perhaps the argument that
behaviour can be altered by certain contingencies of reinforcement. Critics
might argue that this would seem to be common sense. Nor are Skinner's
humanitarian ideals the target for criticism. Rather, it is what Skinner
ignores or denies that evokes the most scorn. To portray humans as little
more than glorified banks of available responses to be selected by the
environment is seen as not only degrading but also scientifically
inaccurate. Thus, it might be argued that a capacity to respond to
contingencies of reinforcement is only one amongst many different
processes underlying behaviour. Humans have some conscious insight into
their condition and may be the active agents of change based on this. They
are very much more than a complex series of emitted responses shaped by
the environment.

Skinner's research has also evoked criticism for retreating into a 'ghetto'
of behaviourism and operant equipment, somewhat cut off from the
animals (human and otherwise) that live in a natural environment.
However, none of this criticism detracts from the fact that behaviour can
be changed by operant techniques.

Types of instrumental conditioning

All might agree on the efficacy of contingencies in changing behaviour.
However, unlike Skinner, a number of other psychologists were, and are,
keen to make inferences about events in the animal's head during learning,
and they often use distinctly non-behaviouristic language to do so. For
example, Tolman (1932) observed rats running to the goal box in the maze
apparatus shown in Figure 3.5(a), in which a morsel of food was placed at
the goal box. During training, the hungry rats were placed at the start
point (A) and had one fixed route A, B, C, D, E and F to follow in order
to get to the food. Following training, the rats were transferred to the
apparatus shown in Figure 3.5(b). This provided a number of possible
routes for getting to the 'expected' location of the goal box (i.e. a choice
of 18 routes/arms, with the way ahead blocked). Which route would they

choose? What had they learned? If they had simply learned *how* to get food and they repeated the behaviour shown earlier, they would take the choice nearest to straight-ahead (i.e. arm 9 or 10). If, however, they had learned something about the location of the goal box (i.e. learned *what*), they might tend to extrapolate to its location and thereby tend to choose arms 5, 6 or 7. This was indeed what they did tend to do, suggesting that animals can make inferences and that learning involves 'something in the head' as well as a change in behaviour.
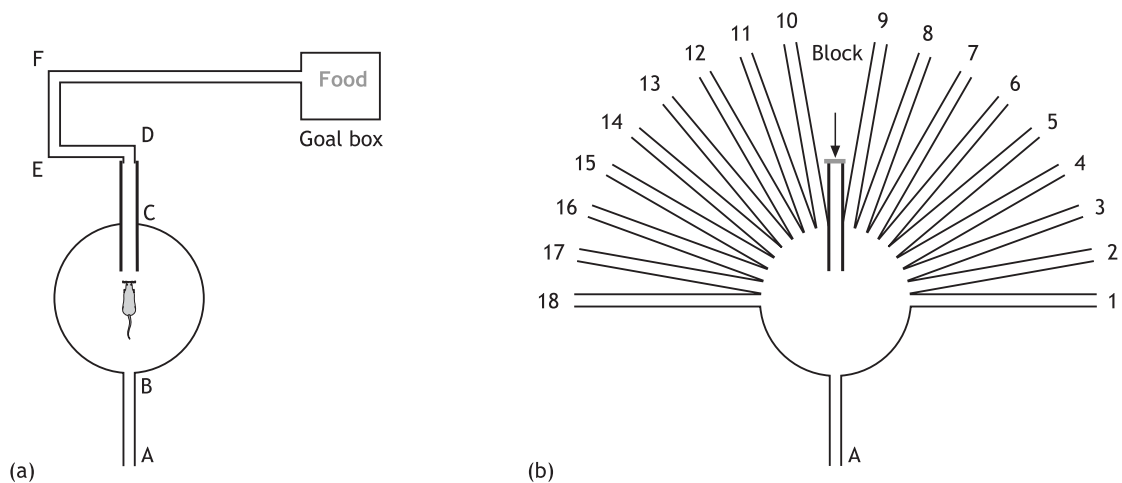
Figure 3.5 Apparatus used by Tolman: (a) learning phase, and (b) testing phase

As was described for classical conditioning, there appear to be different types of learning that can occur during instrumental conditioning. These can occur in parallel. In a given situation, one of them might dominate and account for behaviour.

Take, for example, the experiment illustrated in Figure 3.6. The rat is released from the south end (Figure 3.6(a)) and runs north. At the T-junction it is confronted with a choice of turning left or right. If it turns left it obtains a reward of food, but a right turn is not rewarded. After a number of trials it is reliably turning left each time. Has the rat learned to perform a simple turn to the left, a stimulus–response association (S–R association), or has it learned something more abstract about the situation, such as that food is near the window of the room (a so-called 'extra-maze cue')? One way of finding out is to try, as shown in Figure 3.6(b), to run the maze experiment from a north start.
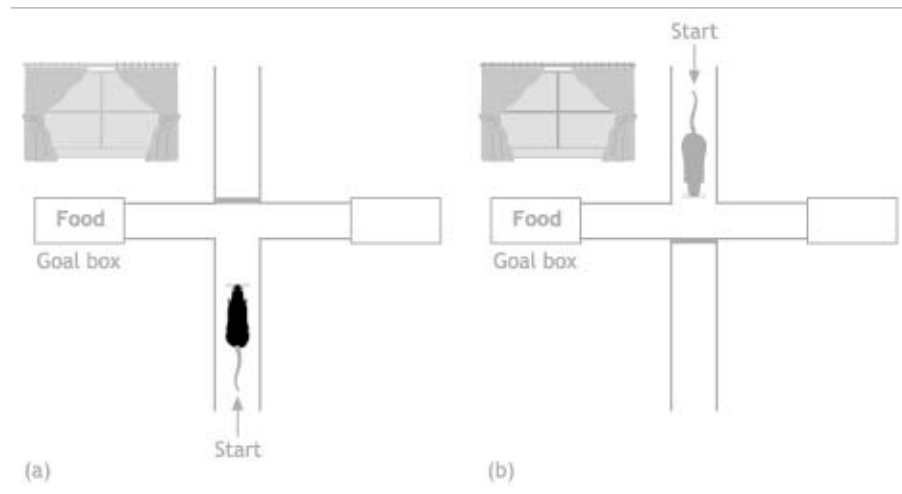
Figure 3.6   Rat negotiating a T-maze: (a) training phase, (b) testing response after a new start point

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Activity 3.3

Work out what behaviour on the part of the rat is predicted on the basis of learning understood in terms of: (i) forming a stimulus–response association, or (ii) acquiring knowledge about the maze and room.

A stimulus–response link will take the rat left (i.e. east), whereas exploiting knowledge about the room will take it right (i.e. west). In practice, animals tend to learn both things in parallel. Which level of learning dominates depends upon such things as the length of experience and the nature of the maze and the room.

Similarly, in a Skinner box, rats sometimes appear to learn a rather straightforward stimulus (i.e. lever)–response (i.e. press) association. In this regard they act something like automatons, triggered into activity by the physical stimulus of the lever. At other times they also appear to acquire an expectation (or 'expectancy') of the form (behaviour) →(outcome); for example, (lever-press) → (food) (Bolles, 1972). They sometimes start out by forming an expectancy and with extended experience move into a more automatic mode of control (Adams, 1982; Dickinson, 1985).

Why do we infer that a rat has formed an expectancy? Could we try to create an expectancy and then see what happens when it is violated? We can, for example, change the size of reward earned and look at the rat's behaviour. Suppose that a rat has been used to earning two small pellets of food in response to a lever-press. Then the reward is changed so that it

earns only one pellet. Finding such a reduced size of reward is followed by an increased secretion of hormones normally associated with stress (Goldman *et al.*, 1973). Conversely, if the rat obtains four pellets, this is associated with a suppression of the secretion of such hormones relative to the background rate. The original two pellets were associated with no change in secretion of such hormones. It appears that the rat has formed an expectancy of the consequences of its behaviour. If these are less good than expectation, a negative ('stress') reaction is triggered. If they are better, it seems that a positive emotion is triggered.

Does the description of rats forming expectancies *of the outcome of their behaviour imply that they do this at a conscious level? Does the term 'expectancy' necessarily suggest this?*

Theorists do not imply that a description in terms of expectancies means that the animal necessarily forms a *conscious* representation of the outcome of its actions, though we know that humans are able to do this. So, used in this context, maybe the term 'expectancy' should be put in inverted commas in order to suggest that it is being used cautiously, somewhat as a metaphor. Whether metaphor or not, it is a useful term. Expectancy distinguishes processes that are immediately sensitive to the consequences of an action (as with the case of reward size in the example just described) from processes that involve an automatic stimulus–response link. Only by considering the history of the animal in terms of earning reward can we understand the effect of shifting reward. The term 'expectancy' conveys the sense that the animal does not always react in a way that can be explained by a simple stimulus–response connection between food received and behavioural and physiological reaction.

Assessment of the comparative approach

So, what has the study of different species contributed to our understanding of learning? Although only a limited range of learning phenomena can be captured in such a simple apparatus as the Skinner box, the principles of conditioning that emerge apply across species, and are of fundamental importance and broad application. However, although many psychologists might acknowledge this, they might view the mind and its conscious aspect as being central to any understanding of the *human* condition. They would regard the temporary dominance of behaviourism as a retrograde step in the development of psychology.

Nevertheless, the behaviourist perspective has endowed us with some insights into the laws of behaviour and some practical tools of psychology that are still in very wide use. For example, within instrumental approaches, many psychoactive drugs (e.g. those to combat anxiety or depression) are tested on rats pressing levers in Skinner boxes. The rat is made anxious and the reduction in lever-pressing for food observed. The effect of anti-anxiety drugs on restoring lever-pressing is then measured.

Ethical decisions always need to be made about the possible value of gains from such studies, weighed against any potential harm to the animals involved.

The use of the principles of behaviour modification derived from instrumental conditioning has already been illustrated by the study of the effects of giving reward tokens in reducing disruptive classroom behaviour.

General principles of classical conditioning also provide the basis for practical applications, although therapeutic treatments usually involve both classical and instrumental conditioning. The example of little Albert in Section 2.2 demonstrated how classical conditioning principles are involved in the *acquisition* of fear as a response to specific stimuli. But phobias are *maintained* by instrumental conditioning. For example, whenever someone with a spider phobia runs away from a spider, the 'spider–fear' association is strengthened because the escape is negatively reinforcing. Therapeutic treatment of such phobias often uses a technique known as 'in vivo' (in life) exposure whereby the phobic person is gradually exposed to the feared stimulus. Clients initially experience an increase in anxiety, but so long as they do not *avoid* the exposure, their anxiety responses diminish considerably as they habituate to (get used to) the spider. In habituation it is almost as if the nervous system 'becomes bored with' the aversive stimulus. In this procedure the individual reverses the stimulus–response association.

A classical conditioning technique known as counter-conditioning is also used to treat phobias. It involves training the client to substitute a relaxation response for the fear response in the presence of the feared stimulus. The treatment is called systematic desensitization. The therapist gradually increases the level of exposure to the feared object. There are three basic steps: (1) training the client to relax; (2) establishing a hierarchy of the feared stimuli; and (3) counter-conditioning relaxation as a response to each feared stimulus, beginning with the least feared and moving up the hierarchy until all levels have been counter-conditioned.

This classical conditioning approach is usually combined with a cognitive intervention (cognitive behavioural therapy). This involves the therapist helping the client to think differently about spiders; for example, that they are a useful and necessary part of the ecological system, that they have not evolved to hunt or intentionally attack humans, and that their bites are rarely fatal.

Behaviourism emphasized a search for universal principles of learning that apply across situations and species; and some of these, such as the law of effect, do indeed apply. But it is sometimes necessary to state where the generalization is applicable and where it isn't. For example, researchers have established that under some conditions animals are good at learning some things and bad at learning others. For example, an animal such as a rat readily learns that a particular food is followed by gastrointestinal upset (Garcia, 1989). It forms an association between the food and the upset, such that it avoids food of this flavour in the future. By contrast, it learns with great difficulty that a visual stimulus is associated with gastrointestinal upset. To some theorists, this suggests that animals come into the world already equipped with a *bias* in favour of certain types of learning and with constraints against learning other things.

In addition to its use within the behaviourist tradition, the Skinner box has been employed as a *tool* within other theoretical orientations. Data arising from the tradition of behaviourism have enabled psychologists to formulate other models of learning. These are summarized in such terms as (event 1 → event 2), meaning that an animal comes to expect event 2 as a result of experiencing event 1. Observing rats in a Skinner box has led to the formulation of the expectancy model, summarized by (behaviour) →(outcome). Although the architects of such models employ the techniques of behaviourism, the explanations that they derive appeal to events in the head of the rat, such as knowledge about an expectancy. Clearly these cannot be directly observed but are inferred, and so the basis of such an approach is very different from the original guiding principles of behaviourism.

Consider another example. Suppose one wanted to know whether and how pigeons categorize the world? How could this be researched in a species that cannot speak? The answer is: with the help of a Skinner box. The pigeon is kept hungry and trained to earn food by pecking at a key. If it pecks when 'the scene contains a person', it earns reward, while pecking at a 'non-person scene' does not earn reward. In this way it is taught a discrimination between scenes containing a person and the scenes without a person. Using this procedure, it can be shown that pigeons are good at performing this (and other) discrimination tasks. They *seem* to extract features to form an internal representation and build a concept of 'person' which they apply to 'persons' of different shapes and sizes in various

settings. And they seem to be quite good at forming these discriminations. This capacity in pigeons which is revealed using a learning technique (pecking a key for food) leads to several important questions that apply to people as well as animals. In the next section we begin to explore concept formation in humans.

Summary Section 2

- Behaviourist psychology is a perspective which advances the view that psychology should confine itself to the study of observable events.
- Pavlov pioneered an experimental approach termed 'classical conditioning'.
- In classical conditioning, a contingency between stimuli is arranged, a neutral stimulus is paired with an unconditional stimulus and it becomes a conditional stimulus.
- In instrumental conditioning, a contingency is arranged between behaviour and an outcome, e.g. gaining food.
- The type of instrumental conditioning studied in a Skinner box is known as operant conditioning.
- In both classical and instrumental conditioning, learning can take more than one form.

3 The cognitive perspective: category learning

So far we have seen how complex behavioural responses to stimuli can be learned. An important claim has been that animals can acquire expectancies through learning. However, suppose that, rather than learn the specific relationship concerning just the actual events an animal has experienced (lever-pressing and release of food pellets, for example), animals may learn a general relationship, one that also includes stimuli and events that have not yet been experienced. Different kinds of animal have been shown to learn such general relationships. Mercado *et al.* (2000) found that bottlenosed dolphins taught to classify pairs of shapes as either the same or different could *generalize* this ability – that is, they could apply this ability to pairs of shapes they had not seen before. Sappington and Goldman (1994), having tested the abilities of Arabian horses to learn

to discriminate patterns, claimed that some could acquire concepts such as 'triangularity' as opposed to specific patterns to which they had been exposed.

But if animals acquire expectancies or even **concepts** which are 'in the head', then these are not publicly observable. So how can we make sense of the idea that animals have expectancies? How do we reconcile talk of things that we cannot directly observe with a scientific approach to psychology? In this section, we consider the cognitive perspective on learning, an approach that attempts exactly this kind of reconciliation. Whereas section 2 focused on how relationships between stimuli and responses lead to learning, this section focuses on what intervenes between stimuli and responses – what happens 'in the head'.

Concepts
Ideas that are structured in terms of attributes and refer to categories in the world.

3.1 The cognitive perspective

The cognitive approach to psychology arose partly from dissatisfaction with behaviourism. It was felt that the more complex functions of the mind such as language and thinking could not really be explained in terms of stimulus–response relationships. However, cognitive psychology also developed from a series of technological and theoretical advances in computing and mathematics that suggested some deep connections between people and complex machines such as computers – notably that both could be understood in terms of **information processing**.

Information processing
Information is assumed to be received via the senses, further processed or transformed, and then used to guide action and behaviour.

Cognitive psychology has its roots in work that sees important relationships between people and machines, despite their superficial differences. Some researchers believe that the machine therefore provides a convenient metaphor*, according to which an understanding of machines, such as computers, may shed light on the workings of the mind. Others, however, believe that the connection is much closer, and that people literally are machines of a certain sort.*

Cognitive psychologists believe that it is possible to describe what is 'in the head' (i.e. what is called the mind) at a *functional* level (in terms of what the mind does) and a *process* level (how the mind does what it does) without having to specify in detail how those functions and processes are physically instantiated in the brain (Marr, 1982). Cognitive psychologists might, for example, describe memory in terms of what gets remembered (and what doesn't) and the factors that influence this. Perception might be described in terms of, among other factors, what people perceive, when

they perceive it, and, perhaps, how prior knowledge influences perception.

Much of our understanding of everyday complex systems – such as computers and cars – typically resides at these levels of function and process. Although we may understand how to format and prepare a document on a computer, most of us have no understanding of how the electronic hardware of the computer gives rise to these functions. Similarly, we might understand that a starter motor plays a role in the process of starting a car's engine, but have little understanding of how this function is physically achieved.

Cognitive psychology's strategy of trying to understand the mind in terms of its functions and processes is therefore not very far removed from our everyday understanding of other complex systems. Cognitive psychologists typically assume that a mature psychology will integrate this functional understanding with knowledge about the brain's physical basis, and there are growing signs that our understanding of some of the mind's activities is approaching this level of maturity. Increasingly, cognitive psychologists are studying neuropsychological disorders and using scanning techniques that provide images of brain activity, in order to inform their views of the mind.

Our vehicle for outlining the cognitive perspective on learning is **category learning**. Although cognitive psychologists have investigated many different kinds of learning, category learning provides a clear example of what the cognitive perspective involves. As adults we typically take categories for granted, yet at some point in our lives we come to understand that things belong together in categories. For example, we recognize that all our disparate experiences of other people have a common element – they are all experiences of *members of the same category, 'people'*. Categories therefore provide a means for organizing our experience, and making sense of the world. They also allow us to extrapolate from past experiences, to plan and make predictions, abilities that would have bestowed an evolutionary advantage. Indeed, it is likely that without concepts our world would strike us, as William James put it, as a 'great blooming and buzzing confusion' (1890/1950, p.488).

So the focus of this section will be on how we come to organize our experiences into categories; how, for example, we come to recognize that spiders, birds, and people, all belong to the category of 'animals', while things like houses, cars, clouds, and ideas do not. We shall consider to what extent we can explain the *learning* of categories such as these. However, we shall also see that some researchers consider that at least part of our understanding of categories is innate or inborn. In considering these issues, we will try to answer the following questions.

Category learning
The learning that occurs when people come to understand that certain objects or entities belong together in particular categories.

- How is it that people come to possess the information that they have about categories?
- To what extent might some of this information be innate as opposed to learned?

3.2 How might we acquire new categories?

Cognitive psychologists interested in learning have focused on the information people gain during learning, and on the mechanisms or principles that enable people to acquire that information. Essentially, the question they are concerned with is 'What are the things in the head that give rise to and arise from learning?' Perhaps the most consistent answer to this question involves the notion of a **hypothesis** and its successful testing.

The study of category learning by cognitive psychologists began some time ago. In a pioneering account, Bruner *et al.* (1956) explained category learning in terms of hypothesis testing. Although much research has been conducted since, their work still frames some fundamental aspects of psychologists' thinking about category learning. To illustrate category learning, try Activity 3.4 that uses an example from Bruner *et al.*

Hypothesis
A suggested explanation for a set of observations that may or may not turn out to be supported.

Activity 3.4

Suppose you travel to another country and a friend introduces you to many new people. After introducing each one she tells you either 'This person is influential' or 'This person is not influential'. After a while, your friend leaves you, and you decide that you should try to work out for yourself who is influential and who is not. How would you do this?

Comment

One way in which you might approach this task is to try to recall particular attributes of those people who have been identified as influential, and which did not apply to those identified as not influential. Perhaps all the influential people were expensively dressed. This might allow you to generate a hypothesis about 'influential people' that you could go on to test.

To see how hypothesis testing might work in practice, consider some of the stimuli that Bruner *et al.* used in their studies, shown in Figure 3.7.
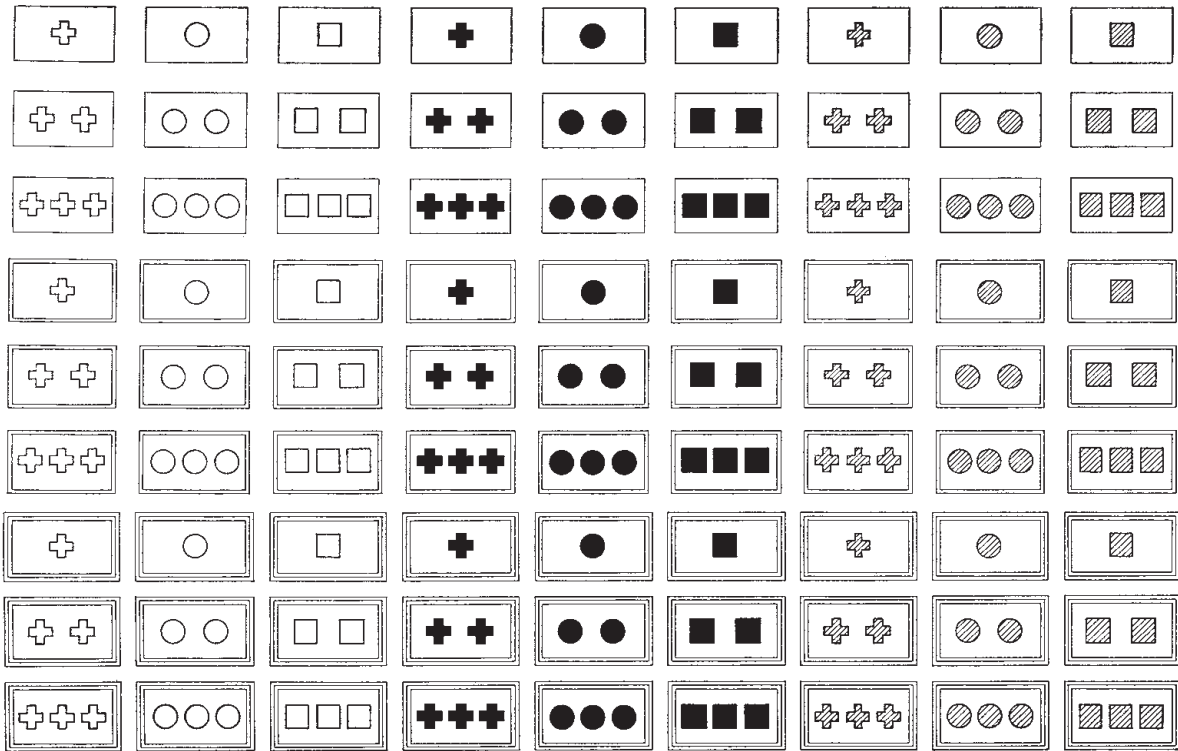
Figure 3.7   An array of 81 rectangular stimulus cards used in Bruner *et al.*'s study of category learning. Each card is printed with a varying combinations of the following four properties: shape (square, circle or cross); number of each shape (1, 2 or 3 instances); shading of the shapes (plain, black or striped); and number of borders round the card (1, 2 or 3) (Source: Bruner *et al.*, 1956, Figure 1, p.42)

Bruner *et al.* began by pointing to one of the cards shown in Figure 3.7, and telling their participants that it belonged in a particular category. They described the categories in terms of nonsense labels. Nonsense labels are 'made up' words – let us imagine that Bruner *et al.* called their category 'fep'. So the participants might be told that the card third down from the top in the leftmost column 'is a fep'. Their task was to learn the category 'fep' by pointing to other cards and asking whether or not they were also in the category.

Activity 3.5

Imagine that you are a participant in Bruner *et al.*'s study, and have been told that the third card down from the top in the leftmost column is a 'fep'. What hypotheses would you have about the nature of 'feps'? Which card would you point to next? Why?

After being given the answer for each instance they pointed to, the participants would write down their hypothesis, pick the next instance, and continue in this way until they settled on the right hypothesis. By asking participants to write down their hypotheses, Bruner *et al.* only considered hypotheses of which their participants were conscious. But the important question is whether this kind of hypothesis testing might explain category learning in general, even when the hypotheses are not conscious. Chapter 4 of the second course book (*Challenging Psychological Issues*) considers consciousness in more detail.

Among other measures, Bruner *et al.* recorded the number and nature of the instances their participants asked about before settling on the right hypothesis. Based on this evidence, Bruner *et al.* claimed their participants used particular strategies to learn the category. In the strategy they called 'successive scanning', participants entertained one hypothesis at a time, and continually tested the hypothesis until it was shown to be in error. They then considered the next plausible hypothesis. If, in the example above, you hypothesize that 'All feps contain three crosses', then you might ask whether the card in the top right-hand corner is a 'fep'. If the answer is yes, then you will have to choose another hypothesis. If the answer is no, you might continue testing. The difficulty with successive scanning is that each choice carries relatively little information. A positive answer does not mean the hypothesis is true – there may be other hypotheses compatible with the evidence accumulated. And a negative answer gives relatively few clues as to what the right hypothesis will be.

In the other popularly used strategy, 'conservative focusing', participants sought to eliminate *classes* of hypotheses by choosing instances that differed in only one way from the previous ones. In the above example, knowing that a card with a single border and three plain crosses is a 'fep', a participant would seek to determine the relevance of these attributes to membership in the category. The relevance of the single border can be determined by choosing an instance that differs from the first only in this respect – perhaps asking about the card in the bottom left-hand corner, as this contains three plain crosses, but has a triple border. If this card is a 'fep', then the single border is not relevant; if the card is not a 'fep', however, then the single border must be relevant. In this way, through successive choices of instances, the relevance of each of the original card's attributes to category membership can be determined. Since each new piece of information rules in or out whole classes of hypotheses, conservative focusing is in general a much more useful strategy.

Bruner *et al.* found that participants using conservative focusing could learn these categories more quickly than those using successive scanning. When Bruner *et al.*'s stimulus materials were devised using cards displaying meaningful attributes (e.g. boy or girl, frowning or smiling), as in Figure 3.8,

(a)   (b)   (c)   (d)
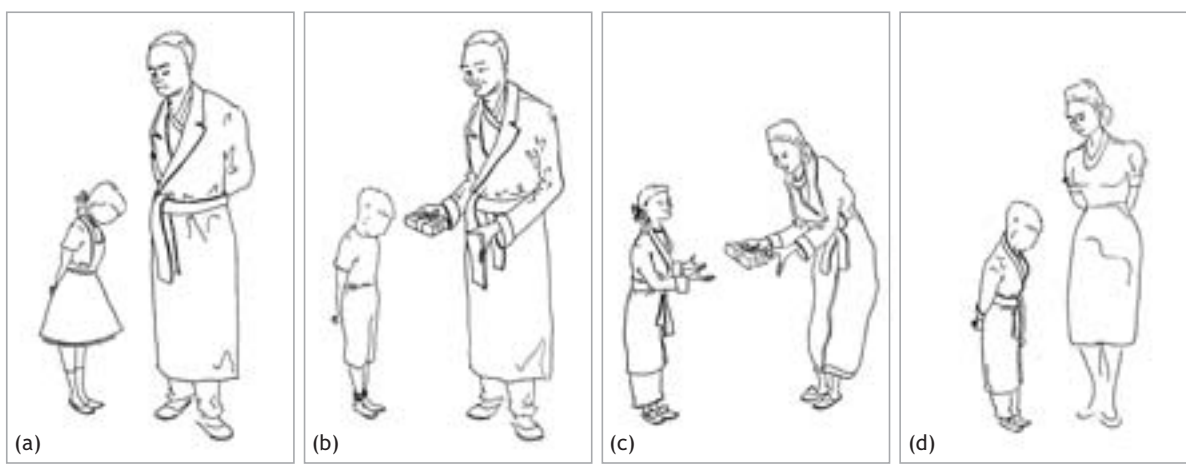
Figure 3.8   Four examples from a 'thematic array' of test materials used by Bruner *et al.* (Source: Bruner *et al.*, 1956, Figure 2, p.107)

participants took longer to learn the category. The researchers suggested that, because of their participants' prior knowledge about the relevance of certain attributes, they tended to ignore logically possible categories that involved combinations of attributes that would be implausible in everyday life. For example, participants might not associate an adult giving a present to a child with the child simultaneously standing as if being rebuked. Because these attributes are meaningful, participants may use this prior knowledge to consider only those categories that would normally make sense.

Developing Bruner's work: meaningful categories

Artificial stimuli
Stimuli devised by the experimenter in order to have no intrinsic meaning.

Ecological validity
The extent to which a study reflects naturally occurring or everyday situations.

Natural categories
Categories that occur naturally and are not invented or devised by the experimenter.

Attributes
Properties of things that are reflected in the structure of concepts.

Bruner *et al.* used **artificial stimuli** because these are largely devoid of prior associations, and so they hoped their findings would better reflect the underlying processes of category learning. Their use of more meaningful attributes showed how these could interfere with their underlying processes, by making it difficult for people to consider all logically possible combinations of attributes. Nonetheless, their studies lack **ecological validity**, and one may question how well their results generalize to more natural learning situations. Unlike the stimuli in Figure 3.7, which can be defined in terms of number of borders, number of objects with a particular shape, and so on, **natural categories** tend not to be definable in terms of combinations of independent attributes. Natural categories seem to cohere, in that their **attributes** belong together for certain reasons – there are connections between them. Birds are not just things that are typically feathered, winged, and able to fly – rather, their being winged and feathered typically *enables* birds to fly, though, of

course, there are exceptions. Murphy and Medin (1985) considered this coherence to be critical to explaining the categories we have. To them, the importance of connections between attributes suggests it may be fruitless to try to list all of the attributes of particular categories (as you would be led to do for the categories of Bruner *et al.*). Murphy and Medin believe that our categories have coherence because our prior knowledge explains the connections between their attributes. Following Murphy and Medin, researchers have tended to focus more on the learning of natural, everyday categories, and have looked for evidence that category learning is supported by prior knowledge.

Murphy and Allopenna (1994) showed the importance of background knowledge in category learning. They asked their participants to learn meaningful categories where the category members had a high proportion of attributes in common. Murphy and Allopenna were interested in how quickly their participants would learn that all the members of the category belonged together. They used meaningful attributes that could all be *linked together* by certain themes. For one category, the relevant theme was 'underwater building' – that is, each of the items in this category possessed attributes that could be inferred to be appropriate for underwater buildings. Murphy and Allopenna reasoned that if their participants could use the fact that the different members of the category were all linked to the same theme, then they would learn the category more quickly. This is what they found. The participants did not try to learn the different attributes of each category member, but used their background knowledge to infer a common theme to link the attributes together.

Kaplan and Murphy (2000) extended our understanding of the influence of prior knowledge. They used categories where each category member possessed only one attribute that was relevant to a theme – the remaining attributes were unrelated to the theme. For example, for the category of 'vehicle', one of the themes used was 'arctic use'. Each category member had six attributes – five unrelated to the theme (e.g. has automatic seat belts, has four doors) and just one theme-related attribute (e.g. made in Norway). Their participants were asked to learn two categories – they had to learn to judge which instances belonged to which category, and were given feedback about their accuracy. This process was repeated for all category members until participants answered all questions correctly. Kaplan and Murphy were interested in how long it would take before their participants had learned the categories. They reasoned that if prior knowledge only *weakly* influenced category learning, then the fact that only one attribute was related to the theme might mean that it would not significantly assist category learning. However, their participants still learned the theme-related category more quickly – approximately twice as quickly as those participants who learned categories with attributes that

could not be related to a theme. It is worth stressing that participants in these experiments were not told the relevant theme, or even that there was a theme to which the category could be linked.

How can these findings be explained? According to Kaplan and Murphy, people quickly infer that the attributes of category members can be linked by a theme, and they then use this knowledge to guide their learning. For example, their participants might have tried to discover how the attributes of an instance (e.g. has automatic seat belts) *could* fit with the theme (e.g. for use in the arctic), in spite of there being no prior association. Trying to discover connections between attributes thus appears to be an important way in which prior knowledge can influence category learning.

Murphy and colleagues have shown that many of the factors Bruner *et al.* tended to exclude from their studies (such as the meaningfulness of attributes, categories, and category labels), actually play a very important role in category learning. This is not to say that the earlier work was in error – it is just that the primary research questions have shifted. Whereas Bruner *et al.* were interested in how we test hypotheses in category learning, more recent work has focused on how background knowledge can help us focus on some hypotheses rather than others. However, a question has been raised as to whether hypothesis testing, guided by background knowledge or not, can ever properly explain category learning. Indeed, it has been suggested that categories simply *cannot* be learned. Yet if categories cannot be learned, what sense are we to make of the studies that appear to show category learning? As we shall see, how we respond to this suggestion that categories cannot be learned has important consequences for how we are to understand the phenomenon we have called category learning.

3.3 Can categories be learned?

The question as to whether categories are learned or innate has a long history. The Greek philosopher Plato argued that our ideas are innate or inborn. He believed that what appears to be learning is actually the 'recollection' of innately specified ideas. He attempted to show this by constructing an imaginary dialogue in which an uneducated person, when appropriately questioned, showed knowledge of complex ideas such as the principles of geometry.

Nativism
The belief that knowledge is mainly or exclusively innate.

Empiricism
The belief that knowledge is mainly or exclusively acquired from empirical evidence – evidence about the world received via our senses.

Plato's position is a prime example of **nativism** – the belief that knowledge is mainly or exclusively innate. Nativism stands in contrast to **empiricism**, the view that knowledge is mainly or exclusively acquired from empirical evidence – that is, evidence about the world that we receive via our senses.

The nativism–empiricism debate about the nature of knowledge is still played out today. For Bruner *et al.*, people *learn* concepts via a process of generating and then refining hypotheses in the light of further evidence. In contrast, the philosopher Jerry Fodor and the linguist Noam Chomsky suggest that categories *cannot be learned*, and that our concepts – our ideas of categories – must be innate. The arguments of Fodor and Chomsky are critical to our understanding of category learning. How we treat these arguments will influence how we interpret empirical studies of category learning such as those of Bruner and Murphy. As we shall see, the arguments have implications for how we understand learning as a process of change.

You may wonder why psychologists should consider the arguments of philosophers and linguists. After all, you may feel that the methods and techniques of cognitive psychology are sufficient to yield a complete understanding of learning. However, cognitive psychology has a long history of looking to other disciplines in order to gain insight into the workings of the mind. An example is the machine metaphor we considered in Section 3.1. Here, foundational research conducted by logicians and early computer scientists gave psychologists an important new means for understanding the mind. And, as indicated above, learning is a topic that has attracted the interest of philosophers over thousands of years. These other disciplines often provide additional argumentation that can contribute to a psychological understanding.

The arguments of Fodor and Chomsky centre on what has become known as the **induction problem**. For all we know, the very next set of experiences we have may throw into confusion the generalizations we have so far relied upon. So although we may generate hypotheses that generalize on the basis of past experiences, these hypotheses cannot be guaranteed to be correct. Consider the discovery of the platypus, which changed fundamentally our beliefs about mammals (Eco, 1999). Previously, people believed that mammals suckled their young, and did not lay eggs. These beliefs were based on observations of mammals. Discovering the platypus revealed how these observations did not serve as a guarantee of future observations of mammals. When platypuses were observed to lay eggs, people ultimately came to modify their earlier beliefs. If it can happen with mammals, then who is to say it cannot happen with more mundane categories such as dogs, cats, and clouds, let alone complex categories such as 'influential people'? Chomsky and Fodor (1980) argue that this **induction problem** presents real difficulties for the argument of

Induction problem
The problem that arises because our past experiences do not serve as a totally reliable guide to our future experiences.

Bruner *et al.* that category learning is based on hypothesis testing. The problem shows that hypotheses that are compatible with empirical evidence at one time may later turn out to be wrong. The implication of this is that when we first generate and then settle on a hypothesis – like the hypothesis that mammals do not lay eggs – there are actually a number of different hypotheses all of which are compatible with the evidence. Usually it is only when the first hypothesis turns out to be wrong that we come to realize there were other hypotheses we had rejected or ignored.

The critical issue raised by the induction problem is this: if several hypotheses are equally compatible with the empirical evidence, how and why do people settle on just one? Chomsky and Fodor (1980) and Fodor (1980) argue that, because the problem of induction indicates that category learning cannot take place by means of hypothesis testing, the only alternative is that category knowledge must be innate. These arguments present a major challenge to the interpretations that cognitive psychologists have offered of category learning. Their suggestion is that what we have taken to be learning is not *learning* at all!

Fodor and Chomsky's position is extreme. Their view is that knowledge of all categories is innate, from simple categories, such as 'red' and 'cold', to complicated ones such as 'subatomic particles'. How plausible is it that our knowledge of subatomic particles is innate? As future science uncovers new categories, ones of which we are currently unaware, how plausible would it be to claim that these 'new' categories were innate? The developmental psychologist Jean Piaget has argued that the absurdity of Fodor and Chomsky's conclusion shows that their argument is in error (see Piattelli-Palmarini, 1980). However, it is one thing to assert that their arguments are wrong; it is quite another to show it. In spite of the controversy of the their position, there have been few convincing counter-arguments since it was first articulated.

If Fodor and Chomsky are right, we will need to reject the idea that categories are learned. But how can we make sense of this when Bruner and Murphy and others claim to have empirical evidence of people learning categories? How might we resolve this tension?

One possibility is that Fodor and Chomsky are talking about somewhat different aspects of learning from psychologists such as Bruner and Murphy. In characterizing categories as being innate, Fodor and Chomsky are claiming that nothing fundamental alters when someone appears to learn a category. In their view, the difference between someone who appears not to have learned a category and someone who does is not that great. Both have innate knowledge of the category, for example. Both have the ability to settle on the right hypothesis for this particular category, as opposed to the countless competing ones compatible with their empirical evidence. The person who appears to have learned the category

has merely succeeded in drawing out their innate knowledge, and has put it to use. The person who appears not to have learned the category possesses the same innate abilities – it is just that they have not drawn out their category knowledge, nor have they put it to use.

Contrast this with the work of Murphy and Bruner. Their studies show considerable differences between those that have and have not learned particular categories. The former reliably identify instances as members of the category. They link their knowledge of the category to their wider knowledge of the world. They reason about the attributes associated with the category, and identify relationships between them and themes that link them together. In terms of information processing, a lot more happens inside the head of someone who appears to have learned a category than that of someone who has not.

At the beginning of this chapter we considered learning in terms of an organism adapting or changing in response to its environment. But we did not consider whether *all* changes could be linked to learning in this way. The tension between the empirical work on category learning and the arguments of Fodor and Chomsky suggests that we may have to consider carefully what kinds of change we can call learning. One way of responding to the arguments of Fodor and Chomsky is to concede that they show that a person's fundamental conceptual resources do not change when they appear to learn a category. If learning is defined as involving fundamental changes in conceptual abilities, then perhaps there is no such thing as category learning. However, if learning involves changes in information processing and behaviour, then perhaps categories are learned after all. So the contrast between the empirical studies, on the one hand, and the arguments of Fodor and Chomsky, on the other, may not be as stark as first it seems. Perhaps the fairest conclusion is that learning is multifaceted, and that the tension arises because researchers are really talking about slightly different aspects of learning.

However, even if we were to define category learning as involving fundamental conceptual change, it is not clear that Fodor's arguments are right. Cowie (1999) suggests problems with Fodor's arguments (though Fodor rejects her analysis), and Fodor himself hints that there may be something wrong: 'What I think it [the argument] shows is really not so much an *a priori* argument for nativism as that there must be some notion of learning that is so incredibly different from the one we have imagined that we don't even know what it would be like as things now stand' (Fodor, 1980, p.269). Fodor suggests that it may be wrong to think of learning as involving hypothesis testing. If he is right then psychologists may need to look for an alternative conceptualization of learning. Where might one look? You may think that Section 4 offers one possibility. It outlines a sociocultural approach to learning, in which

learning is seen as involving more than just an individual learner. However we conceptualize learning, the goal of cognitive psychologists will be to explain the information processing that goes on in individuals when 'learning' occurs.

Summary **Section 3**

- Learning depends not just on the kind of experiences we have, but also on our own abilities to *process the information* we receive, and *relate it to previous knowledge.*
- Bruner *et al.* argued that categories are learned through hypothesis testing. They showed that people differ in the strategies by which they choose to test their hypotheses.
- Murphy and colleagues have shown that people learn categories by seeking to integrate the attributes of new categories with themes suggested by their existing background knowledge.
- Fodor and Chomsky present a serious challenge to theories of category learning by arguing that categories cannot be learned by means of hypothesis testing. The argument relies on the induction problem, according to which there are always many hypotheses compatible with the empirical evidence available to us.
- A response to the arguments of Fodor and Chomsky is to suggest that there are different aspects to learning. Their arguments are pitched in terms of fundamental conceptual abilities, while the empirical evidence examines behaviour and information processing. Another response is to suggest that people may learn categories by means other than hypothesis testing.

4   The sociocultural perspective

The cognitive perspective on learning described in the previous section typically studies how individuals confront and actively make sense of particular learning tasks – the essential challenge being to understand what it is that is going on inside one person's head. In this section, however, we will be asking how mental functioning is related to the interpersonal, cultural, historical and institutional settings in which it occurs. The emphasis will thus shift away from cognitive psychologists' attempts to characterize and understand things 'in the head' – that is, mental

representations. Instead, we will be considering how particular contexts and situations either offer or constrain opportunities for learning. The approach discussed in this section represents what has been described as a **sociocultural perspective** on learning. This view of human learning deliberately attempts to avoid seeing learning as either a purely mental or a purely physical activity and, as the name suggests, the idea of 'culture' is of central importance.

In explaining the significance of culture, Charles Crook (1999) draws upon a biological analogy. In biology, a 'culture' is a chemical medium which supports some form of life (bacteria or perhaps tissue cells), and it makes little sense to characterize an organism without reference to the culture which sustains it. Similarly, seen from a sociocultural perspective, if we want to understand and characterize human learning we have to make reference to the culture that supports and sustains such activity. Thus we need to understand learners' use of cultural tools and technologies and we also need to examine the interpersonal and institutional contexts of learning.

Sociocultural perspective
A perspective on learning which stresses that learning involves the use of tools and artefacts and is embedded within the context of interpersonal relationships, which in turn are embedded in social and cultural systems.

4.1 Learning and the use of tools

In Section 3 of Chapter 2 the technological complexity of human society was discussed with respect to the evolutionary origins of the human mind. In this section we will be considering the significance of technologies and tools for learning. However, as a means of introducing the idea that the use of tools has important consequences for cognition (mental processes), we would like you to consider the impact that different tools and technologies have on mathematical problem solving.

Imagine that we asked you to divide 37,629 by 7.431. How would you approach this task? You might settle down with a paper and pencil and attempt the long division sum by hand, or you might rely on a pocket calculator. Alternatively, you may decide to select the calculator option from the menu bar of your computer. This example illustrates how the actual nature of the cognitive activity involved in producing the answer is significantly affected by whether you use paper and pencil, a calculator or a computer to solve the problem. If you chose to use paper and pencil you would have to lay out the figures on the page, use mental arithmetic, the appropriate calculation conventions and so on. Using a calculator involves knowing the sequence in which to enter the figures and when to use the divide and equals sign. Opting to use a computer would mean that you need to select the appropriate option on the menu bar and know how to enter the figures etc. Your problem-solving activity would have changed depending on your choice of tool.

Whilst the example above clearly relates to solving a problem, rather than learning, the idea that cognitive activity is fundamentally affected by the use of tools and technologies is a key feature of a sociocultural approach to learning. The term 'technologies' may conjure up images of modern 'gadgets' like calculators, computers and so on. However, throughout history people have developed technologies to help them solve practical and intellectual problems and have also used such resources to learn. For example, whilst most of us don't think twice about the act of writing, the technologies of writing (such as the alphabetic symbol system and the associated physical devices such as pens, pencils and paper) are extremely powerful in their effects – culturally, socially and psychologically. You may remember the example in Chapter 1 of how a shift from pen to computer influenced identity for Gergen.

Stop for one moment and consider what life would be like without access to books, newspapers, documents and teaching texts such as DSE212 course materials. What about life minus phone books, address books, diaries and shopping lists? Roger Säljö (1999) claims that it is by pausing to consider such issues that you can begin to see how the ways in which humans learn – retain, reproduce and produce information, knowledge and skills – have changed dramatically since writing became established as a means of documentation and communication.

The key point to note is that human history is characterized by technological change and that human learning involves the mastery of diverse tools and technologies. As Säljö (1999) explains, a fundamental assumption in a sociocultural understanding of learning is that human learning is always learning to do something with tools. But the notion of tools and technologies does not only refer to physical objects such as pens, calculators, computers and so on, it can also be extended to so-called psychological or symbolic tools elaborated within a culture. This means that a mathematical algorithm (a process or set of rules to be followed in calculations or other problem-solving operations) which allows you to do mental arithmetic is just as much a tool as is a pocket calculator. And, perhaps most important of all, language itself (including particular languages elaborated for any particular set of purposes) can also be considered as a psychological tool. In this way of thinking, virtually all intelligent activity involves interacting with a range of tools and technologies, and competence in the use of such tools is central both to intellectual development and to becoming an effective member of society.

Researchers working from a sociocultural perspective thus claim that learning is mediated. In this context, 'mediated' refers to the idea that in between us and the physical and social world are various tools and technologies which affect intelligent activity. The concept of mediation is important as it emphasizes that humans have access to the world around them only indirectly and that *learning is a process that occurs in the interplay between the learner and tools or technologies s/he is using*.

Säljö (1999) has explained how the concept of mediation carries with it important implications for how we conceptualize and study learning: '[The] learning is not only inside the person, but in his or her ability to use a particular set of tools in particular ways and for particular purposes' (Säljö, 1999, p.147). This is why sociocultural researchers often claim that they are interested in understanding what they call 'mediated action'.

James Wertsch (1997, 1998), a leading sociocultural theorist, has explained the properties of mediated action by using the example of pole-vaulting. Here both the pole (a culturally given tool) and the pole-vaulter are intrinsic to the activity. The pole both lends itself to being used in various kinds of ways and at the same time imposes various kinds of constraints. The advent of a new type of pole can make new records possible. Some pole-vaulters will adopt the new pole with enthusiasm and 'make it their own', while others will stick resolutely with the old technology (Light and Littleton, 1999).

This notion of 'making something your own' is referred to as **appropriation**. It is a term specifically used to indicate that tools are not just picked up and put down as and when they are needed, but they become part of how we construe the world, how we approach problems and even how we relate to one another (Light and Littleton, 1999). Appropriation involves more than simply having access to tools and technologies, it involves taking something for one's own use.

Appropriation
To make something
one's own.

A crucial additional point is that tools in general are associated in complex ways with the distribution of power and authority within a culture. In the case of computers, for example, powerful vested interests shape the resources that become available to learners, and issues of access and equity arise (Light, 1997; Light and Littleton, 1999). The issue of power, authority and vested interest in relation to computer technology reminds us that tools and technologies are never experienced in isolation, but only within a contextual whole. According to sociocultural theorists, the tools and technologies around us embody a history of human activity (Crook, 1999), which is why they are often referred to as 'cultural tools'. It is also the case, however, that we are able to utilize their design to engage in distinctive new forms of action. Let's explore this idea a little further by considering a practical example relating to computer technology.

At the time of writing this chapter, governments across Europe are investing significant sums of money in the provision of new computing equipment for schools. Therefore, one of the questions we might want to know the answer to is 'Does using computers make a difference to children's learning experience?'

Activity 3.6

How might you design a research study or studies to address the question posed above? Make a note of your ideas. You should spend about 5 minutes on this activity.

Comment

You could have set about answering this question in lots of ways. For example, you may have thought about designing an experimental study where you investigated whether children's performance on a formal academic test was affected by the nature of the learning resources used – were the results better when the children used a computer-package as opposed to traditional text-based materials? Large *et al.* (1994) designed a study broadly along these lines. They compared children's test results when they had used an encyclopaedia in traditional book format or an encyclopaedia on CD-ROM. They found no significant differences.

This kind of study is perfectly acceptable, and the results are interesting. However, this is not the approach a sociocultural researcher would use to investigate the impact of the CD-ROM technology on children's learning. Given the emphasis on mediated activity in sociocultural theory, a researcher working within this perspective would be interested in the *processes of teaching and learning*, not just the learning outcome as assessed by performance on an academic test. The issue would be how the introduction of the CD-ROM made a difference to the children's learning activity. Here the key question would be 'How is the children's activity re-mediated – that is, distinctively changed – by the introduction of the CD-ROM resource?' Getting answers to this research question would mean adopting a very different approach from that adopted in the Large *et al.* study referred to above. Learning would have to be studied as it happens. This would involve the researcher making detailed observations of the children as they went about their work.

Many sociocultural researchers, however, would not stop there. Recognizing that the work with either the CD-ROM or text-based resource would be part of a broader classroom agenda, many researchers would be keen to avoid de-coupling their observations from the ongoing classroom activity. Thus, a sociocultural researcher might also examine the ways in which the teachers integrated the children's experiences of working with the different technologies into ongoing tutorial dialogues and classroom discussions. As Crook (1999) speculates: 'Perhaps it is this contextualizing work that determines much of a new media's cognitive impact' (p.371).

To give you some idea of the potential insights afforded by a detailed analysis of ongoing learning activity, let's take a look at a small-scale research study conducted by a team of researchers at the Open University. Teresa Keogh and her colleagues (Keogh *et al.*, 2000) examined the nature of talk and joint activity observed in same- or mixed-sex pairs of children engaged in a language task. This task required the assembly of two poems from two jumbled assemblages of lines of the poems presented either on the computer screen or on paper. The findings highlighted the impact that the presence of the computer had on the activity of mixed-sex pairs. When the task was presented on the computer, the boys dominated the activity, both in terms of the physical manipulation of the lines and suggestions for ordering the poems. However, when the task was presented on paper, the activity was distributed pretty much equally between the pair members. Should such findings be replicated, they would clearly carry implications for the organization of classroom computer-based language activities.

Children engaged in a computer-based language task

This concern with practical application and educational intervention is a preoccupation for many sociocultural researchers. Their research is often designed not only to inform theory, but also to make a difference for learners. By understanding the activity of learning, they hope to improve the learning experience for students of all ages. This issue of intervention and application is one that will feature again in the next section, where we discuss people learning together.

4.2 Learning as the joint construction of knowledge: the role of talk

A sociocultural understanding of learning recognizes that social interaction is a central part of human experience, and emphasizes that language is the prime cultural tool for mediating our experience of the world. Knowledge and learning are said to 'circulate amongst us' when we communicate with each other on learning tasks. It is not just that opportunities for discussion prompt individual change, but through discussion and joint activity new forms of understanding emerge. Meaning is thus jointly created by learners working together. Given this, there have been a number of detailed studies addressing the issue of how learning occurs within talk. Some of these have focused on analysing the interaction between parents and their children, and some have studied the ongoing classroom talk between teachers and pupils. More recently, work undertaken in higher education settings has begun to appear. For the purposes of the discussion here, however, we will highlight some recent observational work investigating how children learn and solve problems together (see Box 3.3). Underpinning this research is the notion that a learner's interactions and talk with other people mediate between the learner and the world-to-be-learned-about. So, seen in these terms, understanding learning depends upon understanding the particular types of interactions that serve to foster it.

3.3 FEATURED METHOD

Observational studies

Observational studies involve systematically watching, listening to and recording in some way what people do and say. This may include looking at the kinds of activities they engage in, how they talk, their gestures and their facial expressions. Some researchers use an observational method in naturally occurring settings such as in schools or on the street. Others set up the situations in which they observe participants and then record the naturally occurring behaviour, as is the case in the so-called 'strange situation' procedure where infants are observed in a laboratory made to look like a waiting room. Yet other researchers undertake observations as part of an experimental study. For instance, the Introduction, Section 2.4 discussed the example of Milgram's study of obedience to authority, in which researchers observed the emotional reactions of the male participants as they administered shocks to a 'learner'. Researchers also have to decide whether they want to observe behaviours that are readily categorized or those that involve very fine-grained analysis of behaviour. For example, in classroom settings some researchers observe easily visible and definable non-verbal behaviour, such as a child moving from one

group to another, while others study behaviours that occur for less than a second at a time and that can only be identified by slowing down a videotaped recording. Whatever the particular research context, the key aim is to produce an accurate record of behaviour, and sometimes talk, for analysis and interpretation. Deciding on exactly what to observe and how to observe it is a crucial part of the research process and typically reflects the researcher's theoretical orientation and research interests.

For example, classroom researchers might have a coding scheme already devised on the basis of earlier (or pilot) research and might target the behaviour of certain pupils, recording how often they speak to their teacher, their peers, who they talk to and how animatedly they converse. The coding scheme would explicitly define each category of behaviour or utterance that was to be recorded, such as 'moving from one group to another' or 'asking a question of the teacher'. The researchers would use this coding scheme from the start of the observation. Using the observational method in this way will enable researchers to capture the frequency of different categories of behaviour and then undertake simple quantitative analyses of their data by counting up the occurrence of the different coded behaviours. This requires a very different coding scheme from studies that, for example, want to see *anything* that children do in their classroom over the course of a morning.

There are difficulties in collecting observational data. For example, behaviours and, even more so, utterances are often ambiguous in meaning and this can make coding difficult. One utterance may have multiple functions which cannot be recorded by most coding schemes. As we have seen, some behaviours are difficult to spot and, for this reason, observational studies often require that two observers agree about how they would code behaviours by getting inter-observer agreement. In addition, meanings change and are renegotiated over time. This may be missed in observations done over a short period.

For some researchers, the goal of observational research is to produce detailed qualitative descriptions (rather than the frequencies with which categories occur) and then analyse dynamic processes, themes and meanings. This kind of observational research is illustrated by the work of Neil Mercer and his colleagues (Mercer, 1995; Mercer, 2000). The data that were collected in these observations were both behavioural (what the children did) and symbolic in that the transcripts of what the children *said* were analysed in terms of meanings in order to understand how children jointly construct understanding together in their talk.

Mercer and his colleagues undertook a naturalistic observation study to investigate the nature of primary school children's talk when small groups were working together on computer tasks in classroom contexts. This involved the research team making video-recordings of approximately 50 hours of classroom talk in 10 English primary schools, which they later transcribed and analysed qualitatively.

When the observations of children's sessions of joint work were analysed it was revealed that the children used three distinctively different kinds of talk, which were described as disputational, cumulative and exploratory talk. *Disputational talk* was effectively unproductive disagreement. Such talk was characterized by an initiation (e.g. suggestion or hypothesis or instruction) followed by a challenge (e.g. rejection or a counter-proposition/hypothesis). Initiations were typically accepted either without discussion or with only superficial amendments, and challenges typically lacked clear resolution or else were resolved in ways that meant children accepted that they disagreed. *Cumulative talk* simply added uncritically to what had gone before so that it was part of an accumulation of ideas. In contrast, so called *exploratory talk* demonstrated the active joint engagement of the children with one another's ideas. In this category of talk, initiations of ideas may have been challenged and counter-challenged, but appropriate justifications for challenge were articulated and alternative hypotheses offered. Where alternative accounts were offered they took note of what had previously been said. Progress was thus the result of the joint discussion and acceptance of suggestions.

Mercer and his colleagues acknowledge that all three types of talk are appropriate in certain circumstances, but consider that exploratory talk offers a potential for learning over and above that offered by the other two types of talk. To illustrate exploratory talk and Mercer's qualitative analysis, let us take a closer look at some of the research team's data. The following transcribed extract of talk taken from the research team's recorded observations is followed by the team's brief comments on this material. The sequence shows a group of three 9 to 10-year-old children working on a computer program called Viking England, a historical simulation package, and engaging in exploratory talk:

Planning a raid

Diana: Let's discuss it. Which one shall we go for?

All: (*inaudible – reading from instructions*)

Peter: 1, 2, 3 or 4 (*reading out the number of options available*). Well we've got no other chance of getting more money because ...

Adrian: And there's a monastery.

Diana: And if we take number 2 there's that (*inaudible*) ...

Peter: Yeh but because the huts will be guarded.

All: Yeh.

Adrian: And that will probably be guarded.

Diana: It's surrounded by trees.

Peter: Yeh.

Adrian: And there's a rock guarding us there.

Peter: Yes there's some rocks there. So I think, I think it should be 1.

Adrian: Because the monastery might be unguarded.

Diana: Yes 1.

Adrian: 1 Yeh.

Peter: Yeh but what about 2? That, it might be not guarded. Just because there's huts there it doesn't mean it's not guarded, does it? What do you think?

Diana: Yes, it doesn't mean it's not. It doesn't mean to say it's not guarded does it. It may well be guarded. I think we should go for number 1 because I'm pretty sure it's not guarded.

Adrian: Yeh.

Peter: OK, yes, number 1 (*he keys in 1 on keyboard*). No (*computer responds inappropriately*).

Adrian: You have to use them numbers (*he points to the number keys on right of board, and Peter uses them to obtain the right result. Adrian begins to read from screen display*). 'You have chosen to raid area 1.'

Mercer's commentary

'In this sequence we [...] see some children on task, asking each other questions, commenting and making suggestions. They discuss the various options, and also remind each other of relevant information. They are using talk to share information and plan together. They discuss and evaluate possible courses of action and make joint decisions. There is a lot of explicit reasoning in the talk. What is more, this reasoning is essentially *interactive* – not really reducible to the form and content of individual statements, but more to do with how the discourse as a whole represents a social, shared thought process. There was a lot of this kind of talk in the Viking England activity, in which the children seemed to be reasoning together and building up shared knowledge and understanding to a new level through their talk.'

Source: transcript and commentary from Mercer, 1995, pp.101–4

The notion of ideas and concepts being literally built up in talk and constituted in interactive discourse is an important one for sociocultural theorists and it is an idea which emphasizes how 'personal meanings and understandings are created, negotiated and enriched within interpersonal exchanges' (Crook, 1999, p.369). Learning is seen as a creative process of meaning making and 'although meanings are "in the mind" they have their origins and their significance in the culture in which they are created' (Bruner, 1996, p.3). Murphy (2000) and Grossen and Bachmann (2000) emphasize the need to study the *processes* involved in the joint creation of meaning and understanding, especially since our understanding of these processes has important implications for educational intervention. For example, having recognized the potential value of exploratory talk, Mercer and colleagues set about designing and implementing a programme of intervention to encourage children's use of this type of talk. For these researchers, learning how to use particular forms of 'educated discourse' is as important as learning the specifics of the subject matter in hand. This is because, according to sociocultural theorists, 'an important ingredient in the development of knowledge in society is the creation of specialized forms of discursive practices that allow for precise communication about the world in specific settings' (Säljö, 1999, p.150).

What this means is that, for example, learning psychology is not just about learning psychological concepts, it is also about being able to talk the language of psychology – to appropriate the discourses of psychology and engage in the practices of psychology. Thus the learner gradually takes on the forms as well as the substance of this particular intellectual community – and thereby becomes a member of a community of practice. So, as you study DSE212 you are not simply learning abstract psychological terms and concepts, rather you are learning how and when it is appropriate to use these. In effect you are an apprentice psychologist, learning how to 'do' psychology by engaging in, for example, the practices associated with conducting, analysing and reporting research within recognized conventions.

At this point, it is appropriate to return to an idea which was introduced at the beginning of the chapter – namely, the distinction between 'learning what' and 'learning how'. From a sociocultural perspective, there is no clear separation between what is learned and how knowledge is learned and used.

4.3 Learning as enculturation

The idea that there is no clear demarcation between 'learning what' and 'learning how' leads us on to another central tenet of a sociocultural approach to learning. As Crook and Light (1999) explain, if we want to

understand learning we need to understand it in the particular institutional and cultural contexts in which it occurs. This is because, according to sociocultural theorists, particular contexts either constrain or afford particular opportunities for learning. For example, the particular educational practices we see today in schools and universities are the result of a long period of historical development, and the activities of today's students are largely circumscribed by existing practices and established materials (Crook and Light, 1999). Learners' interactions need to be understood with specific reference to the broader social and historical contexts within which they are positioned, and learning itself is seen as a process of **enculturation**. The following extract, from Seely Brown *et al.* (1989), explains this process:

Enculturation
A process through which people adopt specific cultural practices and act in accordance with cultural norms.

> *Enculturating may, at first, appear to have little to do with learning. But it is, in fact, what people do in learning to speak, read and write, or becoming school children, office workers, researchers and so on. From a very early age and throughout their lives, people, consciously or unconsciously, adopt the behaviour and belief systems of new social groups. Given the chance to observe and practice* in situ *the behavior of members of a culture, people pick up relevant jargon, imitate behavior, and gradually start to act in accordance with its norms. These cultural practices are often extremely complex. Nonetheless, given the opportunity to observe and practice them, people adopt them with great success. Students, for instance, can quickly get an implicit sense of what is suitable diction, what makes a relevant question, what is legitimate or illegitimate behavior in a particular activity. The ease and success with which people do this [...] belie the immense importance of the process.*
>
> *(Seely Brown, 1989, pp.33–4)*

These ideas suggest that in some important sense learners have to 'learn how to learn'. Consider the example of young children starting school. They actually have to 'make sense of school' in order to take advantage of the associated opportunities for learning. As Margaret Jackson (1987) explains:

> *'Making sense of school' involves an increasing awareness of the social environment and an increasing ability to participate effectively in that social environment. Children as active learners, bring to bear their past experiences and their own understandings and perceptions of the situation. These perceptions may not necessarily match the perceptions of the teacher, for learning in school can be very different from learning at home.*
>
> *(Jackson, 1987, p.86)*

Jackson argues that children's academic performance in school is closely related to their competence within the social organization of the classroom

and clearly highlights the problems encountered by children who fail to make sense of school. Just as children have to make sense of school as a learning environment, so too do you have to make sense of the constraints imposed and opportunities afforded by studying psychology as a student within the Open University. You need to make sense of the rituals and routines, and the demands and expectations created by studying in a supported distance education environment. Seen from a sociocultural perspective, then, the clear boundary which is often drawn between the subject matter of cognitive psychology and social psychology is inappropriate. Consider, for example, the relationship between identity formation and meaning. Seen from a sociocultural perspective, processes of learning and identity formation go hand in hand. This suggests the need for work which integrates our understanding of the processes of identity formation (see Chapter 1) with our understanding of learning. Patricia Murphy (2000) studied children working in primary science classrooms. She illustrated, through detailed qualitative analyses of children's talk and joint activity and responses to questionnaires and interviews, the need for 'identity work' to be an integral part of analyses of learning interactions. Her work includes a striking example of a young boy attempting to reconcile his position as a member of a community of boys with his desire for academic success:

> *Science mattered to Lee, and doing well also mattered, which the other boys were aware of. He therefore had to deal with the possibility of being labelled as a 'nerd', a 'keener', a 'boffin'; titles that diminish a boy in the peer culture in schools. The boys, when talking about the [learning] activity, referred to Lee's 'Mega stress telling us all what to do'; 'Lee organized it all'. Organizing activity is typically associated with girls' behaviour, hence this was another threat to Lee's identity in this situation.*

> *(Murphy, 2000, p.150)*

Such research throws into stark relief the limitations of approaches to learning which focus solely on the behaviour or cognitive skills of individuals and illustrates that sociocultural theorists are keen to develop an integrated socioemotional approach to the study of learning.

Summary Section 4

- A sociocultural understanding of learning involves a consideration of learners' use of cultural tools and technologies.
- Sociocultural theorists are interested in the interpersonal and institutional contexts of learning.
- Learning is seen as being mediated by physical tools, such as

computers, and psychological tools, such as language.
- Learning is characterized as a process of enculturation.
- From a sociocultural perspective on learning, the boundaries which are often drawn between the subject matter of cognitive psychology and social psychology are inappropriate.

5   Final word

We have seen how an understanding of learning is important to many different kinds of situation. Understanding how animals change their behaviour in response to relationships between events, how humans change the ways in which they think about the world as composed of categories, and how children and adults use their social and physical environments to acquire new understandings, all involve an analysis of learning. Examining these different situations has led us to consider different ways of viewing learning. One question that remains for researchers is to decide to what extent learning is a unitary phenomenon, and to what extent different learning situations call for different kinds of explanation.

This chapter has looked at different types of learning and different perspectives on learning: the comparative approach, and the cognitive and sociocultural perspectives. So which of them is right? To pose such a question is to play devil's advocate since we would argue against the idea that one perspective is right and the others, by exclusion, are wrong. Different approaches set different tasks and tap different features of a complex system of learning. Some look at behaviour only and others make inferences such as 'The animal has formed an expectancy' or 'The person has formed a category.' There is not necessarily one learning process that is applicable to each situation.

Teaching a dog to salivate to the sound of a bell might concern fundamentally different processes from those involved in teaching a child to recognize a species of bird. In the comparative approach, it was found useful to draw a distinction between learning 'what' and 'how', but this distinction is played down by those who take a sociocultural perspective.

To return to our initial discussion of what constitutes learning, have we found any evidence that each instance of learning corresponds to a change such that an animal, human or otherwise, can behave in a more adaptive way in its environment? It is surely clear that this is so when looking at a comparative approach. Learning to earn food or avoid aversive stimuli

such as thorns clearly enables an animal to fit its environment. Is this also true of the other perspectives?

Successfully acquiring categories represents an economical way of operating in the world. It means that each new instance of experience can be located within an organizing framework. We bring a certain wisdom to a problem and solve it with some economy. Similarly, when looking at a sociocultural perspective, it can be seen that exploiting tools and collaborating with others are ways of equipping a person to survive better in their environment.

Learning takes place within the context of 'what is there already' and predispositions that facilitate some forms of learning rather than others. Animals learn some things with greater ease than others; for example, rats readily associate nausea with the taste of a particular food rather than with a specific visual stimulus. In Section 3, the possibility was raised that some forms of knowledge are innate, perhaps providing the starting point for further elaboration of learning – in the environment. This raises a crucial question about learning. If the appropriate structures and/or some form of innate knowledge are *not* there already, how does learning ever get started?

Another important question for the study of learning is whether an account of learning which focuses on conscious, cognitive processes is sufficient since much learning seems to be dependent upon environmental contingencies and happens without awareness. Moreover, might our understanding of learning be enhanced by the consideration of socioemotional processes such as identity formation? These and other questions continue to stimulate research and debate on the complex topic of learning.

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■ Commentary 3: Three approaches to learning

Learning is a vital, everyday activity. But, as we saw when considering the issue of identities in Chapter 1, everyday and apparently simple psychological issues are far from simple to study and understand. Because there are many different ways in which psychologists have chosen to define and study learning, the authors of Chapter 3 have introduced (1) the comparative approach, which uses research based in the behaviourist perspective, (2) the cognitive perspective on learning, and (3) the sociocultural perspective on learning. So, in this one chapter, you have met three psychological perspectives: behaviourism, cognitive psychology and sociocultural psychology.

Theory

1   Different perspectives can lead to different theories that allow different insights into an issue. This is because they have a different focus and ask different questions.

2   Different perspectives, and different theories, can be *complementary*, *conflicting* or *co-existing*. In the case of learning, the perspectives may be understood as co-existing and therefore as offering different insights into the diverse processes of learning.

3   Different psychological perspectives and theories can provide a variety of ways of applying their findings to everyday psychological problems.

Methods

4   Both the behaviourist and the cognitive perspectives rely primarily on the most common psychological method – experiments. But behaviourists use experiments to explain *behaviour*, whereas cognitive psychologists use experiments and their findings to make *inferences about mental processes*.

5   The comparative approach in psychology depends on the assumption that humans share characteristics with other animals. The behaviourist perspective on learning assumes that research on learning will generalize, at least across vertebrates, and sometimes to other creatures as well.

Themes

6   The theme of change is central to learning. Unlike change as studied in evolutionary psychology, in learning it is confined to change within the lifetime of each human being or non-human animal. Learning in humans may occur below the level of consciousness or may be the result of conscious effort.

■ Thinking about theory

Choosing and using perspectives and theories

Just three chapters into the book we have already made a good start on illustrating the diversity of psychology. The authors in this last chapter have presented three different perspectives that have been used to examine the topic of learning. In this respect the chapter is similar to Chapter 1 ('Identities and diversities'). In Chapter 1 the aspects of identity on which the different perspectives focused were *somewhat* different. But in Chapter 3 the aspects of learning examined within each perspective are *so* different that we might wonder whether the 'learning' of the behaviourist, cognitive and sociocultural psychologists is in fact the same phenomenon.

The authors of the chapter make clear that it is no easy task to decide how best to study learning and that it requires some ingenuity even to *define* learning in ways that help psychologists to investigate it. One way to think about perspectives is to say that each will tend to focus on different aspects of a phenomenon, define it differently and ask different questions. This has certainly been illustrated in the chapter on learning. Turning that around, another way to look at it is to say that psychological phenomena are so complex that they can be defined in a range of ways, with each definition of the subject matter *demanding* a different perspective for investigation and understanding.

Different perspectives lead to different theories. And different theories can provide different insights into the same issue. So what happens when different theories seem to explain the same topic? Some theories may be discarded because they are not supported by evidence. But sometimes, after substantial research, what remains are very different theories, often from very different perspectives, that *are* supported by their own particular kinds of evidence. So how can we view these different theories? In some instances they can be thought of as *complementary*, each enriching understanding of the issue in its own way. Very occasionally there is a possibility of synthesis, i.e. combining the ideas they produce into a unified whole. Theories can, however, be *conflicting*, and in the chapters that follow you will find that there are examples of theories which introduce serious conflict within psychology. Or theories might just *co-exist* – with little or no communication between those who subscribe to them and minimal consideration of how the theories might or might not relate.

You may remember that the three theories considered in Chapter 1 ('Identities and diversities') shared some common features but also produced different and sometimes contradictory ways of thinking about identities (e.g. as 'core' and 'singular' in psychosocial theories or as 'de-centred' and 'plural' in social constructionist theories). For this reason, the three theories of identities could be said to conflicting, at least in some

respects. In the case of learning, the theories, and the perspectives from which they derive, can be understood as co-existing, i.e. as offering different, but not necessarily conflicting, insights into the diverse processes of learning. What we learn from observing animal learning can be put alongside what we know about how people *think* when learning; and the sociocultural conditions that facilitate learning can be thought of as providing a fuller picture of learning as a broad topic. So, whilst psychologists differ in what they believe is most important in the study of learning, such differences between perspectives could be viewed as potentially mutually enriching.

But, on the other hand, and as is often the case, we could claim that the theories simply co-exist because there is virtually no communication between those who subscribe to the different underlying perspectives. In other respects the perspectives themselves could be said to be conflicting. Most clearly, the behaviourist perspective conflicts with the cognitive perspective on the issue of mental processes and whether the focus should be on just behaviour or behaviour that is essentially used to make inferences about what goes on 'in the head'.

As with all theories, the question of whether particular theories are 'correct' cannot be conclusively answered. The more research is done, however, the more we can be certain which theories *do not work*. It is through this process of continual testing, challenging and refining of theories that psychology progresses.

Applying psychological knowledge

There is sometimes another way to think about complementary, conflicting and co-existing theories, and the perspectives from which they derive. We can consider the usefulness of their particular findings – their practical applications. In Chapter 1, the three theories of identity were compared to see how well they could be applied to the everyday identities of people with physical impairments. This 'usefulness' can be one way to evaluate the different theories.

Chapter 3 illustrates this important potential of theories – that they can be *applied* in order to change the world in ways that we hope will be beneficial. (See also the second course book and particularly the third book, *Applying Psychology*). The principles established by the behaviourist perspective on learning, such as the law of effect (one of the most robust laws we have in psychology) certainly have practical value. Applications of behaviourist learning theory based on Skinner's operant conditioning include behaviour modification (for problematic behaviour) and the treatment of patients in some clinical settings. Research using classical conditioning has produced methods of desensitizing people with phobias. In a very different way, the sociocultural perspective provides many insights into how children's learning at school may best be facilitated; for

example, Mercer's suggestion regarding the teaching of explicit ground rules for exploratory talk in collaborative work.

Mapping traditions

Contemporary perspectives in psychology have their roots in different historical traditions. The chapter you have just read is helpful in presenting three important traditions in psychology. You can track these traditions and their variants by using *EPoCH*. You can either enter the names of influential psychologists or the names of the perspectives themselves – behaviourism, cognitive psychology and sociocultural psychology.

There was a time when behaviourism was the dominant perspective in psychology; it has a long tradition and continues to be influential. In this tradition the use of an outsider viewpoint and behavioural data were considered to be the only legitimate way to understand psychology. Some psychologists still take this strong position. But many others, although continuing to use mainly behavioural data, would not think of themselves as being part of the strictly behaviourist tradition.

The second perspective on learning introduced in Chapter 3 is cognitive psychology. This broad perspective on psychology could be said to have begun with the 'cognitive revolution' of the 1960s that brought back into psychology a primary interest in what goes on in the mind. But, historically, the cognitive tradition began much earlier than this. In Chapter 3 you saw that a concern with mental processes, such as *purposes* (e.g. the work of Tolman, as early as 1932) and *representations* that exist in some form in the mind (e.g. 'expectancies'), has long been present in the study of learning. This concern came to be thought of as a move away from behaviourism (which was particularly concerned with learning) towards cognitive psychology. But the cognitive tradition was also influencing other areas of psychology and, in fact, its roots *predate* behaviourism.

Interest in thinking, concepts, language and consciousness all came before the focus on overt behaviour. The shift in focus to behaviour – the radical innovation of behaviourism – began as a reaction against the methodological difficulties of studying abstract mental processes. In Wundt's laboratory (opened in 1879), there were attempts to study thinking. As early as 1885, Ebbinghaus, a psychologist who began the empirical work on memory, tried to find out about the mental processes of memory by systematically recording his own capacity to recall nonsense words that he had set out to learn. You will meet this work in Chapter 8, 'Memory: structures, processes and skills'. In the chapter on memory you will also read about a different strand of the cognitive tradition, the work of Bartlett. Bartlett, who published his work as early as 1932, was interested in our memory for meaningful materials (like stories) and schemata – the ways in which knowledge seems to represented in the mind. Yet another strand of the cognitive tradition is the information-processing approach to attention

which will feature in Chapter 6 ('Perception and attention'). All these strands, together with other more recent influences like cognitive neuropsychology, philosophy and computer science, make up the contemporary perspective of cognitive psychology.

The sociocultural perspective, the third perspective discussed in the learning chapter, is a relatively new tradition and can be seen as part of what was identified in the Introduction as the 'second cognitive revolution'. This move in psychology emphasized the importance of investigating cognition by studying how meaning is created through participation in cultural practices and through language. According to the sociocultural approach, learning is always affected by the culture in which it takes place and is simultaneously cognitive, social, emotional, and part of a developmental process.

■ Thinking about methods
Diversity of methods
Because different perspectives are presented in the learning chapter, different methods are also described. However, there are also some similarities in method between the different perspectives. For example, behaviourist theories *and* cognitive theories of learning both rely on experiments. The first featured method box in the chapter illustrates the basic principles of experimental method with a behaviourist example, using animals. The cognitive psychology approach to learning concentrates on experiments where *humans* are the participants – because the cognitive perspective is concerned with the human mind. Thus, Bruner and his colleagues' experiments are designed to understand what is going on inside people's heads as they learn to categorize – how they respond to particular learning tasks. In Section 4 on the sociocultural perspective, observation is seen as its favoured method, and the second featured method box discusses different kinds of observational study. However, some researchers in this tradition do use experiments in their work.

Comparative method
Behaviourism uses what is known as the comparative method, taking for granted the idea that we share characteristics with a variety of animals, not just primates as in the chapter on evolutionary psychology, and that this can be usefully exploited in research. The experiments used by behaviourist researchers are designed to study the behaviour that is observable as non-human animals learn. Studies of classical and operant conditioning have used rats, pigeons and other animals as experimental subjects. This is because the behaviourist perspective assumes that research on learning will generalize, for the most part, across vertebrates (and sometimes other creatures). As in Chapter 2 ('Evolutionary psychology'), the authors bring together an understanding of what research

on human and non-human animals can contribute to an understanding of human psychology.

■ Thinking about themes

Fixity and change

Learning is about change, but change of a very different kind from that discussed in Chapter 2 ('Evolutionary psychology'). Evolution, as we have seen, is about change over extremely long periods of time. Learning, on the other hand, is the process by which humans and other animals acquire skills and information over the course of their lifetimes.

Learning can be viewed as change that occurs in response to what animals and humans experience in their environments; it is often a form of adaptation. In one sense, all the theories discussed in Chapter 3 are about how animals (human and non-human) are able to adapt to their environments within a generation. Therefore, one important focus is on the ways in which animals can be flexible in response to environmental influences. But this doesn't necessarily mean that the adaptation and learning are purposive. For the most part, as in classical conditioning, instrumental learning and a great deal of category formation, the adaptation and learning are below the level of consciousness. This is a different kind of change from that associated with the curiosity and goal-oriented learning activities in the classroom, as described in Section 4 of the chapter.

In the chapter that follows (Chapter 4, 'Biological processes and psychological explanation'), the author carries forward the themes of fixity and change, examining the ways in which animals adapt to their environments *and* how they maintain internal equilibrium (i.e. stability or fixity) through the process of homeostasis.

Biological processes and psychological explanation

Frederick Toates

Contents

▉ Aims

This chapter aims to:

- introduce enough of the basics of biology so that you can appreciate the relevance of the subject to the study of psychology
- present the argument that the relationship between biology and psychology is a reciprocal one, in that each discipline can call upon the other for insight
- encourage a critical stance towards the use of biological processes in psychological explanation.

1   Introduction

This chapter is about the insights into psychology that can be gained by looking at biological processes. Many of the chapters in this course consider aspects of psychology that can be illuminated with the help of biological understandings and explanations. For example, in Chapter 3 you considered processes such as forming new associations between stimuli and responses, and developing and using categories. You will have learnt that cognitive approaches could be developed without looking at what might be happening 'inside the brain'. However, knowledge of the brain can enhance such psychological explanation.

Popular and scientific literature contains frequent references to psychology and the brain. For example, it looks at how the structure and activity of the brain can illuminate differences between the sexes or reveal what has 'gone wrong' in the case of violent criminals. There are even claims for the existence of particular parts of the brain that underlie religious experience (Albright, 2000). Religious belief involves complex ideas, goals and feelings; and from a biological view, it could be argued that religious ecstasy, as experienced by saints and mystics, is associated with overactivity of certain brain regions. In terms of the discussion of evolutionary psychology in Chapter 2, it might even be argued that these brain regions have evolved to serve a particular function, since a belief in a God might confer an evolutionary advantage, such as helping to consolidate group action. This chapter will encourage a critical look at such claims.

So, what is biology? It is the science of living things. It looks at animals and plants and concerns their bodily structure and lifestyle. Among other

Physiology
The study of the structure and function of the body.

things, it looks at the components that make-up the body of an animal, such as the brain, heart and lungs, and it examines how animals (including humans) coordinate their actions. This field of biology is termed **physiology**. Biology also looks at the whole animal in its environment, considering such things as how it defends itself, obtains and digests food, and how it mates. Of course, only a limited part of biology is of direct relevance to psychology and that is the part that will occupy this chapter.

We start life as a single fertilized egg in our mother's womb. From this, the adult develops. Our adult form is the outcome of the complex interdependence between biological structures and the environment. First, there is the environment of the egg in the womb, developing into a foetus that is sensitive to taste, smell, sound and movement. Later, there is the environment outside the womb. The environment has both physical and social dimensions, for example that of the mother–infant interaction of suckling. To understand psychological development, we need some knowledge of biology and how the biological being is locked into interaction with its environment.

We are a biological species with bodies that are comparable, in some respects, to those of apes, cats and rats. But in other respects, we are a special species, with the unique capacity to utilize a complex symbolic language and to reflect upon our conscious awareness (as we have seen in Chapters 1 and 3 in this book, and will return to in other places throughout the course). Nonetheless, we are part of the biological world and viewing us in this light can give psychological insights. Our principal interest in this chapter is with the physiology of the human body, especially the brain, and how a study of it can enhance our understanding of behaviour and mental processes. Among other things, we shall ask – what is the relationship between the mind, with its conscious and unconscious aspects, and the physical body?

There are a number of ways in which a study of the brain can illuminate psychology. For example, brain damage can disrupt normal psychological function, such as memory. What happens when a patient with damage to a part of the brain involved in a particular form of memory is set the task of learning to perform a difficult mechanical skill by hand? An example of such a task is to trace a figure while viewing the hand in a mirror that reverses everything left to right. Typically, the patient gets better at the task with practice (Milner, 1966). However, despite repeated experience of the task, the patient fails to remember having done it before and even fails to recognize the psychologist organizing the investigation. This points to a disruption of certain types of memory (e.g. for people), while other types (e.g. a mechanical skill) remain intact. A psychological classification of

learning and memory, for example into 'what' and 'how' (see Chapter 3), might therefore draw upon evidence from a biological perspective in this way.

A person's brain can be scanned with special equipment to observe the activity of different regions. Low activity in a region may suggest malfunction, which can often be linked to psychological malfunction in such things as memory. In some cases of brain damage, a patient can react appropriately to the appearance of an object in their visual field but has no conscious awareness of seeing it (Weiskrantz, 1976). In effect the patient says, 'The object, which I did not see, was moving to the left'. This evidence from the analysis of biological damage suggests a dissociation between conscious and unconscious determinants of behaviour, something of central concern to psychologists.

Psychologists like to theorize about behaviour and the mind. Given two rival theories, one might logically favour that which fits a contemporary, biological understanding of the brain. The aim of the present chapter is to show how to relate phenomena of interest to psychologists to underlying biological processes.

Summary Section 1

- A biological psychology perspective encompasses different areas of study such as development, evolution, genetics and physiology.
- Physiology looks at the components of the body, how they interact and how they are involved in the control of behaviour.
- Studying the brain can provide insights into psychological processes and the determinants of behaviour.

2 The role of biology in psychological explanation

What is the exact role and status of biology in terms of providing insights into behaviour and the mind? How should biology be used in psychology? Authors in both the popular media and scientific literature sometimes suggest that explanations for even complex psychological phenomena can *only* be found by looking at genes and brain structure. This approach is exemplified by the influential biologist Francis Crick. In his outspoken

work entitled *The Astonishing Hypothesis – The Scientific Search for the Soul*, Crick suggests:

> *... that "You", your joys and your sorrows, your memories and your ambitions, your sense of personal identity and free will, are in fact no more than the behaviour of a vast assembly of nerve cells and their associated molecules.*

> *(Crick, 1994, p.3)*

Reductionism
An approach to scientific explanation that seeks insight by reducing to a smaller scale of explanation.

Here, Crick articulates a belief in **reductionism**: that potentially all psychological events and experiences can be fully and only explained in terms of the activity within the components of the brain. Since brain science is considered to be both necessary and sufficient to explain psychological phenomena, such phenomena are 'reduced' to a lower level of analysis. In this context, 'lower' means smaller scale and Crick, for example, would argue that complex social phenomena might be explained in terms of genes and the biology of the brain.

The approach underlying the present chapter is different from that of Crick and is based on a number of assumptions (Bolton and Hill, 1996; Stevens, 1996; Toates, 2001):

1   No single discipline (e.g. psychology or biology) has a monopoly on the truth or a superior perspective. We can gain an insight by drawing on knowledge from various disciplines.
2   There are particular laws and principles applicable at a psychological level and these cannot be reduced to the laws of biology, chemistry and physics.
3   The laws and principles of biology apply to both non-humans and humans.
4   Our task is to relate the laws and principles of psychology to those of biology and vice versa.
5   The biologically orientated psychologist (like myself) sits at the frontier of the biological and social sciences, familiar enough with both approaches to see the indispensable role of each.

The relationship between biology and psychology is reciprocal. For example, in one study non-human primates were injected with a standard dose of the drug amphetamine, which influenced their behaviour, but not in any consistent way (Cacioppo and Berntson, 1992). However, sense could be made of the data once the issue of social hierarchy was considered. For animals high in the social hierarchy, amphetamine increased their tendency to dominance, whereas for those that were low in the hierarchy, it increased their tendency to show submissive behaviour in the face of a more dominant animal. An analysis of events within the body on a purely

biological level might well have missed an important determining factor in the behaviour of the animals: the influence of social context (Cacioppo and Berntson, 1992).

Another illustration of the relationship between biology and psychology is the link between psychological states and the well-being of the heart and circulation (Allan and Scheidt, 1996). A negative psychological state, such as hostility, has a number of effects in the body including an increased release of fatty substances that can block blood vessels. This effect is less likely when the person is in a positive psychological state.

This chapter takes as a given that biological and psychological factors interact in important ways and adopts what can be termed a 'biological psychology perspective'.

2.1 A biological psychology perspective

Consider the following case. A person goes to their doctor complaining of depression. The doctor might consider some kind of psychological intervention, such as counselling or therapy, to investigate the patient's thought processes, behaviour patterns and social relationships. The doctor might also believe that biological intervention could be useful and may prescribe medication such as Prozac, which is an anti-depressant drug that has a particular influence on the chemicals in the brain – one that is understood by the biological and chemical sciences. However, the psychological and biological levels of intervention are not mutually exclusive. Good doctors and therapists will consider the mode of action of the drug and any changes in behaviour and thought processes that it might trigger. They will know that the specific chemistry of the drug is only one factor in its efficacy, since the patient's beliefs and the therapist's attitudes to both the drug and patient might affect the outcome. The drug can affect chemicals in the brain in such a way as to influence positively the outcome of psychological therapy. This case exemplifies the approach that will be adopted in this chapter: the integration of biology and psychology, meaning that we are dealing with one unified system, having both biological and psychological aspects.

The biological psychology perspective advanced here rejects the exclusive reductionism expressed earlier by Crick, whereby that which is of interest to psychologists is described in terms of 'nothing but' the structure of our brains (MacKay, 1974). But, if we reject the idea that biology can explain everything, what is left? What exactly is this domain that is of peculiar interest to the psychologist? How might we relate it to the biology of the brain?

2.2 Analogies and emergent properties

How do we relate the phenomena of mental life to an understanding of the brain? The task can appear daunting, even to those who dedicate their lives to solving it. However, explanation in this area, as elsewhere, appears to be aided somewhat by appealing to analogies (MacKay, 1974). Take a look at Figure 4.1. What does it show? A series of dots or a meaningful sign? For some purposes, it might be described as a series of dots, formed on a white surface from ink which has a particular chemical composition. For other purposes, such as finding your way, it is more usefully described as a sign. It would be futile to argue over which is the more 'accurate' or 'better' description of Figure 4.1.

Figure 4.1   A series of dots or a meaningful sign?

Applied to our area of concern, what does the example in Figure 4.1 suggest? The discourse about the brain traditionally used by the biologist could be thought of as analogous to the pattern of dots; and that of thought, cognition and mind, traditionally used by the psychologist, as analogous to the meaningful sign. These are two different levels of description of the same underlying reality.

For another illustration, consider that water consists of two gases, hydrogen and oxygen. At one level, it might be described in terms of these constituents. At another level water may best be described as a liquid with particular distinct properties such as wetness and a tendency to flow. This example serves to illustrate an important principle, that of an **emergent property**.

Emergent property
A property exhibited by a combination of components, which is not evident when looking at the properties of the individual components alone.

When the gases oxygen and hydrogen combine, something new, with distinct properties, emerges – liquidity. The properties of liquidity are not evident when looking at the component gases, but are absolutely dependent upon them. The notion of emergent properties is a suitable motif for the present chapter. We could suggest that mental and behavioural phenomena arise from the properties of the physical brain in interaction with the physical and social environment. This raises an issue that has exercised many academics and which has deep implications for how we view ourselves and our fellow humans. We shall turn to this next.

2.3 Issues of mind-brain

Activity 4.1

Try asking some of your family and friends how they view the brain and the mind. How do they define each? How are they related? What is special about the brain and the mind in the context of an individual's personal identity?

Some people might describe the brain, but not the mind, in material terms. For instance, at autopsy, a brain can be weighed and its content analysed in terms of chemicals. The brain exists at a particular point in time and a place in space. Minds on the other hand are sometimes described as not following physical and chemical principles and as having some different mode of existence. This idea is closely associated with the views of the French philosopher René Descartes (1596–1650).

Figure 4.2 shows an example of behaviour discussed by René Descartes. Given a stimulus such as the heat of the flame, the body reacts in a predictable, 'reflex' way (in this case, to move a limb away from the heat).

Descartes was in the habit of spending time in the gardens of St. Germain-en-Laye, near Paris. He was fascinated by the automatons there. These were hydraulically activated statues of monsters, triggered into movement by a visitor stepping on a pedal. Given the stimulus, a monster would suddenly spring out of the bushes and squirt water into the faces of the visitors.

Figure 4.2 Behaviour as described by Descartes

Descartes suggested that non-human behaviour (and some human behaviour) was like this: an automatic response to a stimulus. However, he suggested that over and above such stimulus–response mechanisms, humans have a reasoning mind (or 'soul') that could intervene and produce behaviour that was not automatic. Non-humans did not possess this and lacked immortal souls. The idea of **dualism**, a fundamental distinction between two aspects of human existence, mind and body, is associated most closely with Descartes. However, in studying brain and behaviour, very few psychologists or biologists now subscribe to dualistic principles in the tradition of Descartes. The majority opinion

Dualism
A philosophical perspective that draws an absolute distinction between the brain and mind.

rejects the idea that a mind can have an existence distinct from the physical brain.

In terms of emergent properties, biological psychologists would suggest that cognition, the mind, and conscious and unconscious awareness, all emerge from a certain combination of brain components operating in a particular way in interaction with an environment.

These philosophical considerations will be investigated in more detail in Chapter 4 of the second course book, *Challenging Psychological Issues*. Now it is time to turn to some basic biology, chosen for its relevance to understanding psychological phenomena.

Summary Section 2

- A reductionist perspective sees the possibility of reducing psychological phenomena to a complete explanation in terms of biological structures and processes, such as components of the brain.
- Although the present chapter will look to biological processes for an understanding of psychological phenomena, it will not attempt a reduction to biology.
- The philosophy advanced here – an integrative biological psychology perspective – is that there exist parallel and interdependent biological, psychological and social processes.
- The biological psychology perspective recognizes that explanation is a two-way process: physiological events depend, in part, upon psychological and social context.
- When components combine, something new, with distinct properties, emerges. Psychological phenomena might be described as emerging from the brain in interaction with the environment.
- Some theorists have suggested a fundamental dualism between material brain events and a non-material mind. However, these days within psychology, the mind is usually described as an emergent property of the brain.

3 Some basic biology

As with any new subject there are some basic concepts and terms that need to be understood. This section does not attempt to explain biology as a subject in its own right. Rather, it introduces just enough basic biology for you to understand the bases of a biological psychology perspective.

3.1 Cells – general and specialized

A fundamental principle in biology is that animals can be described in terms of the components that constitute the body. The body is composed of billions of very basic building blocks termed **cells**. Cells might be compared with the individual humans that form a society. Like people, there are variations in the function of different cells. Some cells, for example, form the structure of the skin and lungs. Mobile cells, in contrast, include red blood cells which transport oxygen, and specialist immune cells which are recruited to fight bacteria and viruses. Although there are differences in function, cells do have some common properties. As illustrated in Figure 4.3, each cell is surrounded by a cell membrane which, to some extent, separates the environment within the cell from the external environment. All cells require the nutrients and oxygen brought by the blood and a means of disposing of waste.

Cell
A basic building block of an organism.

Figure 4.3　Some cells of the body (Source: Toates, 1998, Figure 2.1, p.25)

As psychologists, our principal interest amongst cells is in a particular type – the **neuron** – which serves the function of communication and control. Neurons form the basic building blocks of systems that are directly involved with behaviour. The network of all the neurons of the body, together with some closely associated cells, is termed the **nervous system.**

The nervous system will form a principal focus of this chapter and will be discussed further in Section 3.3. We shall be concerned with how variations in the functioning of the nervous system in individual people can be associated with differences in behaviour and the mind (for example, differences in temperament). Before we look at how neurons and nervous systems function, we will consider some broader, fundamental principles of biology.

Neuron
A type of cell that forms part of the nervous system and which is specialized for processing information.

Nervous system
The collection of cells in the body, such as neurons, that handles and processes information.

3.2 Physiology, motivation and behaviour

Through evolution, animals have emerged with physical and behavioural characteristics that maximize their chances of survival and reproduction. Viewed in this context, we can make sense of their behaviour by means of a functional explanation. This relates behaviour to its 'adaptive value' in evolutionary terms. Understanding such principles is essential when we ask – how much of human behaviour can be understood in terms of its evolutionary roots and its adaptive value? For example, it is not obvious how seemingly maladaptive behaviour such as drug-taking can be explained. However, a close look at adaptation provides a valuable context. Consider the following examples of the functions served by different behaviours.

An animal has mechanisms for locating and ingesting nutrients and water. These mechanisms take account of the external availability of food and the internal conditions (sometimes described as 'need states') of the animal. As a result, food tends to be selected at times that are appropriate for survival. Feeding **motivation** is aroused at these times. An animal such as a rat exhibits curiosity; it regularly explores its environment, paying particular attention to any changes. This maximizes its chances of locating sources of food.

Life is something of a juggling act in which humans, like other animals, balance conflicting requirements, such as whether to mate or feed, whether to flee, freeze or attack. Psychologists postulate a series of motivations (e.g. feeding, exploratory and sexual) which compete for expression in behaviour. These depend upon internal and external factors. For instance, energy deficiency increases the strength of feeding motivation. A system of prioritization is assumed to select which motivation is to gain expression. For example, feeding or mating would be interrupted by fear if a predator or potential attacker appears. Mechanisms of aggression and fear exist to protect the animal from danger. Evolution has been assumed to shape such processes in a way that has maximized survival and opportunities for reproduction (McFarland, 1976).

Homeostasis

Think about the psychological importance of maintaining body temperature. Excessive cold or heat occupies your conscious awareness and relentlessly goads you to take corrective action. The body can only function provided that conditions within it remain close to the optimal value, where the body functions best. For example, for a species such as a human, body temperature cannot depart far from 37°C if the individual is to survive. In the same way, neurons can only function within an optimal range of internal temperatures. For a similar example, the human body normally consists of some 69 per cent water, and this level is crucial to survival.

Variables such as temperature and body fluid level exhibit **regulation** (Cabanac and Russek, 1982). If there is a deviation of the value of these variables from the norm, action, described as **control**, is effected. Control of body temperature involves physiological actions such as sweating or shivering and behaviour such as building a shelter or moving into the shade. Control exerted in the interests of body fluid regulation involves changes in thirst motivation and drinking, and urine production.

The processes whereby physiological variables are regulated and corrective action is taken to keep them within close limits is termed **homeostasis** (meaning 'near to standing still'). We speak of 'homeostatic behaviour' such as drinking, feeding and seeking shelter at times of cold exposure. In humans, conscious awareness can be occupied by a negative

Motivation
A tendency to engage in a particular type of behaviour, such as feeding.

Regulation
The maintenance of stable conditions for bodily variables such as temperature.

Control
Action that is exerted in the interests of regulation.

Homeostasis
The tendency of certain parameters of the body to remain nearly constant and action to be taken when they

emotion associated with, say, cold or thirst and thoughts of how to correct it. Correction of deviations from the optimal is usually associated with powerful pleasure, such as that of a person in the desert finding water.

deviate from their normal values.

   Information from both the internal body and the external world is integrated in determining behaviour. For example, in deciding to feed, the brain is informed of both nutrient levels and the availability of food. The following section looks at some of the bases of this communication.

3.3 Communication and control

How is information communicated within the body and used in determining behaviour and mental states? For example, humans and other animals react to tissue damage by removing themselves from the source of damage. How is such information communicated? How is this behaviour mediated? The present section looks at two biological communication mechanisms: the nervous system and hormones.

Neurons and the nervous system

Neurons are specialized to convey and process information. Neurons come in many shapes and sizes as shown in Figure 4.4. Take note of the two components of the neurons in Figure 4.4 – the **cell body** and a long extension termed a **process**. Groups of neurons combine to form **neural systems** that perform a particular function, such as to arouse the motivation to seek food. Neural systems are of interest to psychologists since their role in a particular behaviour or cognition can sometimes be identified.

Cell body
The cell body is the part of a neuron that contains the nucleus, amongst other things.

Process
A part of a neuron, an extension.

Neural system
A combination of neurons that serve a particular role.
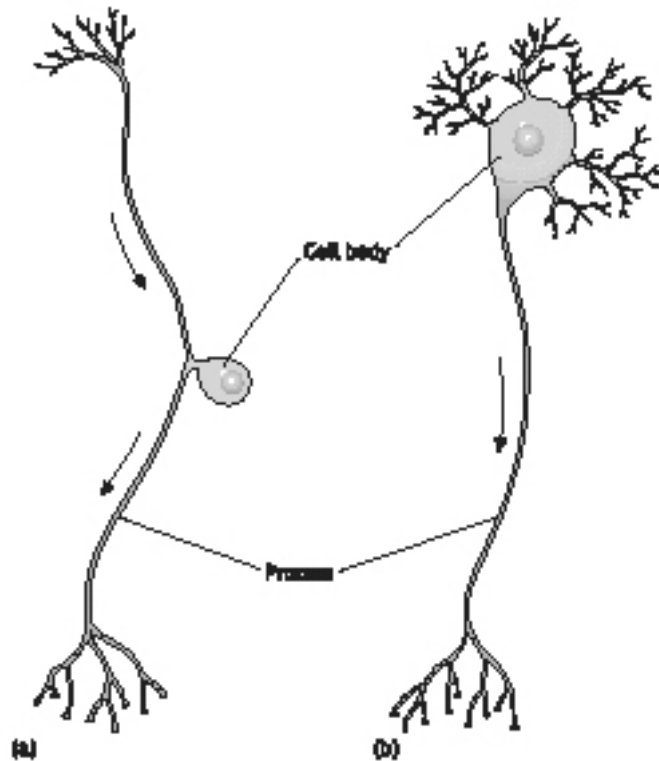
Figure 4.4   Neurons (a) with the cell body to one side of the main process and (b) with
the cell body towards one end of the main process (Source: adapted from
Martini *et al.*, 2000, Figure 13-10, p.340)

Spinal cord
A collection of neurons
housed within the
backbone.

**Central nervous
system**
The brain and spinal
cord.

**Peripheral nervous
system**
The part of the nervous
system that is outside the
brain and spinal cord.

Most neurons are in the brain but, as Figure 4.5 shows, they are also
found throughout the body, particularly in the **spinal cord**. The spinal
cord is located within the spine and is surrounded by the backbone.
It consists of a column of neurons, many of which extend throughout
the length of the spinal cord. The brain and spinal cord together
constitute the **central nervous system.** The neurons that are outside
the central nervous system constitute the **peripheral nervous
system.**

Neurons in the brain form the basis of our mental life. We can gain
an insight into how they operate by looking at a simple reflex reaction.
Figure 4.6(b) illustrates a segment of spinal cord and one role of some
neurons located there. If a sharp object comes into contact with the
skin of the foot, the tips of a number of neurons located at the skin
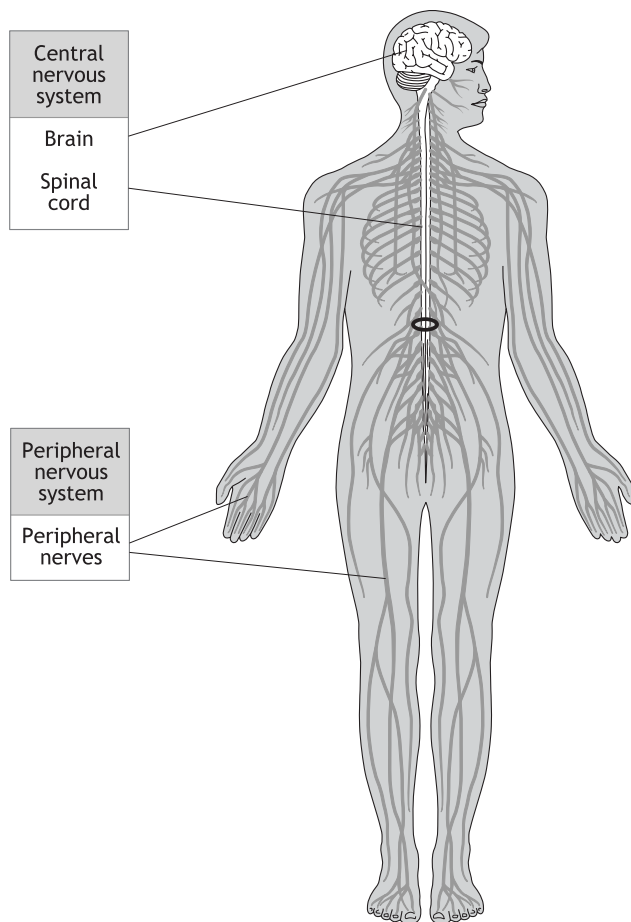
Figure 4.5   The nervous system (Source: adapted from Martini *et al.*, 2000,
                 Figure 13-1, p.330)

(represented by the single neuron, labelled 1) serve as **detectors** to
this damage. When these neurons are stimulated, as in the case of tissue
damage, an electro-chemical reaction occurs, setting up electrical activity in
these neurons (see Section 4.1 for further discussion). This forms part of
the communication network, with 'messages' transmitted towards the spinal
cord. At the spinal cord, the 'messages' are routed through neurons, such as
those labelled 2, 3 and 4 in Figure 4.6(b), towards muscles which cause the
reflex withdrawal of the foot from the sharp object. Within the spinal cord,
neurons also carry messages on tissue damage up to the brain, where they
contribute to triggering the sensation of pain.

Detector
A neuron or part of a
neuron that is sensitive to
events in the world, such
as touch or tissue
damage.

Central
nervous
system

Brain

Spinal
cord

Peripheral
nervous
system

Peripheral
nerves

Sharp object

Skin

To brain

1

2

3

4

Muscle

(a)

(b)
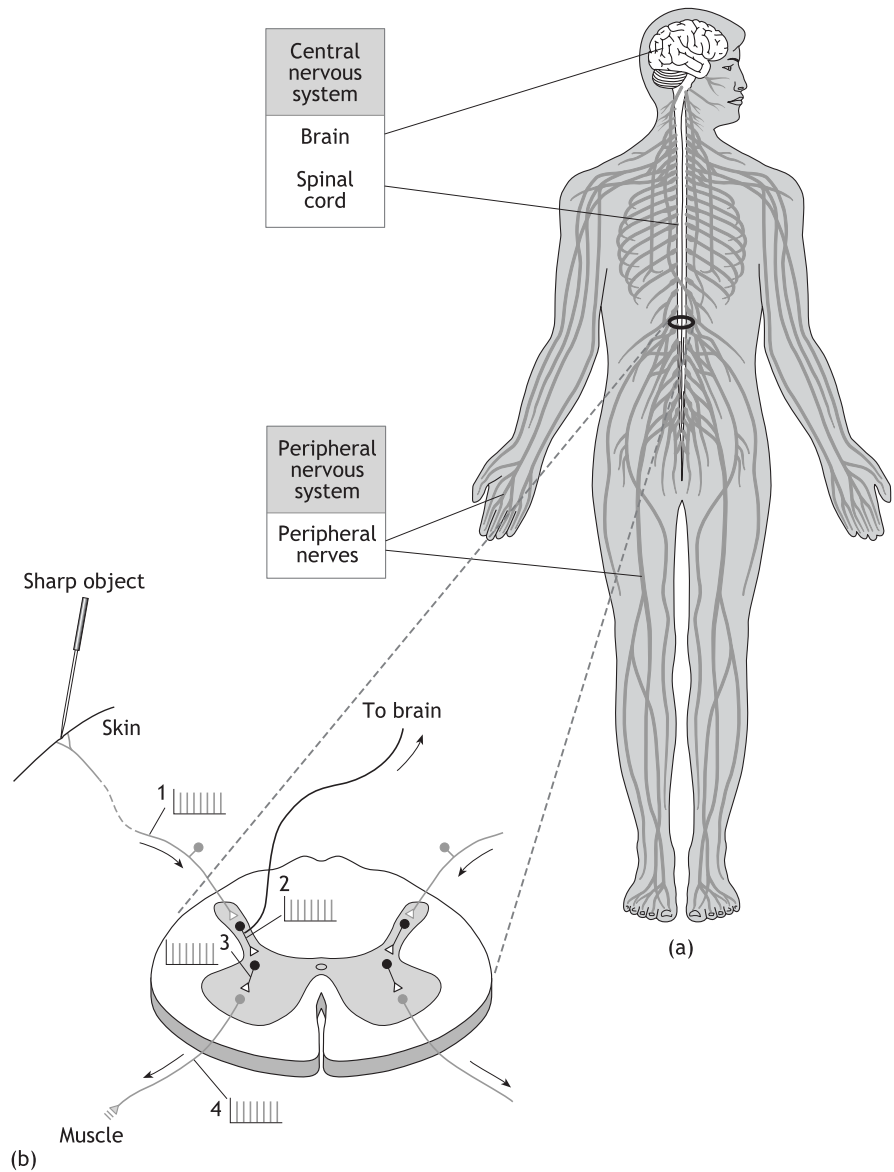
Figure 4.6   The (a) nervous system and (b) a section of spinal cord, showing the
neuronal system involved in defence against tissue damage (Source: adapted
from Martini *et al.*, 2000, Figure 13-1, p.330 and Toates, 2001, Figure 2.4b,
p.25)

Hormones

Hormones are chemicals that exert many effects throughout the body. Some are only of peripheral interest to psychologists and will not be discussed here. However, certain hormones affect the nervous system and therefore have an influence on behaviour and mood. Reciprocally, the activity of the nervous system affects hormones. In this context, hormones are of central relevance to an understanding of the mind, cognition and behaviour.

Hormones are an example of 'chemical messengers'. To illustrate, Figure 4.7 shows how a **hormone** (1) is released into the blood at one site, such as a gland, (2) is transported to another site (termed a 'target'), (3) occupies receptors at the target organ and (4) in occupying them, changes the activity of the target organ (other modes of action of hormones also exist but are less relevant for our purposes).

Hormone
A chemical that is secreted into the blood at one location, is transported in the blood, and effects action at a distant site.
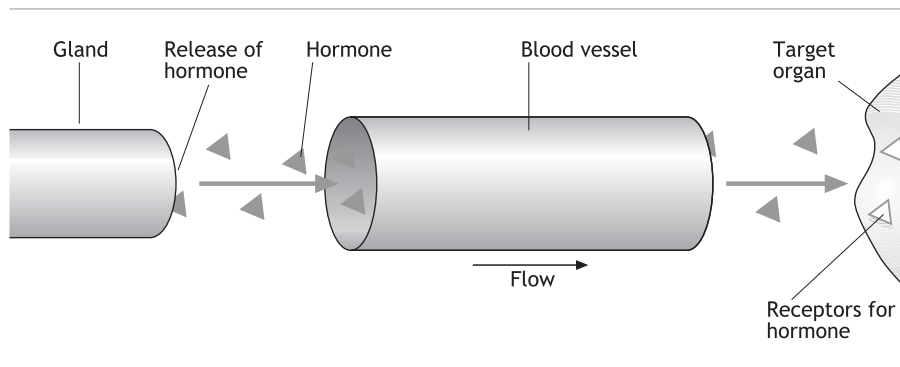
Figure 4.7   Hormones functioning as 'chemical messengers' (note that hormones fit particular receptors)

Hormones are a good example of the kind of dynamic interaction between biology and the social context that was introduced earlier in this chapter (Archer, 1994). Hormones play a role in effecting behaviour but, reciprocally, social context influences hormone levels. For instance, certain hormones increase the tendency of animals, including humans, to exhibit aggression. In non-human primate males, defeat in a competition for dominance can lead to a drop in the levels of the hormone testosterone (Rose, Bernstein and Gordon, 1975). In human males, winning in a competitive activity is associated with a boost in certain hormone levels (Archer, 1994).

So far we have looked at some links between biology and behaviour. In order to understand a number of other aspects of biological processes such as how characteristics can run in families, we now need to turn to the process of reproduction and evolution.

3.4 Reproduction and evolution

Activity 4.2

Stop for a moment and try to recall the principles of evolution discussed in Chapter 2. Think about what these principles require in terms of genetic transmission. For example, consider how it is that certain characteristics run in families. Hair and eye colour are obvious examples, but there is also evidence that temperament might, at least in part, be the outcome of something transmitted by biological means.

Nucleus
The component of the cell body of a neuron that contains the genetic material.

Chromosome
The structure within which genes are located.

Gamete
A generic term for egg cells of the female and sperm cells of the male.

In order to understand the process of biological inheritance, it is necessary to look at the cells of the body. Cells, such as skin cells, heart cells and neurons, have a particular feature in common – they contain a component termed a **nucleus**. For a given individual, each cell nucleus contains 46 thread-shaped structures termed **chromosomes**. Each thread carries, what could be termed the unit of inheritance of information, genes (see Section 2 in Chapter 2 for a general discussion of genes). Figure 4.8(a) shows the structure of a generalized cell. Certain cells differ from this standard pattern. Egg ('ovum') cells produced by the female, and sperm cells produced by the male differ from other types of cells since they contain only 23 chromosomes, which are unpaired. These egg cells and sperm cells are collectively called **gametes**. For the sake of simplification, Figure 4.8(a) only shows three pairs of chromosomes and Figure 4.8(b) shows three unpaired chromosomes.

Figure 4.8   Cells showing nucleus and genetic material – (a) generalized cell and (b) gamete

The biological means of the inheritance of information from generation to generation relies on the combination of individual chromosomes within sperm cells and ovum cells to make a full set of chromosomes. At conception, two sets of 23 chromosomes, one from the female and

one from the male, come together to give a full set of 46 chromosomes (see Figure 4.9). This forms part of what is termed **reproduction**. Each chromosome arising from the male finds its 'match' or 'pair' with a corresponding chromosome arising from the female. The genetic material of the new cell is not an exact replica of either the female or the male; bringing together cells from the female and the male yields a novel combination of genes. However, particular characteristics of each parent can manifest itself in the offspring as a result of genetic transmission.

   An egg, once fertilized, has 46 chromosomes and is termed a 'zygote'. Shortly afterwards, the zygote divides into two and each division then grows to a full cell. These two then divide to give four cells and so on, until the new individual is fully developed. Each time a cell divides, the genetic material in its nucleus is copied, so that both cells have the same genetic information as in their precursor cell. This process is termed **replication**.

Reproduction
The coming together of sperm and egg cells and the production of a new individual.

Replication
The process of producing cells from the original precursor cell, the fertilized egg cell.
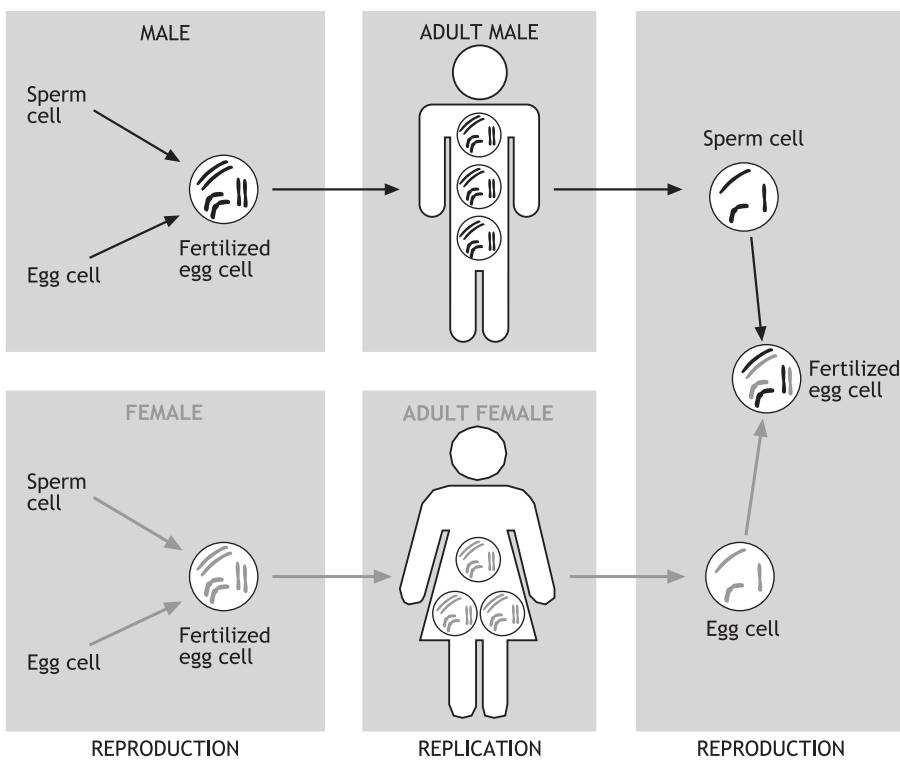
Figure 4.9   A sequence of the processes of replication and reproduction (Source: adapted from Toates, 1998, Figure 2.20, p.45)

Genotype and phenotype

How do *nature* and *nurture* act together in determining our behaviour and our mental life? This section will begin to answer this question.

Together with the environment (in all senses of the word), genes influence the structure and function of the body in terms of factors such as height, hair colour and the structure of the nervous system. In turn, the structure and function of the body influences behaviour.

Genes are responsible for the synthesis of complex chemicals termed proteins, which form an important part of the structure of the body. Differences between individuals in, say, temperament might arise in part from genetic differences, mediated via differences in the structure of the nervous system.

Within a given individual, each cell contains an identical set of genes (apart from the fact that gametes have only one set). The collection of all the genes within each cell of an individual is termed its **genotype**. The genotype constitutes a source of information, which together with the environment, determines the development and structure of an individual. Genotype is determined at fertilization by the combination of genes that are contributed by the parents and it remains constant throughout life.

Growth and development do not simply consist of building large numbers of identical cells by division. Rather, from the standard form, cells start the process of **differentiation** to form different types of cells with various functions. The timing and nature of differentiation depends, in part, on the properties of the genes within a given cell (see Section 2 in Chapter 2). At one time, genes were called the 'blueprints' for development, but this term is rightly unpopular these days (Gottlieb, 1998; Richardson, 1998). It suggests a fixed and predetermined course of development checked against coding instructions, which is not how things are. The expressions a 'source of information' for development or an 'influence' on development are more accurate since events in the body are also dependent on the external environment, for instance the availability of nutrients and the effects of behaviour itself on the environment. Gottlieb's model in Figure 4.10(a) demonstrates this concept. It shows the different levels of bi-directional influences on individual development. For example, the growing child effects action on the world by its behaviour, as in smiling at caregivers, and this evokes behaviour in others.

Genes interact with their immediate environment in the body. As illustrated in Figure 4.10(b), in this context 'immediate' means the fluid environment within the cell. Each cell interacts with neighbouring cells and the whole animal interacts with its surroundings. Strictly speaking, as represented in Figure 4.10(b), the genetic material within the cell and the external environment of the animal never come into direct contact in order

Genotype
The collection of all of the genes within the cell of a given individual.

Differentiation
The changes that occur within cells during development, such that they come to serve particular roles.

to interact. The whole animal interacts with its external environment and genes interact with their cellular environment (Johnston, 1987).
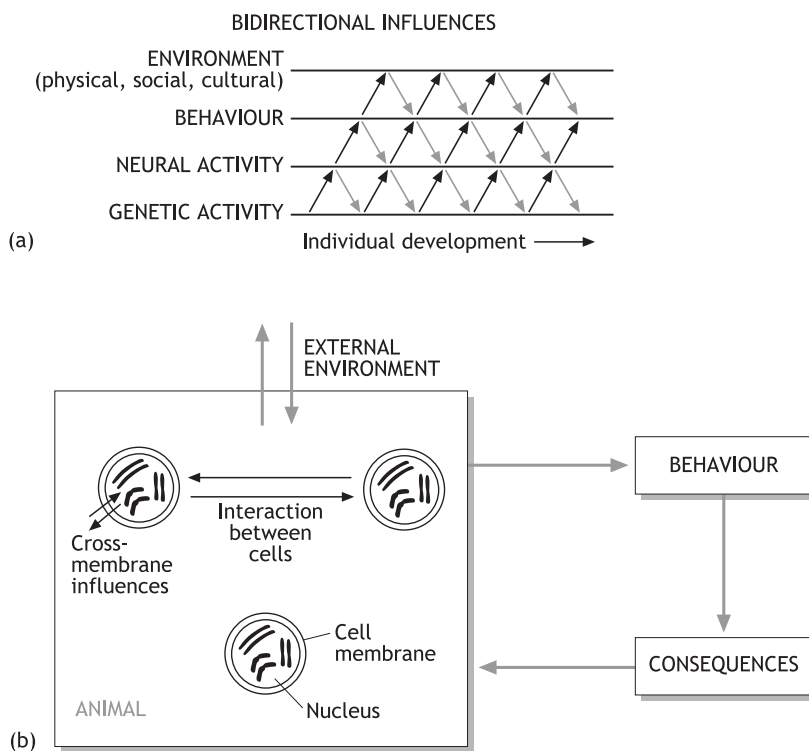
Figure 4.10 Dynamic 'gene-environment' interactions underlying development – (a) Gottlieb's model and (b) a more detailed representation (Source: Toates, 2001, Figure 6.2, p.146)

Exposure to different environments, for instance those in which social interactions differ along a dimension of friendly to hostile, can have implications for how the process of development occurs. The actual structure or behaviour that appears as a result of the genotype interacting with the environment is termed the **phenotype**. Features of the phenotype change as a result of experience. For example, muscles strengthen with use and such things as joy, fear and aggression are learned by the consequences of behaviour (see Chapter 3). The genotype might be thought of as a kind of potential for development into a number of different phenotypes, and the end products also depend upon the environment experienced along the way. For reasons described in Chapter 2, some phenotypes will be at an advantage compared to others: they will reproduce more effectively. The genotype that contributed to such a phenotype will therefore tend to increase in frequency in the population, which is the basis of evolution.

Phenotype
The physical structure and behaviour of an animal that arises from the interaction of the genotype and the environment.

Role of genes

From the biology that has been presented so far, some important messages emerge for psychology. Discussions are sometimes couched in such terms as – is some behaviour *caused by* genes or the environment? Is nature *or* nurture the more important in determining a psychological characteristic such as intelligence? The notion of gene-environment interaction discussed above, shows that these are misleading dichotomies. The development of the nervous system and behaviour depends on both genes and the environment, and it is meaningless to refer to their relative importance. It is like asking – what is more important in determining the area of a rectangle, its length or its breadth? Or what is more important in baking bread, the ingredients or the oven?

If two individuals differ in a characteristic, is this due to differences in their genes or their environment? Even this question can be problematic since genetic differences between individuals might predispose them to find different environments. For example, genetically based differences in personality might underlie different tendencies to seek a quiet or noisy environment.

Of course, we cannot do controlled experiments on human genes and the environment in order to determine their relative effects. The complexity of the subject matter makes it difficult to even form theories. However, in the spirit of the earlier discussion, we can look at a simpler system that follows some similar principles and try to derive some insight that can be applied to the more complex example.

Consider Figure 4.11 (Rose, Kamin and Lewontin, 1984). There are two plots of soil, one rich in nutrients and one poor. Suppose that you put your hand into a sack of seeds and take out a handful at random. You put these seeds in the soil to the left, which is the rich soil. You take another handful of seeds at random and put these into the soil to the right of Figure 4.11, which is the poor soil. You keep the conditions, such as illumination, temperature and watering, constant over the two plots.

Rich soil   Poor soil

Figure 4.11 An example of the roles of genes and the environment (Source: adapted from Toates, 2001, Figure 2.15, p.34)

Note the differences between the two plots in the way that the plants grow. The underlying cause of these differences *between* the plants in the two plots would appear to be environmental (i.e. difference in the quality of soil) since there was a random allocation of seeds between the two plots. However, consider the differences among the plants *within* a given plot. Since the environment within a plot is constant, differences between the plants appear to be due to the genetic differences between them.

However, although genetic differences within a plot produce initial differences in plants, the plant itself can change its environment and that of neighbouring plants in the same plot. For example, a tall plant may cut out the light falling on a shorter plant, affecting the growth and development of the shorter plant. Although this shows the subtle complexity of gene–environment determination, this is not to deny the importance of genetic differences. However, the discussion in this section reveals the fallacy of assuming that because the differences within a population (plant or human) are *initially* genetically determined, so necessarily the differences between populations must also be genetically determined.

While the basis of the differences in environment within each plot in Figure 4.11 is genetic, the discussion reveals the danger of neat dichotomies. Human society and the psychological characteristics of its members are subject to even more complications of interpretation regarding the roles of genes and the environment than the plants in Figure 4.11. This will be discussed further in Chapter 5 of this book.

Having set the broad biological scene, the next section will focus on how the nervous system functions and its role in psychological phenomena.

Summary Section 3

- The body is made up of billions of small 'building blocks' termed cells.
- Motivation is said to underlie activities such as feeding and sex. Motivation is determined by a combination of internal and external factors.
- Some important variables such as body temperature are maintained within tight limits by a process termed 'homeostasis'. These variables are regulated. Action, described as control, is taken in the interests of regulation. Behaviour is one type of such action.
- One particular type of cell is the neuron. These cells communicate and process information by means of electrical signals.
- The collection of all the neurons in the body, together with some other cells, constitutes the nervous system.

- The central nervous system is composed of the brain and spinal cord.
- A hormone is a chemical means of communication, released at one location and carried in the blood to another.
- Genes interact with their immediate cellular environment and the whole animal interacts with the external environment.
- Rigid dichotomies in terms of the importance of either genetics or the environment should be avoided.

4 Neurons, neural systems and synapses

This section looks at neurons, how they communicate with other cells and how neural systems perform the roles that we associate with behaviour, the brain and the mind. For ease of explanation, we start by looking at events within individual neurons. By looking at the properties of neurons in the periphery of the body, we are able to gain a better understanding of how neurons operate. However, the principles that emerge are thought to be general ones, equally applicable to the brain. Remember that the activity within neurons underlies behaviour and, in turn, behaviour itself influences the activity of neurons.

4.1 Action potentials

The neuron is a cell specialized to transmit and process information. Look back to Figure 4.6(b) to see an example of this. Imagine a sharp object comes into contact with the tip of neuron 1. In Section 3.3 of this chapter, the reaction was described as 'setting up activity' in neuron 1. What does it mean to say that a neuron is 'active'?

   If you were to take a very fine wire and spear an individual neuron, you would find that there is a small electrical voltage across the cell wall. In other words, the inside and outside are like two terminals of a miniature battery and a neuron has an electrical voltage or 'polarity'. If you did nothing else to disturb the neuron, you might well observe that it simply rests at this voltage indefinitely. Figure 4.12 shows the voltage of a neuron at rest. If a noxious stimulus contacts the tip of this neuron, you would observe a sudden and dramatic change in the electrical activity of the neuron. This change from the resting value and the return to it is termed an **action potential.**

Action potential
A brief and sudden change in electrical voltage in a cell and the means by which information is transmitted by neurons.
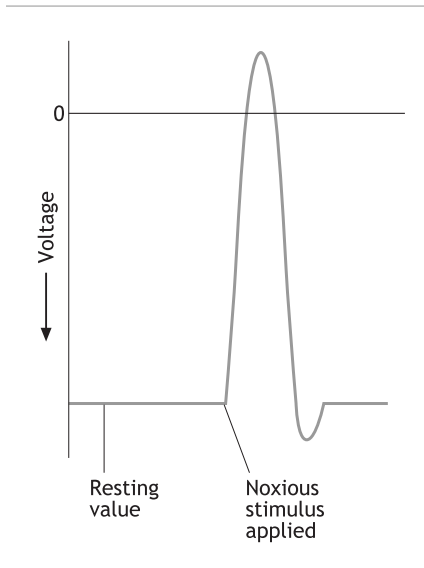
Figure 4.12 Electrical activity of a neuron

A property of an action potential is that once initiated, it travels down the length of the neuron. Figure 4.13 shows the 'propagation' of an action potential. Suppose that the stimulus is applied and the reaction of the neuron observed. As a frame of reference, let us call the time that the action potential arises at the tip, 'time zero' (t_0). A fraction of a second later, at t_1, the action potential is observed at location A. By t_2, it will have reached location B and by t_3 will be at the spinal cord. Action potentials travel rapidly, as evidenced by your speed of reaction to tissue damage.

The neuron shown in Figure 4.13, as well as neuron 1 in Figure 4.6(b), are examples of a class of neuron termed **sensory neurons.** These

Sensory neuron
A type of neuron that is specialized to detect information and convey it to the central nervous system.
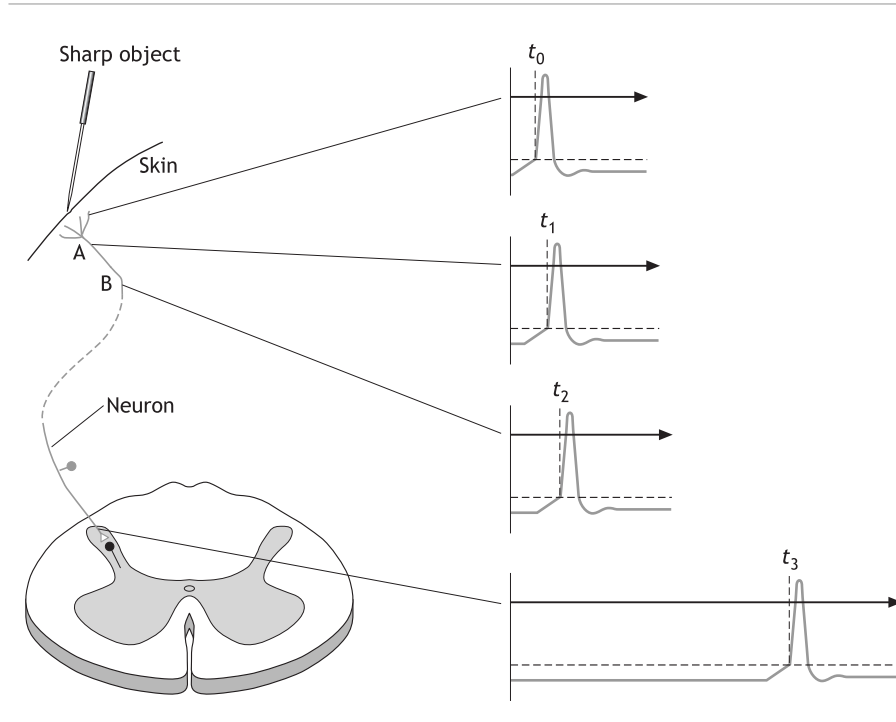
Figure 4.13 Transmission of an action potential (Source: adapted from Toates, 2001, Figure 4.9, p.87)

neurons are responsible for detecting events such as tissue damage or harmless tactile stimulation, and conveying information about the event to the central nervous system.

With reference to Figure 4.6(b), when the action potential reaches the end of neuron 1, it comes to an end. However, it can instigate events such that neuron 2 produces another action potential, which travels its length. In turn, this triggers an action potential in neuron 3. Finally, neuron 4 is activated. The existence of an action potential in neuron 4 excites the muscle. When it is excited, the muscle contracts and the limb is removed from the offending object. Neurons such as neuron 4, which trigger muscles, are members of the class termed **motor neurons**, the effectors of action.

Motor neuron
A type of neuron that is specialized to convey information from the central nervous system to muscles.

Normally, tissue damage would not be expected to trigger just a single action potential in one neuron. Rather, it would trigger a series of them in a group of neurons. Sometime after one action potential has come to an end, another can be initiated. In other words, information is conveyed according to the frequency of action potentials in a neuron, each action potential being just like another.

Figure 4.14 illustrates how information can be conveyed by the frequency with which action potentials occur in a given neuron. There are neurons, termed 'cold neurons', with tips in the fingers and which are specifically
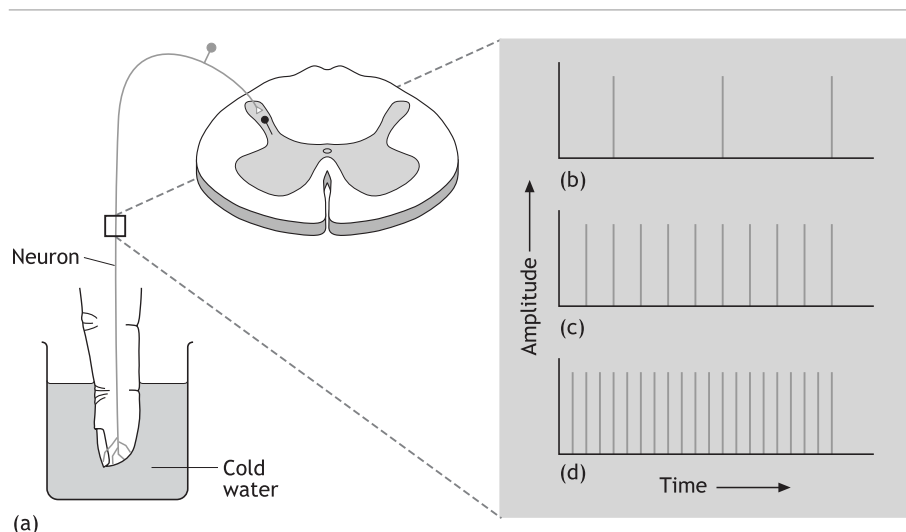
Figure 4.14 Encoding in terms of action potential frequency – (a) finger placed in cold water and sensory neuron sensitive to cold, (b) moderate cold encoded by a low frequency of action potentials, (c) lower temperature encoded by an increase in frequency of action potentials and (d) still colder temperature encoded by high frequency of action potentials (Source: Toates, 1998, Figure 2.6, p.32)

sensitive to cold. As the temperature of the tips of the neurons decreases, the frequency of action potentials in these cold neurons increases as shown in the three graphs in Figure 4.14. The message arriving at the spinal cord and subsequently conveyed to the brain concerns information on temperature encoded in terms of frequency of action potentials.

4.2 The synapse

Turn back to Figure 4.6(b) and look at the junction between two cells. How does activity in a neuron influence another cell? If you look carefully at Figure 4.6(b), you can see a minute gap between the cells. How is this gap bridged?

   Figure 4.15 shows an enlargement of the junction between two neurons, termed a **synapse**. The principle of the organization of a synapse is a general one, whether it is in the brain or periphery. Synapses within the brain are of crucial importance for understanding our mental well-being and illness, since they can malfunction. An abnormality in a number of such synapses is thought to lie at the root of much psychological disorder, such as a disturbance of mood.

Synapse
The junction between a neuron and another cell.

   The principle under consideration in this section is how synapses operate. Look at Figure 4.15. You might like to imagine the neuron on the left to be neuron 1 of Figure 4.6(b) and that on the right to be neuron 2. With reference to the synapse, neuron 1 would be termed a 'presynaptic neuron' and neuron 2 a 'postsynaptic neuron', as shown in Figure 4.15.
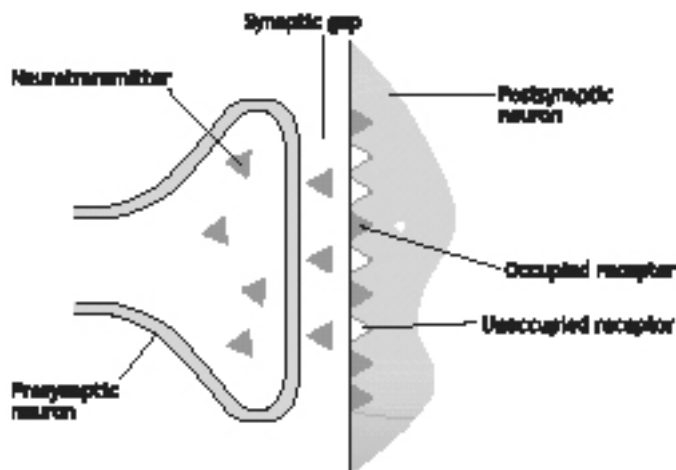
Figure 4.15 A synapse between a neuron and a second cell (Source: Toates, 2001, Figure 2.6, p.27)

Neurotransmitter
A chemical that is released from a neuron and influences a neighbouring cell.

Excitation
The effect that a neuron has on a neighbouring cell such that the second cell is more likely to exhibit action potentials.

Inhibition
The effect that a neuron has on a neighbouring cell such that the second cell is less likely to exhibit action potentials.

Note the chemical transmitter substance ('messenger'), termed a **neurotransmitter**, stored at the terminal of the presynaptic neuron and the receptors for this chemical located on the surface of the postsynaptic neuron.

When an action potential arrives at the terminal of the presynaptic neuron, it releases neurotransmitters, which move quickly across the synaptic gap and occupy the receptors on the postsynaptic neuron. When this occurs, the electrical property of the postsynaptic neuron is altered. Thus, although the communication *within* a neuron is by electrical means, communication *between* the neurons occurs through chemical means (as shown in Figure 4.15).

The change caused by chemicals at a synapse can consist of **excitation** of the second neuron. This refers to either the appearance of action potentials in a neuron at rest, or an increase in activity to above its existing level for a neuron that is already active.

But, as Figure 4.16 shows, excitation is not the only effect that a neurotransmitter can have. Depending on the nature of the substance and the receptors that it occupies at the second cell, a neurotransmitter can exert **inhibition**. This means a suppression of activity. A given synapse can either be excitatory or inhibitory (but not both).

At a psychological level it is not difficult to find examples of inhibition, captured by expressions such as 'a person is too inhibited to ask a question' or 'my inhibitions stood in the way'. How might such examples relate to the brain? In the absence of hard evidence, you should always
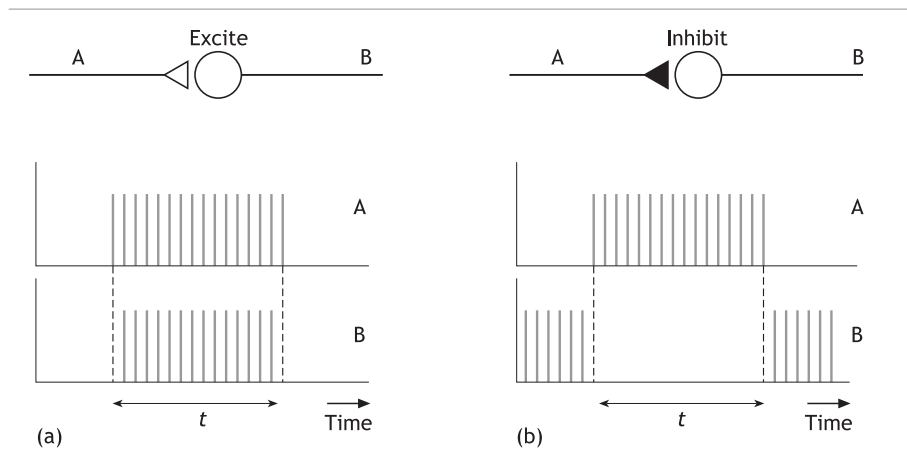
Figure 4.16 (a) Activity in neuron A excites activity in neuron B, and (b) activity in neuron A inhibits any activity that might otherwise exist in neuron B (some neurons, such as B in this case, are spontaneously active) (Source: adapted from Toates, 2001, Figure 3.1, p.53)

be cautious when speculating about the link between psychological events and brain processes. However, we know that the activity of neurons at one site in the nervous system can be inhibited by the activity of neurons at another site. For example, within one region of the brain, there might be the physical embodiment of the psychological experience of restraint exerted on behaviour, based upon rational calculation. This brain region might then exert inhibition on tendencies to aggression.

Figure 4.17 shows two synapses side-by-side. The specificity of the shape of the neurotransmitter and receptor, analogous to a key (neurotransmitter) fitting a lock (receptor), means that if a neurotransmitter from one synapse wafts across to another, it is without effect since it cannot engage with the receptors of the 'foreign' cell.

Neurons are characterized by the type of neurotransmitter that they store and release. For example, a neuron that stores and releases the neurotransmitter serotonin is described as 'serotonergic'. Imagine neuron 1 to be serotonergic in Figure 4.17. For the synapse between neuron 1 and 2 to be termed serotonergic, there would need to be a site for the release of serotonin from one cell and the next cell would need to have receptors for serotonin on the cell membrane.

Mental illnesses such as schizophrenia appear to be associated with abnormalities within certain types of neurotransmitter at particular regions of the brain. In schizophrenia, some parts of the brain are abnormally active and the person's attention is drawn to stimuli that would otherwise be ignored. Therapy can consist of chemical intervention to try to correct such abnormalities, such as reducing the overactivity in some parts of the brain.

The next section is designed to exemplify how neurons can combine to form neural systems serving a particular role.

Figure 4.17 Two synapses employing different neurotransmitters – neuron 1 employs neurotransmitters that fit receptors on neuron 2 and neuron 3 employs neurotransmitters that fit receptors on neuron 4, but not on neuron 2 (Source: adapted from Toates, 2001, Figure 4.22, p.96)
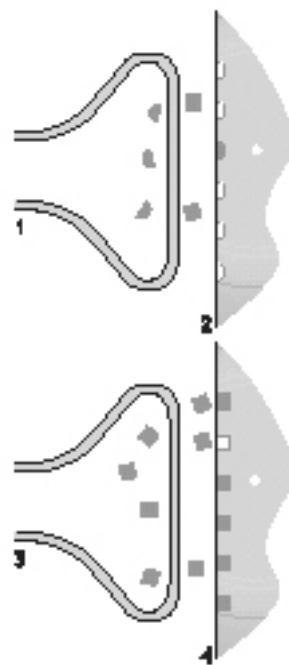
4.3 Sensory detection and transmission – the visual system

How do we see the world around us? Most people see a world of colours, but those who are colour blind appear to see the world only in shades of grey. What is the difference between these two groups of people? Where does the difference lie – in the eyes or the brain? In understanding perception, we need to know what kind of information is sent from the eye to the brain. For example, how is the information coded to enable us to see colours? Our visual perception of the world has long been of interest to psychologists.

A knowledge of how the neurons in the visual system work is vital to understanding perception. Figure 4.18 shows a cross-section of the eye and a section through the retina. At the back of the eye on the retina, there is a mosaic of **receptor cells** which are sensitive to light. These cells are termed **rods** and **cones**. Like the cells described earlier in this chapter,

Receptor cell
A cell specialized to detect, for example, light.

Rod
A type of receptor cell specialized to detect light.

Cone
A type of receptor cell specialized to detect light.
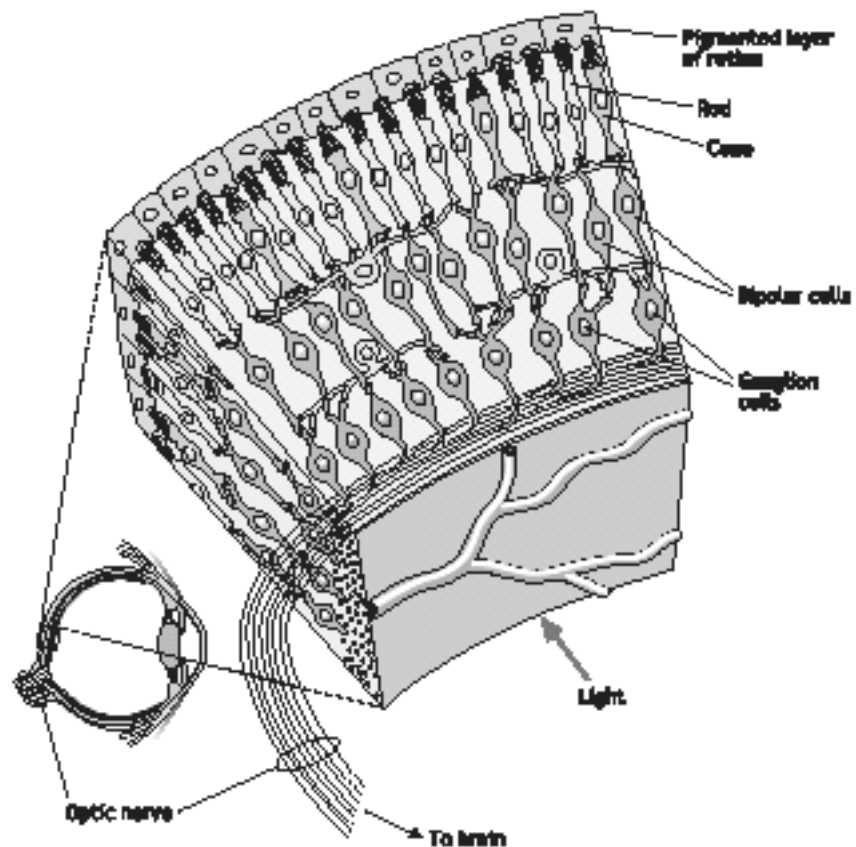
Figure 4.18 Cross-section of the eye and retina (Source: adapted from Martini *et al.*, 2000, Figure 18-22(a), p.690)

rods and cones also exhibit a small electrical voltage. When light falls on them, they change their electrical state: they are disturbed from their resting value. This change in electrical state is signalled to other cells (termed bipolar cells) within the retina, with which they form synapses. The bipolar cells then convey the signal to a third layer of cells in the retina, termed **ganglion cells**.

As shown in Figure 4.18, although ganglion cells are located partly within the retina, they have long processes that extend to the brain. An individual ganglion cell is something like the neuron shown in Figure 4.4(b). The bundle consisting of all these processes of ganglion cells leaving an eye is termed the **optic nerve**. A **nerve** is the collection of a number of processes of neurons forming a bundle, something like a cable, in the peripheral nervous system.

Receptive fields

Information is transmitted from the retina in the form of activity within the ganglion cells that constitute the optic nerve. There are many more receptors than there are ganglion cells and so, on average, a large number of receptors converge, through bipolar cells, to a given ganglion cell. This degree of convergence varies over the retina. For the region of retina shown in Figure 4.18, there is a low degree of convergence. What effect do receptors have on a given ganglion cell? In answering such questions on sensory systems, investigators often employ the expression **receptive field**.

A neuron within a sensory system can be characterized by its receptive field. As a general definition, the receptive field of a neuron is the area of sensory surface which, when stimulated, influences the activity of the neuron under investigation. For example, a particular type of sensory neuron (shown in Figure 4.13 and discussed in Section 4.1) has a receptive field at a particular point on the skin corresponding to its tip. Stimulation within this area excites the neuron. How do researchers establish what is the receptive field of a ganglion cell in the visual system?

Ganglion cell
A type of cell in the visual system, part of the route conveying information from receptors in the eye to the brain.

Optic nerve
The collection of neurons that convey information from the eye to the brain.

Nerve
A collection of neurons in the peripheral nervous system, rather like a cable made of a number of electrical wires.

Receptive field
The part of a sensory surface, such as the retina of the eye, which when stimulated influences a neuron under investigation.

4.1 *FEATURED METHOD*

Invasive techniques: single unit recording

Technology has played a crucial role in understanding the brain and it has enabled researchers to relate brain activity to behaviour. For example, scientists are now able to gain a better understanding of the nervous system by looking at the activity of single neurons, in terms of their frequency of generating action potentials. In this way, the role an individual neuron plays in behaviour can sometimes be identified. Some of the techniques used in this type of research are described as 'invasive', in that it is necessary to 'invade' the nervous system with

a piece of technology. Not surprisingly, the use of such techniques provokes controversy, and raises ethical issues.

Figure 4.19 shows the experimental apparatus and the subject in an invasive technique used to measure the receptive field of a retinal ganglion cell. An anaesthetized cat's head is held in position, pointing at a screen. A very fine microelectrode is implanted in a single ganglion cell in the optic nerve of the cat. The tip of the microelectrode detects the activity of a single ganglion cell. When the cell's activity is recorded while the eye is in complete darkness, a spontaneous activity level can be observed in the ganglion cell. By applying light stimuli to the retina the frequency of activity of the neurons in the visual system can be observed. This enables us to develop an understanding of the function of particular neurons in perception and allows us to describe the receptive field of a neuron.

(a) Stimulus outside receptive field

(b) Stimulus inside receptive field
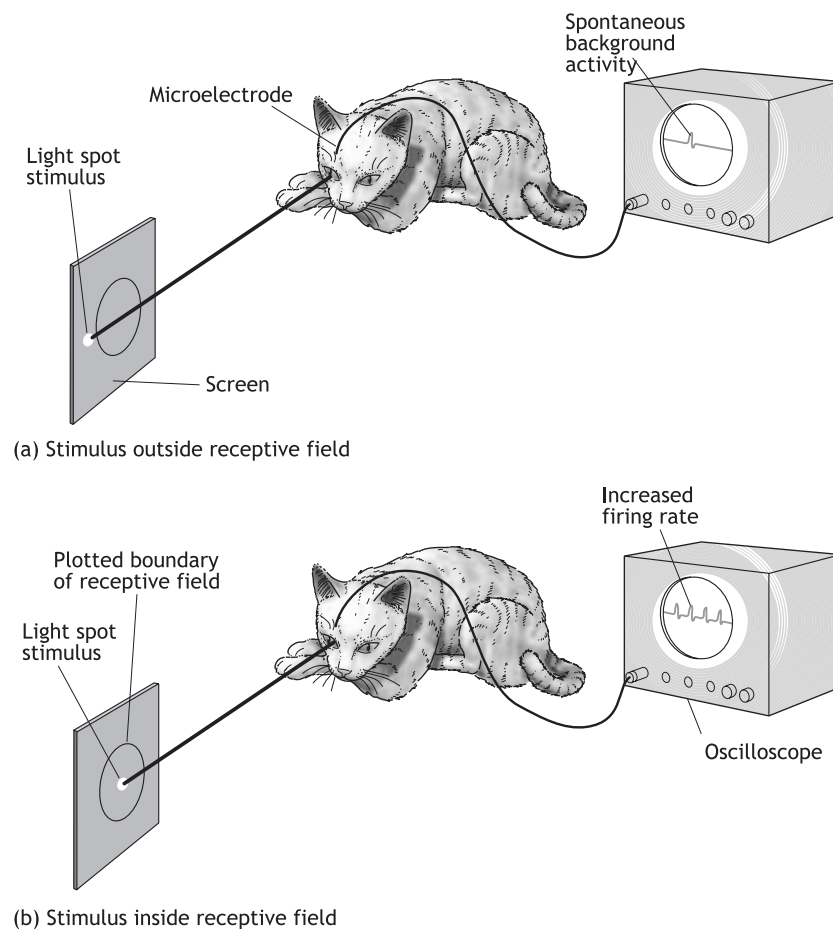
Figure 4.19   Measuring the receptive field of a retinal ganglion cell – (a) light spot outside receptive field and (b) light spot within excitatory region of receptive field (Source: adapted from Greene, 1990)

As shown in Figure 4.19, the screen is explored with a small spot of light. Since the cat's head is held still, there is a one-to-one relation between the screen and the retina, so the scientist can map between them. The activity of the ganglion cell is observed as the spot of light is projected to different sites on the retina. In Figure 4.19(a), note the activity shown on the screen of the recording apparatus called an oscilloscope. Since the light spot is outside the receptive field, there is no change in activity from the spontaneous background level. In Figure 4.19(b) the light spot falls within the receptive field and the activity of the ganglion cell is recorded on the oscilloscope.
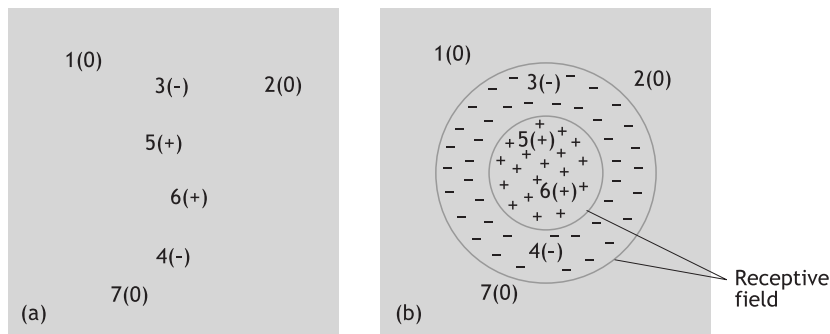
Figure 4.20 Defining a receptive field – (a) points plotted and (b) joining points together (Source: Toates, 1998, Figure 4.15, p.112)

Take a look at Figure 4.20(a). Suppose that first, the spot falls on location 1 on the screen. There is no change in frequency of action potentials recorded from the ganglion cell compared to darkness. By definition, location 1 is outside the receptive field of this ganglion cell so a zero (0) is placed at this location. Light falling at location 2 also has no effect and so similarly a zero is placed there. At location 3, the cell reduces its frequency of action potentials relative to the spontaneous level (darkness). Since it influences the activity of the ganglion cell, light falling here is, by definition, within its receptive field. Since the ganglion cell's activity is inhibited (i.e. a lower frequency of action potentials), the light is within the inhibitory region of the receptive field. Therefore, a minus sign is placed at 3. Similarly location 4 is within the inhibitory region. Imagine that when light is projected to location 5, the ganglion cell exhibits an increase in action potential frequency compared to darkness. Therefore, location 5 is within the excitatory region of the receptive field and a plus sign is placed at 5. The same effect is found at 6. Location 7 is outside the receptive field.

Suppose that we have completed an exploration of the entire retina, while recording from a given ganglion cell. Typically, if we join together all the pluses and join together all the minuses, what might emerge is shown in Figure 4.20(b) and Figure 4.21. This defines the receptive field of the ganglion cell. It consists of an excitatory centre (also termed an ON region) and an inhibitory surround (also termed an OFF region). A common type of receptive field consists of a

centre region which is excitatory, and a surround which is inhibitory. This is an example of **centre-surround** organization (Hubel and Wiesel, 1959; Livingstone and Hubel, 1988).

If the brain detects that the cell is exhibiting action potentials at a frequency higher than the spontaneous level, this is evidence for light within the excitatory centre region. This might be a distant star which floods just the centre region with light, while darkness corresponds to the outer region as shown in Figure 4.22(a). Conversely, if the ganglion cell's activity is suppressed to below the spontaneous level, this signals light falling in the outer, inhibitory region, as in Figure 4.22(b). What sort of stimulus might cause this reaction? A polo mint against a dark background and at a certain distance is one possibility. Figure 4.22(c) demonstrates that light covering the entire receptive field has little or no effect on the cell.
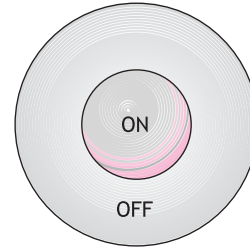
Figure 4.21 Receptive field of a retinal ganglion cell
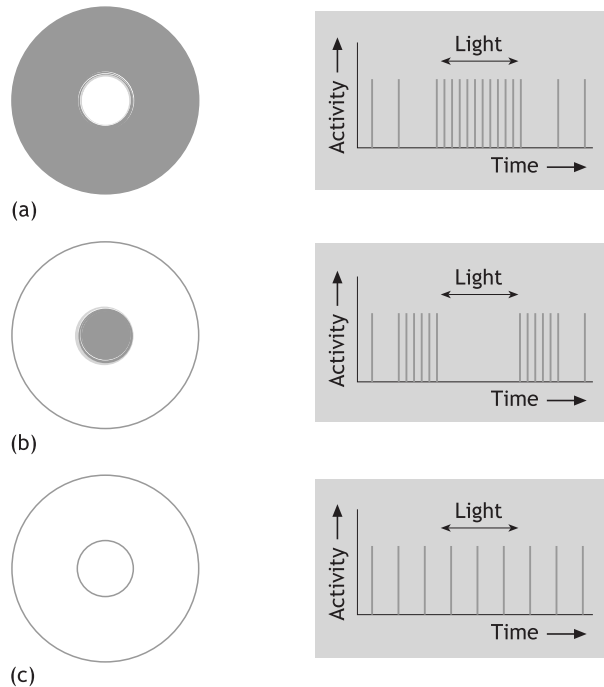
Figure 4.22 Response properties of an ON-centre – OFF-surround ganglion cell (a) to light in centre, (b) to light in surround and (c) to light covering all of the receptive field (Source: Toates, 1998, Figure 4.17, p.113)

4.4 Behaviour and mood – manipulations at the synapse

An assumption within biological psychology is that all features of our psychological life, such as our motivations, moods and emotions, have as their biological bases the activity of neuronal systems in the brain. For example, emotion alters as patterns of activity within particular neural systems change. Changes in the activity of synapses can cause changes in neural systems, which in turn affects behaviour, cognition and mood. Such changes can occur under certain circumstances:

(a) Disease can disrupt chemical transmission, as in the failure to produce a certain neurotransmitter. For example, Parkinson's disease is associated with difficulty in the instigation of action and motor control, and is caused by a loss of dopaminergic neurons (i.e. those that employ the neurochemical, dopamine) and a reduction in activity of those that remain.

(b) Drugs given on prescription (e.g. Prozac for obsessional neurosis and depression) target specific types of synapse, leading to a change in activity in certain parts of the brain, temporarily altering information processing by the brain. For example, a set of neurons whose activity forms part of the basis of fear, might show lowered activity as a result of the chemical manipulation.

(c) Drugs such as nicotine, alcohol, heroin and cocaine exert their effects by altering the activity of synapses in the central nervous system. Changes that occur at the level of synapses alter information processing, e.g. after drinking alcohol, a previously feared task is not ranked as so fearful.

Where a type of synapse shows malfunction, logic would suggest the possibility of chemical therapy; for example to supply an artificial form of the neurotransmitter employed there. When a neurotransmitter is released, it moves across the gap between neurons and is taken up by receptors before being inactivated. One means of inactivation is by a type of chemical termed an **enzyme** that is present at the synapse. If the enzyme itself is artificially inactivated then the neurotransmitter remains for longer at the synapse. Another process is shown in Figure 4.23. In the case of serotonergic synapses, inactivation of a neurotransmitter is caused by serotonin being taken back into the neuron from which it was released, a process termed **reuptake**. One way to artificially boost the activity at such synapses is to block reuptake, which increases the amount of neurotransmitter at the synapse and its activity at receptors. In Figure 4.23(b), the mood altering drug Prozac, targets serotonergic synapses and blocks reuptake. Serotonergic neurons appear to play a role in attention and mood, amongst other things.

Enzyme
A chemical that has an influence on another chemical.

Reuptake
The process of inactivation of a neurotransmitter by taking it back into the same neuron that released it.

KEY
⊓ Reuptake inhibitor

(a)   (b)
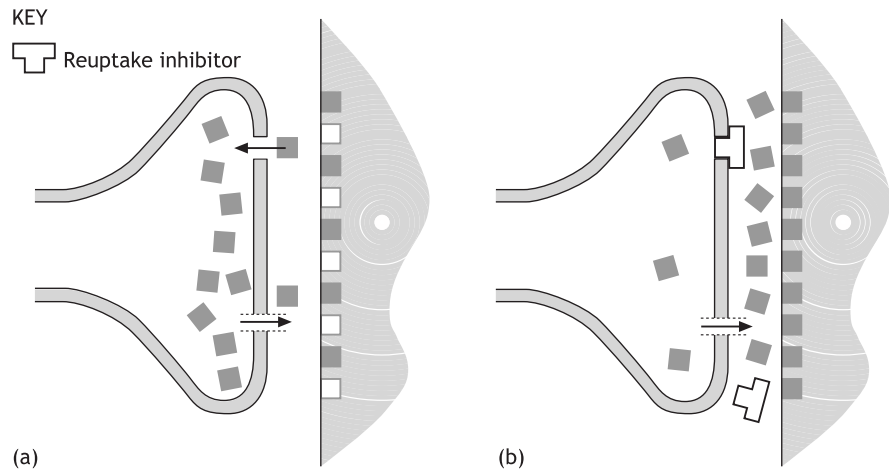
Figure 4.23 Serotonergic synapse – (a) normal and (b) influence of Prozac (Source: adapted from Toates, 2001, Figure 4.27, p.99)

The drug cocaine acts at synapses. Amongst other effects, it blocks the reuptake of dopamine and thereby increases the amount of dopamine at synapses. Users of the drug describe the experience of its effect as euphoria or a 'high', implying that neural systems underlying pleasure have been affected by the changed activity at synapses.

However, since cocaine drastically and rapidly blocks the reuptake of dopamine, there is a net release over a period of time which is not compensated for by reuptake. Therefore, synthesis of dopamine within neurons cannot keep pace with the rate of removal and this results in depletion of dopamine from neurons. This then changes the activity within neural circuits to give a bias towards displeasure, which appears to be the biological basis of the 'crash' or 'down' (**dysphoria**) that follows cocaine taking. This state seems to contribute to the craving for more cocaine in an attempt to correct the displeasure.

The approach adopted here shows a useful aspect of the process of explaining psychological states by looking at biology. States such as euphoria and dysphoria can be associated with particular changes at a biological level. Drugs affect synapses that form part of neural systems involved in cognition, emotion, motivation and pleasure. However, drug-induced changes at synapses only make sense when interpreted in terms of the whole nervous system and conscious awareness. There is by no means a simple one-to-one link between a drug and the mental state of an individual. Antidepressants do not work for everyone. Psychoactive drugs such as heroin and cannabis often require repeated use and an appropriate social context to reveal and 'interpret' their effects. For experienced users, a totally inert chemical can sometimes create a similar effect to a specific drug if it is taken in anticipation

Dysphoria
A negative mood.

of the actual drug. For example, addicts who unwittingly take substances of no chemical potency often report psychoactive effects from using them.

There is an important psychological effect associated with the powerful pain-killing drug morphine. Morphine targets neurons in the central nervous system that are involved with pain. Some patients who expect to be given morphine sometimes feel pain relief simply on being injected with an inert substance, an effect termed a **placebo effect** (Wall, 1993). The link between these actions is an area of interest to biological psychologists.

Placebo effect
An effect obtained by an apparently neutral procedure, which owes its efficacy to a belief by the patient that a therapeutic intervention has taken place.

Summary Section 4

- Pulses of electricity termed 'action potentials' convey information within neurons.
- Sensory neurons convey information to the central nervous system and motor neurons convey information from it.
- Information is conveyed in terms of the frequency with which action potentials occur.
- A synapse is the point at which a neuron influences another cell. At a synapse, neurotransmitter is released from one neuron, crosses a junction and influences another cell. A neuron is characterized by the chemical that it synthesizes, stores and releases.
- Neurons can exert either excitatory or inhibitory effects, a given neuron exerting only one such effect.
- The retina is covered by a mosaic of light-sensitive cells termed rods and cones. Information on light detected at the retina is conveyed to the brain.
- Drugs can change the activity of synapses, for example by blocking the reuptake of a particular neurochemical.

5   The nervous system, cognition and behaviour

So far, a major part of the discussion has concerned the properties of neurons and how they combine to form neural systems. Implicit within the account was the notion that neurons are contained within the nervous system. This section looks at the whole nervous system, mainly the brain, and considers (a) how it can be described scientifically and (b) how its capacity to process information, the factor of most interest to psychologists, can be understood in terms of the systems of neurons that comprise it.

When we consider that the human brain has some 100 billion neurons with multiple connections between them, awe might seem the appropriate reaction. Can we gain an insight into how something so complex works and how it underlies cognition, the control of behaviour and consciousness? How do the properties of the whole depend upon the component cells? Looking at the systems of neurons that constitute the brain has provided a powerful means of insight. Our understanding still leaves much to be desired but there are various sources of information, such as study of the structure of the brain, carefully describing what is seen and looking at changes in behaviour that follow brain damage. Our starting point here will be with a reliable description of the brain.

5.1 Anatomical description

Hemisphere
One half of the upper part of the brain.

The brain is approximately symmetrical across its midline, something which you can appreciate in terms of its outward appearance. We therefore speak of left and right **hemispheres**. These terms are used with respect to the perspective of the individual whose brain is under discussion. In Figure 4.24, the left hemisphere is to your right.
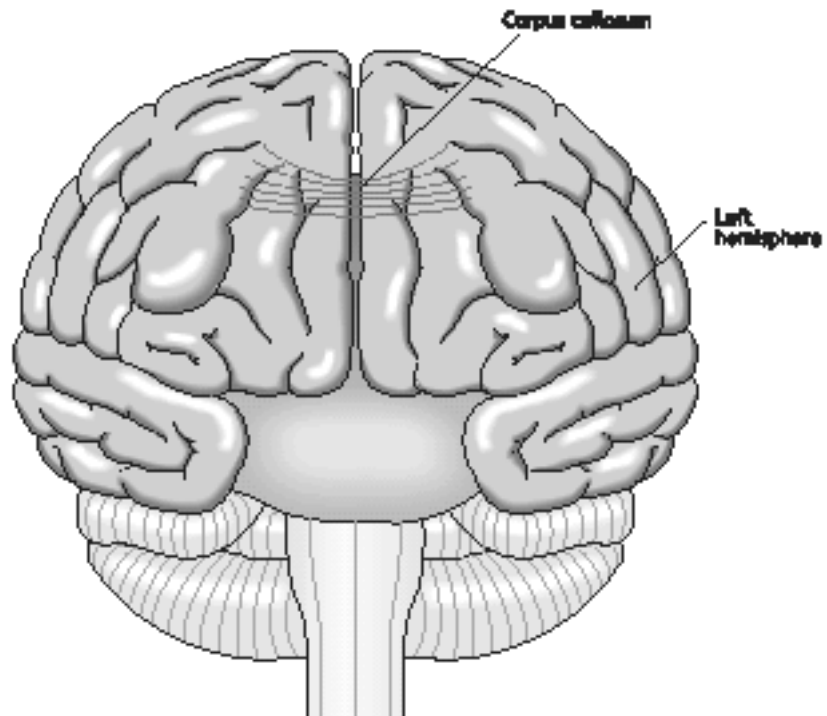
Figure 4.24 Anterior view of the human brain (Source: adapted from Martini *et al.*, 2000, Figure 15-10(b), p.391)

In Figure 4.24, note the outer appearance of the brain, formed by a creased structure, giving it the appearance of a walnut. This outer layer is termed the **cerebral cortex**. As shown in Figure 4.25, the brain is divided into a number of regions known as 'lobes': the temporal, occipital, parietal and frontal lobes. These lobes are known to serve different functions. For example, the occipital lobe is concerned with processing visual information and the temporal lobe is involved in, amongst other things, language.

Cerebral cortex
The outer layer of the brain.
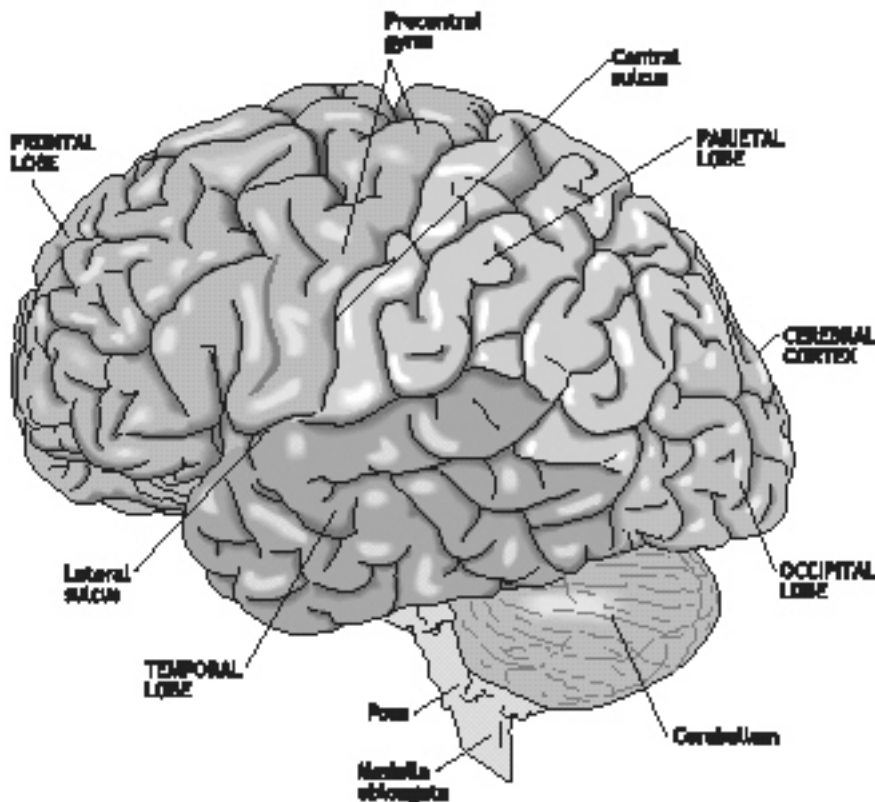
Figure 4.25 A view of the left hemisphere of the human brain (Source: adapted from Martini *et al.*, 2000, Figure 15-9(a), p.395)

The visual system

Figure 4.18 showed the retina and the ganglion cells that project information from the eye to the brain. This section briefly relates an understanding at the level of individual neurons to their location in the brain.
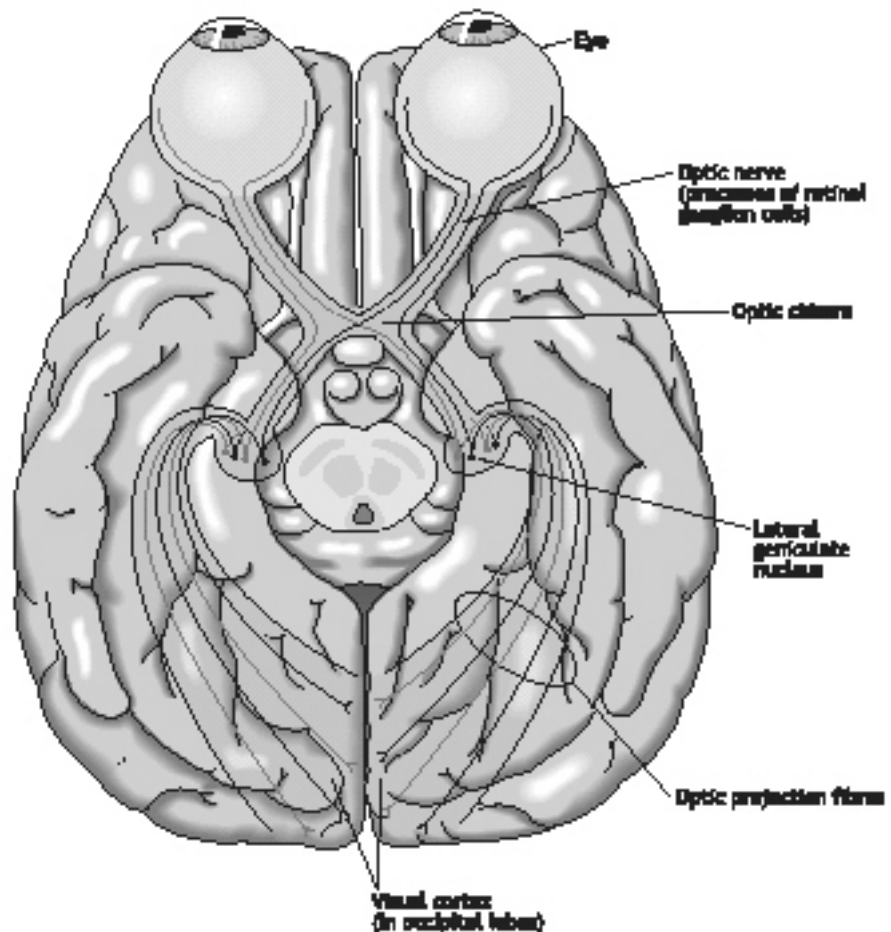
Figure 4.26 The visual system (Source: adapted from Martini *et al.*, 2000, Figure 15-23, p.407)

Lateral geniculate nucleus
A part of the visual system that is a collection of cell bodies of neurons.

As represented in Figure 4.26, the processes of ganglion cells (forming the optic nerve) terminate at the brain structure known as the **lateral geniculate nucleus** (LGN). Anatomists have devised a very rich vocabulary for describing the brain. Let's dissect the expression 'lateral geniculate nucleus'. The term 'nucleus' is used with reference to sites throughout the brain and refers to a collection of the cell bodies of neurons at a particular location. The expression 'lateral' refers to a given location being away from the midline of the brain relative to another location (see Figure 4.27). By comparison, the medial geniculate nucleus (which, incidentally, processes auditory information from the ears) is nearer to the centre of the brain. Finally, the term 'geniculate', derives from the Latin name for knee, which is genu. Early anatomists felt that the LGN looked something like a knee.
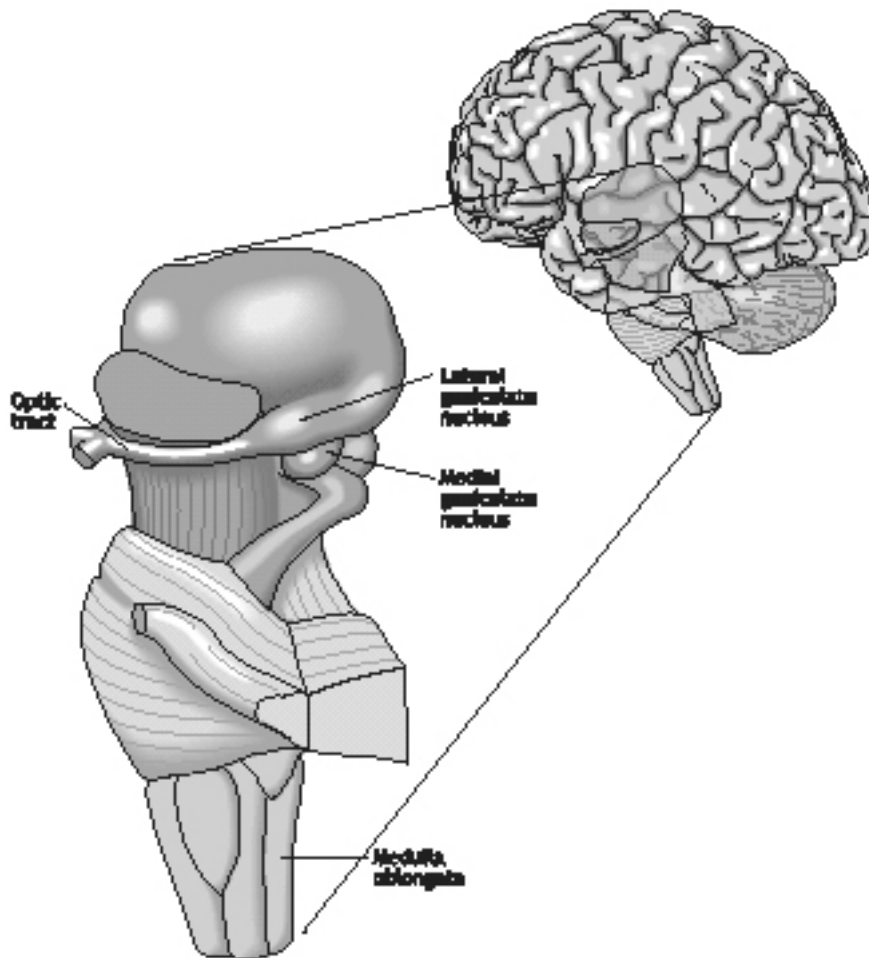
Figure 4.27 View of the lower part of the brain with a focus on the lateral geniculate nucleus and medial geniculate nucleus (Source: adapted from Martini *et al.*, 2000, Figure 15-16(a), p.400)

The neurons whose cell bodies are located in the LGN project processes to the visual cortex (see Figure 4.26), located at the occipital lobe, where further analysis of the visual world is performed.

5.2 Physiology and behaviour: sources of insight

This section examines some of the techniques used to investigate how the brain works and how its activity links with psychological phenomena.

Human brain surgery and electrical stimulation

In some cases, surgery has to be performed on the human brain, for example, to remove cancerous tissue. The behaviour of patients (e.g. performance on memory tasks) can then be compared before and after surgery. One particularly interesting surgical intervention for severe epilepsy was pioneered by Roger Sperry and his associates in California (Sperry, 1969). The basis of epilepsy is chaotic electrical activity amongst the neurons found in a particular part of the brain.

The two halves of the brain communicate through several routes, a principal one being the **corpus callosum**. Figure 4.28 shows a section through the midline of the brain, a slice through the corpus callosum.

Corpus callosum
A bundle of processes of neurons which connect one hemisphere with another.
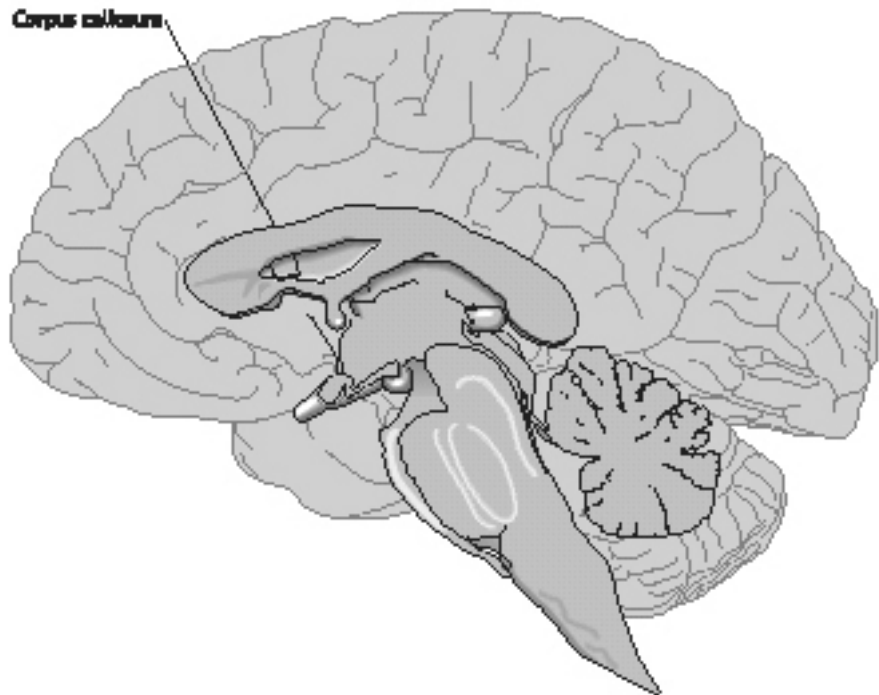
Figure 4.28 A view of the right half of the brain following a section of the brain through its midline (Source: adapted from Martini *et al.,* 2000, Figure 15-13(a), p.395)

Communication between the hemispheres is needed to integrate information throughout the brain. Unfortunately, epilepsy focused in one half of the brain also tends to influence the other half electrically, acting via the corpus callosum. The radical and daring surgery by Sperry consisted of cutting through the corpus callosum. The surgery did indeed restrain the epilepsy but what effect did it have on the rest of the mental and physical life of the individual? After the operation, the patients' epilepsy was much

improved, but otherwise they appeared to be remarkably unchanged in their everyday behaviour, relative to that shown prior to surgery.

The surgery did however have some consequences. By targeting visual information to only one hemisphere, experimenters found a way of training the individuals on one task using just one hemisphere. On testing them, it was found that this learning was unavailable to the other hemisphere. One bit of information can be selectively presented to one hemisphere and different information to another. Each hemisphere could assimilate conflicting pieces of information. For example, a green light on a button would signal reward as far as the left hemisphere was concerned (and a red light would signal an absence of reward), but this information would be unavailable to the right hemisphere. Indeed, as far as the right hemisphere was concerned, a red light could be used to signal reward. On being set such tasks, patients were sometimes in conflict as to what to do, though whether their consciousness had been split remains a formidable problem.

Brain surgery can be performed on conscious humans since cutting the tissues of the brain does not evoke pain (there are no tips of neurons sensitive to tissue damage in the brain). In a classic study by Penfield and Rasmussen (1968), humans undergoing brain surgery for the removal of diseased tissue received electrical stimulation to different regions of their brains. Patients were asked to give reports on the conscious sensations evoked. For example, electrical stimulation of regions of the temporal lobe evoked vivid memories of incidents earlier in life. Such evidence enables theories on the biological bases of memory to be produced (and we will return to these in more detail in Chapter 8).

In some cases, for patients in chronic pain, electrodes are permanently implanted with their tips in regions associated with emotion. Patients can control stimulation of these electrodes and a decrease of pain is sometimes experienced. It is assumed that the stimulation alters the pattern of electrical activity within certain neural systems. It increases the electrical activity in neural systems associated with positive emotions and reduces activity in those associated with pain.

Accidental brain damage

One major source of evidence on the relationship between brain and behaviour has been the study of damage to the brain, for example caused by gunshot wounds or tumours. Another cause of damage is the blocking of a blood vessel within the brain or the breaking of a vessel (known as a 'stroke'), which results in a loss of the supply of fuel and oxygen to a part of the brain. Neurons in the location of the damage die and so any changes in behaviour suggest the contribution these regions usually make to normal functioning. A general term for damage to a region is **lesion**.

Lesion
Damage to a region of the brain, for example in an accident or in surgery.

There have been some famous cases of lesions that have illuminated brain and behavioural science, none more so than that of an unfortunate man named Phineas Gage (see Box 4.2).

4.2 *Accidental brain lesion*
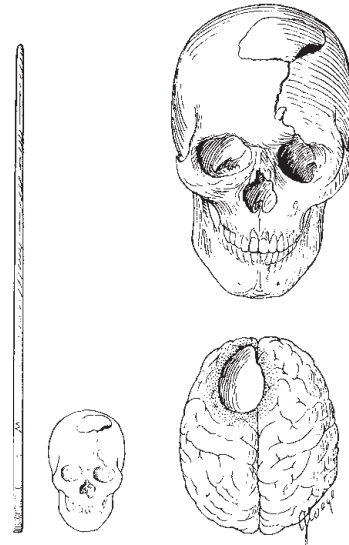
Figure 4.29 The accident of Phineas Gage (left, tamping iron and skull drawn to scale; top right, the skull; bottom right, the brain showing damage to the left frontal lobe)

Phineas Gage was employed as foreman of a gang of railroad workers, who were constructing a new railway line in Vermont in 1848. This involved using explosives to blast rocks out of the way for the line. One day an explosion went wrong and a tamping iron, 3 cm in diameter, passed right through his brain. Amazingly Gage survived the accident. However, the missile caused extensive damage to his left frontal lobe and some damage to his right frontal lobe (Macmillan, 1986; Damasio, 1996). Damage was particularly to the front part of the frontal lobe, termed the prefrontal lobe.

Gage subsequently showed little in the way of intellectual or linguistic impairment. However, marked changes were noted in his personality. Quite out of character, he became obstinate, egocentric and capricious and started to use foul language. Reconsidering Gage in the light of more recent evidence on the role of the frontal lobes, suggests that the parts of the brain concerned with emotional expression were previously held in check by the frontal lobes. This source of inhibition was disrupted by the damage.

Psychologists can also look at the circumstances under which the prefrontal cortex is most active in 'normal' participants. This method enables psychologists to construct theories on what this region does. The prefrontal cortex plays a role in, amongst other things, utilizing memories in the inhibition of behaviour, often in the face of competing tendencies to react to immediately present events. Following the accident, Gage showed a defect in his capacity to utilize emotional information concerning the more remote consequences of his actions (Damasio, 1996). Gage appeared to be emotionally in the 'here-and now', a victim of impulsivity.

A problem with basing our understanding of the brain on accidents is that they are 'one-off', uncontrolled phenomena. Damage is rarely to neat, circumscribed parts of the brain, and usually affects several areas simultaneously. Under ideal experimental conditions, scientists would employ a matched control group to analyse results and develop theories. In the case of human brain damage, there is no matched control group against which to compare the damaged brain.

There are additional difficulties in interpreting results when studying brain damage. For example, depending on the circumstances, other brain regions can take over some responsibility from the damaged region. The system might be fundamentally reorganized, and psychological function can be less disturbed than one might have first supposed. At a neural level, new communications between neurons can be formed. In some cases, such a process can offer hope to people suffering from brain damage.

If a part of the brain is damaged such that it is taken out of action, behaviour changes as a result. Strictly speaking, the working of the rest of the brain is revealed by the damage, and not the contribution or the role of the damaged part itself. An analogy can help to illustrate the problem (Gregory, 1966). Suppose that after removing a component from a radio, it emits a deafening howl. No one would assume that the normal function of the missing component is to suppress howling. When applied to interpreting the effects of brain damage, this analogy should encourage caution, but it does not negate the value of such evidence.

Experimental lesions

In a controversial approach, applied to non-human animals, scientists have damaged selected parts of the brain to investigate what effect, if any, this has on the brain. In what is termed the 'experimental group', clearly defined parts of the brain have been lesioned and the effect observed. A 'control group' of the same sex and age receives what are termed 'sham lesions' and the results compared for the two groups. Sham lesions consist of control animals being subject to some of the same surgical procedure as the experimental group, such as anaesthesia and cutting the skin, but the brain itself is not lesioned. The animals are killed and the brain of the subjects in the experimental group can be analysed to confirm the exact site of the lesion.

Stop and consider the ethics of performing such experiments on animals. Is it justified to inflict damage to an animal's brain if there is the possibility of gaining an insight into, for example, human psychiatric illnesses?

Experimenters do everything to minimize the discomfort of their subjects and there are strict laws on what can and cannot be done but the issue remains fraught.

Imaging the brain

In the last decades of the twentieth century, there were important advances in the techniques of forming images of the brain, both of its structure and the amount of blood flow to different regions. Advances in these techniques are continuing. Participants are studied as they engage in psychological tasks, which enables the activity of brain regions associated with the task to be measured.

4.3 FEATURED METHOD

Non-invasive methods for studying the brain's activity

In Featured Method Box 4.1, we explored how invasive techniques enable us to study individual neurons. These types of invasive techniques are obviously limited since they cannot be applied to humans. But, it is possible to gain a general impression of the function of different brain regions by using brain imaging techniques. These techniques are called 'non-invasive', since the nervous system is not disrupted by them (or is only minimally and temporarily disturbed).

Positron emission tomography (PET) is a non-invasive imaging technique. PET allows an image to be formed of the activity of different regions of the brain. It is based on the fact that differences in activity between brain regions are associated with variations in the flow of blood to them and their utilization of fuel (glucose and oxygen). Blood flow to a region varies with the activity of the neurons in the region itself. This gives researchers a possible index of the magnitude of local information processing at the regions observed. Comparisons can be made (a) within a given individual, between different regions of the brain and at various times, and (b) by looking at the same brain region in different individuals.

To instigate the technique, a radioactively-labelled substance termed a tracer is introduced into the body, either by inhalation or by using an injection (Myers, Spinks, Luthra and Brooks, 1992). The presence and location of the tracer is then monitored. A range of cells, such as neurons, employ specific chemical fuels for their energy needs, a principal one being glucose, a type of sugar. One variety of PET exploits the properties of an artificial substance similar to glucose, termed 2-deoxyglucose (2-DG). After the substance is introduced into the body, it enters neurons in the same way that glucose does. However, rather than serving as a fuel, the substance accumulates in the neurons. The brain regions in which

Positron emission tomography
A technique for forming images of the activity of the brain.

neurons are most active accumulate most 2-DG. After a time, the radioactively-labelled substance leaves the neurons and is lost from the body.

What can a PET scan reveal? Brain regions can be scaled according to their activity level, as shown in Figure 4.30 where regions involved in auditory and motor functions are indicated. By recording images of brain activity while research participants perform different tasks, researchers are able to formulate a hypothesis about the relationship between brain functioning, the different regions involved and psychological phenomena. A participant can be asked to perform a specific response, such as clenching a fist, or the participant may be asked to imagine a scene. Brain regions which play a part in either of the two activities – the organization of motor control of the hands or the formation of visual images – will then be activated.
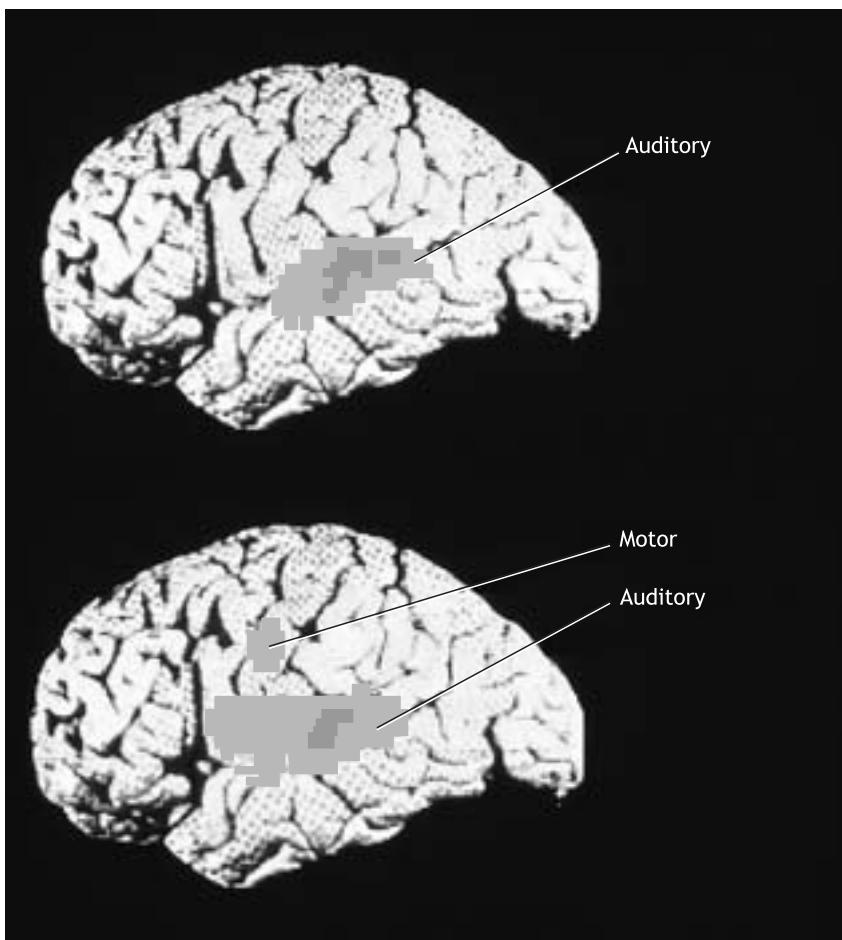
Figure 4.30 A PET scan showing (top) when there's activity in the auditory region and (below) when both auditory and motor regions are active.

PET scans can also reveal regions of the brain that are functioning irregularly. A PET scan of an individual with brain injury may show lower brain activity levels

(compared with a control group) in certain brain regions when asked to perform a range of tasks. By identifying the regions of the brain that are affected by the injury, therapy can be investigated. It is also possible to monitor any improvements in the individual by using PET scans to note increases in activity in the part of the brain affected by the injury.

The PET scans of violent criminals have been compared with scans of control participants to look for differences in brain activity levels. The question posed in this type of research was whether regions of the brain known normally to exert restraint on action (e.g. the frontal lobes) are under-active in violent criminals. There is some evidence that this is indeed the case (Raine, Buchsbaum and LaCasse, 1997).

You have now looked at the properties of individual neurons and neural systems as well as how to relate these to an understanding of the whole brain. Some links between neurons, the brain and psychology have been indicated. The next section continues in this direction, but does so within a broader context by returning to material introduced early in the chapter.

Summary Section 5

- The brain is divided into left and right hemispheres, and its outer layer is known as the cerebral cortex.
- Surgical lesions of the corpus callosum have been shown to disrupt communication between the two hemispheres.
- Techniques for studying the brain include looking at the effect of brain damage, electrical stimulation, and forming an image of brain activity using positron emission tomography (PET).

6 Integration

This section shows how various sources of biological evidence can be brought together to give an integrated picture of influences on behaviour and how behaviour influences biology.

6.1 The control of behaviour

The present section considers the role of the brain in the control of behaviour, looking at both the external world and the internal physiology

of the body. Figure 4.31 exemplifies just two of the many features of such control. Signals that arise in the brain, are conveyed down the spinal cord (neurons 1 and 2) to the muscles that control the legs and to the heart (neurons 3, 4 and 5).
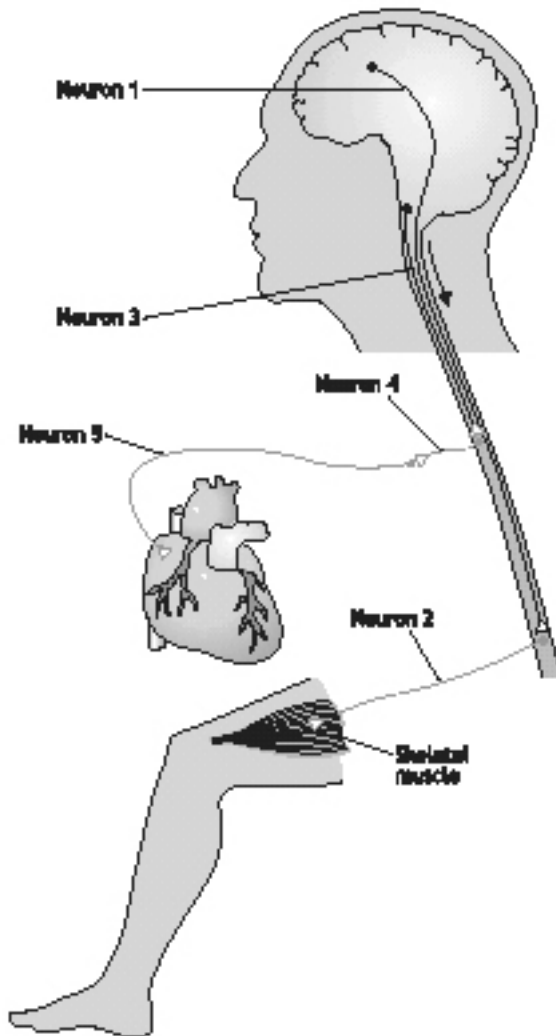
Figure 4.31   Control over external and internal environments (Source: Toates, 2001, Figure 3.3, p.55)

Imagine you are confronted with a runaway car. From adaptive considerations, it makes sense that your legs will be activated to move you as fast as possible. The legs require a large supply of blood in order to provide fuel to the muscles. This requires adaptive and coordinated internal

adjustments of physiology, for example the heart beats faster and the internal 'plumbing' of the body is adjusted. Blood vessels at the muscles in the leg dilate to permit a larger flow of blood, and blood is diverted away from other body regions, such as the stomach, where the need is less acute. How are these actions effected? How is coordination between behaviour in the external world and the necessary internal adjustments achieved? Two branches of the nervous system are implicated – the somatic nervous system and the autonomic nervous system.

The somatic nervous system

Somatic nervous system
A division of the nervous system, which controls skeletal muscles.

Skeletal muscle
A type of muscle attached to the skeleton, which is responsible for moving parts of the body such as the arm.

Voluntary behaviour
Behaviour that is under our conscious control.

As shown in Figure 4.32, the **somatic nervous system** (soma means body in Greek) is the part of the nervous system that is responsible for action exerted on the external world. It controls what are termed **skeletal muscles**, such as those in the arms and legs. Skeletal muscles are used to effect our **voluntary behaviour** under conscious control by the brain. Figure 4.31 shows one such route of action. Neurons with their cell bodies in a region of cortex project processes down the spinal cord and communicate with motor neurons. In turn, their activity causes contraction of the skeletal muscle. For convenience we often dichotomize between reflexes and voluntary behaviour. However, in reality, most behaviour is made up of a combination of both.

Figure 4.32 The central nervous system and the division of responsibility for action

Motor cortex
The part of the cerebral cortex which is responsible for organizing motor control.

A region of the cortex concerned with organizing motor control is termed the **motor cortex**. In Figure 4.33, a bizarre-looking figure is shown alongside the section of motor cortex. It represents the association between each part of the motor cortex and the part of the body over which it exerts some control. Imaging techniques can reveal the link between the activity of a given brain region and the region of body over which motor control is effected. Also, damage to a specific part of the motor cortex, as in a stroke, is associated with the corresponding disruption to motor control in particular regions of the body (e.g. loss of speech or use of the left arm). As you can see in Figure 4.33, the relative sensitivity of control of different

regions of cortex varies. The fingers have a disproportionately large area of cortex devoted to them, indicative of the ability to resolve fine details in motor control through the fingers.
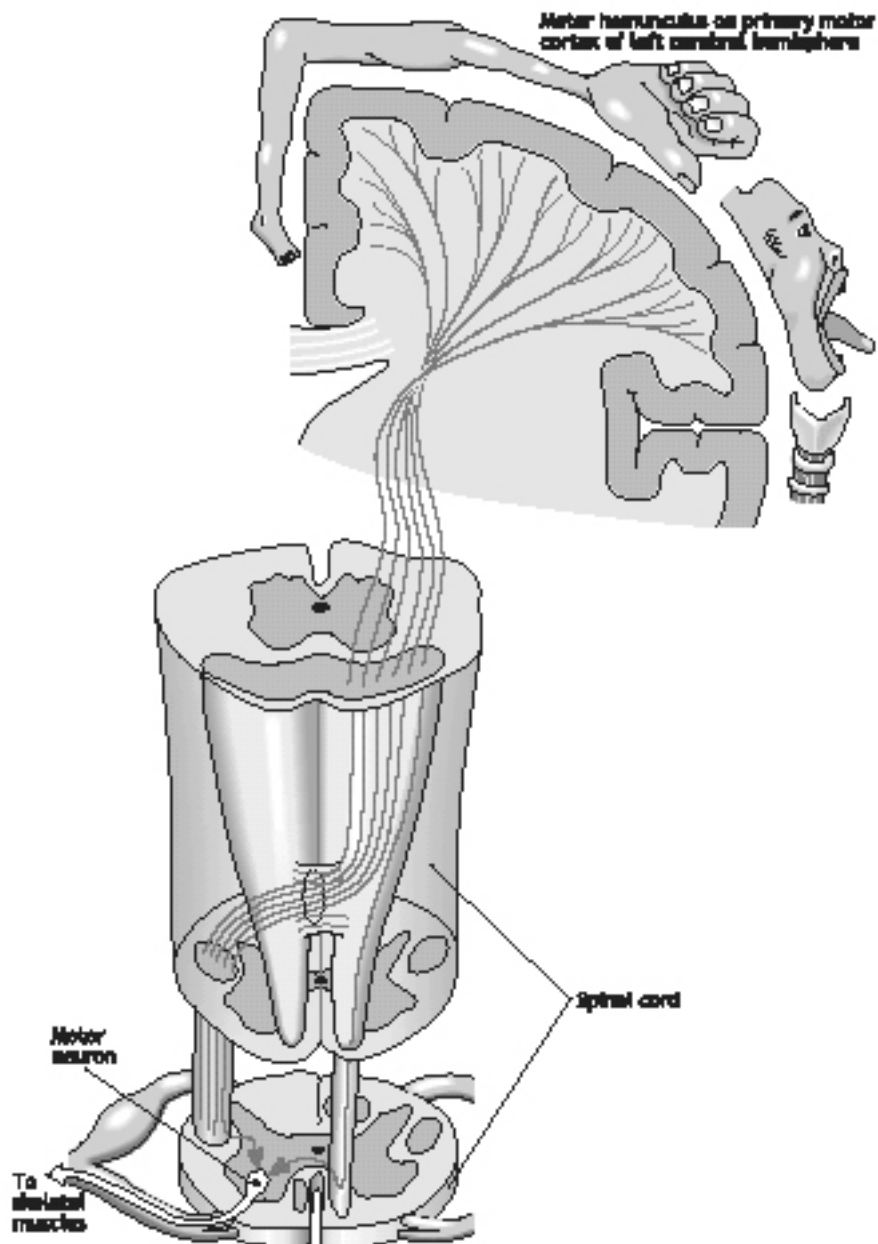
Figure 4.33 Motor control (Source: Martini *et al.*, 2000, Figure 16-4(a), p.429)

The autonomic nervous system

Autonomic nervous system
Part of the nervous system which is responsible for exerting action on the internal environment, for example through smooth muscle.

The **autonomic nervous system** (ANS) is involuntary and is responsible for effecting action within the body itself, but not on the external world (see Figures 4.31 and 4.32). Again, the link between physiology and behaviour is two-way. Our emotions influence the physiology of the body and, in turn, emotions and moods depend upon feedback from the periphery of the body (e.g. activity by the immune system) (Damasio, 1996).

The ANS controls heart rate, the diameter of blood vessels throughout the body and the production of saliva, amongst other things. You do not have to make a conscious decision to accelerate your heart rate during an emergency or slow it down when you meditate, it happens automatically. Indeed, deliberately trying to target the ANS by voluntary control is extremely difficult. Try thinking of when you last blushed with embarrassment. Then think how futile or even counterproductive conscious attempts to counter this are. Blushing is caused by the dilation of blood vessels near to the surface of the skin of the face.

Cardiac muscle
Muscle in the wall of the heart which is responsible for its activity.

Smooth muscle
Muscle which is excited by the ANS, and is found in places such as the walls of blood vessels and the intestines.

Action is effected within the ANS by two types of muscle and by hormones. The two types of muscle are termed **cardiac muscle** and **smooth muscle**. Cardiac muscle is located in the walls of the heart and it effects the beating action of the heart. It exhibits a steady 'background' frequency of heartbeats. However, action within the ANS can either excite the heart to beat faster (e.g. in danger) or slow it down (e.g. when meditating). Smooth muscles are found in the walls of vessels, such as the gut and blood vessels. Their degree of contraction is changed by the activity of the ANS. The gut's smooth muscle programs ripples of contraction, which propel food along the gut. External influences can alter this, for example, when a state of anxiety provokes inappropriate and painful gut contractions.

The two principal hormones in the ANS are adrenalin and noradrenalin (termed respectively epinephrine and norepinephrine in the American literature). These hormones are released from the inner part of a gland situated just above the kidney, termed the adrenal gland (hence their name). The adrenal gland receives a rich supply of blood and so these hormones are secreted into passing blood and circulated throughout the body.

Sites of action of the adrenal hormones include receptors at the cardiac muscle. Their occupation of the receptors increases the heart's pumping action. From this, you might be able to suggest a possible logic behind a claim of the kind 'he is hooked on his own adrenalin'. This could imply that these hormones directly influence the brain. Or it could mean that we

detect their influence less directly, for example on heart rate. Either way, sensation-seekers could be motivated to seek out situations that trigger such activation.

Under some conditions, adrenal hormones can be provoked into excessive secretion, inappropriate to adaptive requirements. For example, transient activation is clearly appropriate on some occasions, such as fleeing from a runaway car, but it would not be appropriate if you were stuck for four hours on a train that had broken down. There is little in the way of fighting or running that most of us would feel able to do under these circumstances. Instead, we sit with hormones and fatty substances pouring into our blood streams and forming deposits in our circulatory pathways, elevated heart rates, and groaning intestines. This represents the 'textbook' stress pathology of twenty-first century living; a maladaptive instance of the performance of an adaptive system, which will be discussed in the third course book, *Applying Psychology*.

6.2 The nervous system, development and behaviour

The nervous system changes over time as a function of the growth and the experiences of an individual. It is useful to view some of psychology's discussions in the light of this. For example, a heated debate has raged over human language. To introduce it, let us start with what is uncontroversial: in the adult human brain, regions of the temporal and frontal cortex of the left hemisphere are specialized to process language. We know this since (a) imaging techniques show them to be active during speech and processing the spoken word, and (b) damage to these regions has a particularly disruptive effect on language.

Turning to the controversy, on the one side were exponents of the idea that language is genetically determined by fixed structures 'pre-wired' into the left hemisphere of the brain (Chomsky, 1959). This gives the emergence of language a certain inevitability. Other theorists argued that language was learnt by a process of reinforcement (Skinner, 1957), much in the same way as learning to do anything else (see Chapter 3 of this book). These days, a compromise position appears to carry the most weight. There are parts of the brain which, given an appropriate linguistic context and exposure, preferentially develop into the biological bases of language. In the absence of such a context during development, these areas might be partly captured by other processing such as vision or touch (Elman, *et al.*, 1996).

6.3 Depression – an integrative view

Depression provides a very good example that enables us to draw together a number of the issues raised so far in this chapter, including that of development.

It could be argued that a combination of genes gives an individual a susceptibility to develop depression. However, it is not inevitable that the person will suffer depression since their early and later environment and lifestyle might cushion them against this. Conversely, a person with little genetic bias towards depression might suffer extremes of stress, that may, nevertheless lead to depression (Anisman and Zacharko, 1982).

If we identify that certain genes bias some individuals towards depression, how might this be manifest in the nervous system? The evidence on the efficacy of drugs such as Prozac points to the involvement of certain types of neurotransmitter in depression. Current theories suggest that there are abnormalities in neurotransmission within certain key neural systems such as the dopaminergic, serotonergic and noradrenergic. It is argued that a set of genes might bias an individual towards an abnormality in the density of receptors at a particular type of synapse.

Is depression biological or social? Such a dichotomy is unhelpful since it divides the world in a way that is not logical. Changes in synapses affect the way that we interpret events in the world. Conversely, events in the world, such as exposure to trauma, inevitably have consequences in the nervous system. Therefore, depression is bound to be both biological *and* social.

From a functional perspective, how could a nervous system with a bias towards depression have survived the evolutionary process? One possible argument is that depression is a pathological exaggeration of something that is basically adaptive. A phase of inactivity might serve to conserve resources and, for a social species, serve to deflect aggression or solicit sympathy. It is only when it is excessive that such a strategy is maladaptive.

6.4 Final thought

The chapter has indicated how an understanding of behaviour, emotion, motivation, cognition and the mind, including consciousness, might be enriched by insights from biology. A study of neurons, neural systems and the brain can provide explanations that dovetail with those derived from a psychological perspective. Having surveyed biological psychology and studied Chapter 2, you should be in a good position to take a critical stance towards both biology and its critics. We are not necessarily at the mercy of

only our biology (complex psychological phenomena do not exist 'ready-made' in the genes), but neither do we have autonomy from it. A dynamic interaction between biological factors and social context emerges as the model having the most useful explanatory power.

Summary Section 6

- The somatic nervous system is responsible for effecting action on the external environment via skeletal muscle, whereas the autonomic nervous system effects action on the internal environment.
- Considering the brain in terms of genetics and development enhances our understanding of a number of issues, such as how language emerges and the dynamics of depression.

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■ Commentary 4: Biological processes and psychological explanation

Every chapter so far has indicated that biological processes are central to the psychological processes it has been discussing. Chapter 1 ('Identities and diversities'), for example, argued that embodiment is an important part of people's identities and also that some kinds of damage to the brain can damage identities. Chapter 2 ('Evolutionary psychology') indicated that evolution depends on biological processes, including genetic transmission. Most aspects of learning (the subject of Chapter 3) depend on brain processes and evolutionary history. Later chapters (on personality, perception and attention, and memory) will also demonstrate the interdependence of psychological and biological processes. The chapter you have just read (Chapter 4, 'Biological processes and psychological explanation') focuses directly on how the central nervous system (which includes the brain) works and affects behaviour, emotions and cognition.

Theory

1 Most psychologists, but not all, take the view that biology is not *deterministic*; that is, biology, on its own, does not determine psychological processes. Instead, most believe that psychological phenomena are the result of *interactions* between biology and environments.

2 The issue of whether psychology can be reduced to biology has been, and to some extent continues to be, the subject of debate within psychology.

3 When different perspectives are complementary, such as biological and social explanations for depression, they can be used in conjunction with each other.

Methods

4 Biological psychologists predominantly use an outsider viewpoint. However, some recent neuroimaging techniques do use insider viewpoints as well, in that researchers ask people questions about their experiences as they record brain activity.

Themes

5 Biological psychology is concerned with the question of what makes all animals similar as well as what differentiates humans from non-human animals.

6 Both fixity and change (often referred to as stability and adaptation by biologists) are important in biological psychology.

■ Thinking about theory

Biological psychology is a *perspective* that argues that biological structures and biological processes underpin all behaviour, emotions and cognition. Since psychological processes depend on biology for their expression, there are fundamental issues regarding the role of biology as a tool in psychological explanation.

Perspectives at different levels of analysis

The first consideration is whether or not biology could be said to *determine* psychology. There are those who take an extreme position on this – believing that it does, and that ultimately biology, in some form, will fully explain all psychological phenomena. But most psychologists would claim that biology *alone* does not determine psychology. These psychologists, working in the biological psychology perspective, see psychological phenomena as the result of interactions between biology and environments. The same biological influences can have different effects in different social contexts, and contexts can in turn affect biology (e.g. stress can affect the functioning of the heart and of blood vessels). So there is a reciprocal relationship between them. This means that biological explanations alone are insufficient for psychological explanation and so psychology cannot be reduced to biology.

We have already seen that there are many perspectives in psychology and that they tend to guide how questions about subject matter are formed. So a biological psychologist might be expected to formulate a theory and ask questions about, say, depression, at the level of genetic inheritance, or the structure of synapses, or in terms of neurotransmitters. A social psychologist with an interest in clinical matters would, instead, formulate theories in terms of a depressed person's recent life events, social networks, relationships and general support. Both perspectives yield useful findings at these *different levels of analysis*. The different perspectives are complementary and, in terms of possible treatments, they could be used in conjunction with each other – for example, antidepressants *and* psychological counselling.

The meaning and implications of reductionism and different levels of analysis

In this book we are setting out a basic mapping of psychology, describing and discussing the different perspectives, their theories and methods. As we have already seen, there *are* questions to ask about whether and when different perspectives are in conflict or are complementary; and the second course book will discuss these issues in more depth. *Reductionism* is one way to deal with some conjunctions of different perspectives. For example, the phenomena described within a perspective at one level (such as the personal misery and social effects of depression) are explained in terms of

the theories and phenomena of a different perspective at a lower level (e.g. neurotransmitters at synapses). The important point to grasp about reductionism, in a strict sense, is that it *privileges lower levels in a hierarchy of levels of explanation.* We can think about depression at the 'whole person' and social level, but it is the case that, whatever the social causes, these causes have their initial impact via biology. It is biology that initially creates the low mood as experienced, and depressed behaviour follows. (Note also that depressed behaviour and reduced social engagement will, in turn, have their effect on biochemistry, creating a spiral effect.) Clearly, if the explanation of depression is *only* in terms of biology – reduced to the biological level – then a great deal is missed. And biology is not the lowest possible level: biological processes could be explained in terms of chemicals, chemicals in terms of subatomic particles, and so on. The principle of reductionism can be applied to other hierarchies of explanation. In group psychology, the question is not usually about reduction to biology but about reduction to a lower level in a different sense. For example, can, or should, group phenomena be reduced to explanation at the level of individual behaviour?

The issue of whether psychology can be reduced to biology has been, and to some extent continues to be, the subject of some debate within psychology. But it is likely to be somewhat revitalized in the light of new technological developments such as molecular biology, the mapping of the human genome, and the techniques of neuropsychology. This is because the new techniques dramatically increase the literal visibility of brain structures and their activity, and hence their salience as biological causes and explanations. But it is important to realize that even these material data also have to be *interpreted* before they can be used as evidence.

Explanations at higher levels are not only less visible, but also much more complex to demonstrate. Chapter 4 has given examples of how different levels of analysis each have their own properties. It refers to the possibility that meaningful topics and experiences such as religion might be located in particular structures in the brain. But even if areas of brain activity can be demonstrated as relating to religious experiences, the meanings that these experiences have for individuals, groups and cultures cannot entirely be accounted for at the biological level. Another example is that things happen in groups that *cannot* happen with individuals, one at a time. A group has emergent properties such as cohesion and patterns of dependence that are difficult to demonstrate and study. And perhaps the most crucial emergent property of all is that of *meaning.* Perspectives such as psychoanalysis (discussed in Chapter 9), and social constructionism (one of the theoretical perspectives presented in Chapter 1) focus primarily on meanings and other symbolic data.

■ Thinking about methods

Multiple methods

A biological psychology perspective has different aspects, such as evolution, physiology, biochemistry, genetics and development. Not surprisingly, given that it has to account for a great many processes, it draws on a range of methods developed in disciplines such as chemistry, physics and neurophysiology and uses them with humans and other animals. A major part of biological psychology involves the study of the brain. Biological psychologists use invasive techniques to record the electric activity of single neurons to see how they react – for example, to light stimulation. They also stimulate neurons electrically and study the effects. And since neurons cannot function without chemical neurotransmitters, biological psychologists also study the activity of neurotransmitters in the brain using biochemical analyses.

For biological psychologists, brain damage has provided a means of finding out which parts of the brain are responsible for particular psychological functions, such as memory, perception and personality. However, using the metaphor of the brain as an engineering problem, if brain damage disrupts a psychological function this does not mean that that function was localized in the damaged part. It may simply be that the damage has disrupted connections within the brain. This raises the issue that using induction as a method of enquiry can be misleading and cautions us to recognize that, even in an area of psychology where we can directly investigate structure and function, theory and method allow us only to move towards understanding psychological issues, rather than furnishing us with 'the truth'.

Techniques for studying the brain, and debates about localization of function within it, have been much improved by the introduction, towards the end of the last century, of non-invasive brain-imaging techniques (e.g. positron emission tomography – PET). As in other areas of psychology, technological developments thus lead to exciting developments within the discipline. Another such example in biological psychology concerns the decoding of the human genome which was completed in 2001 and which is facilitating the study of genetic transmission, although, as we have seen, genes can only have their influence in the context of environments. For most of these techniques, psychologists can use the experimental method to compare the performance of different groups of people such as those with brain damage and those without, on various psychological tasks.

All the methods discussed above predominantly use an outsider viewpoint – although some recent neuroimaging techniques do use insider accounts since researchers ask people questions about their experiences as they record brain activity. They also predominantly use what we have called 'material data'.

■ Thinking about themes

Explaining ourselves as human

Biological psychology is concerned with the question of what makes all animals similar as well as what differentiates humans from non-human animals. Although it also discusses differences between people (e.g. in terms of brain damage or reactions to drugs), it is not concerned with what makes each human being unique. It is more concerned with documenting biological universals than with making individuals themselves the unit of analysis. However, biological psychology (like other areas of psychology) is dynamic and this emphasis may shift as non-invasive brain-imaging techniques make it more possible for the uniqueness of each person's neural connections to be explored.

Fixity and change

Biological psychology questions how animals (human and non-human) adapt to their external environment by changing *and* how they maintain themselves as stable organisms in equilibrium, through the process of homeostasis. So both fixity and change (often referred to as 'stability' and 'adaptation' by biologists) are important for survival.

Some biological change is best thought of as development – unfolding over time. But organisms also learn, and in that way adapt to a wide range of environmental circumstances. The recognition that biology and environments (physical, social and cultural) affect each other and are always simultaneously present must lead to a rejection of a dichotomy between nature and nurture, for, as we have seen, complex interdependence between biology and environment begins *in utero* (the womb being a complex environment) and continues throughout life. Chapter 4 thus echoes one of the arguments put forward in the previous chapter that learning is simultaneously a cognitive, social, emotional and developmental process. The biological psychology perspective presented in the chapter argues that, in order to understand development, we need to examine both biological and social processes.

The chapter that follows (Chapter 5, 'The individual differences approach to personality') builds on the material in Chapter 4 by considering possible biological origins of personality and discussing the role of genetics in the study of personality. But it also looks closely at the complexity of environments and the complexity of interactions between biological givens and the social world.

The individual differences approach to personality

Kerry Thomas

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Text

Box 2: adapted from: 'Ethical Principles for Conducting Research with Human Participants 2000', pp.7–11, *Code of Conduct, Ethical Principles and Guidelines*, The British Psychological Society.

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Chapter 1

Text

Box 1.6: Keith, L. (1994) 'Tomorrow I'm going to re-write the English language', *Mustn't Grumble: Writing by Disabled Women*, The Women's Press Limited.

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Figures

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Chapter 4

Figures

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