Theories and Methods

1 Studying Development

The study of how behaviour develops forms part of the science of psychology. But what do we mean by terms such as 'science', 'psychology' and 'development'? This chapter aims to supply the answer, but although it comes first in the book, it may not necessarily be best to read it thoroughly at the outset. Especially if you have not studied psychology before, it might be useful to read it through quickly at this stage, and return to it later, even after finishing the rest of the book, for a more thorough understanding. The issues raised in this chapter are important, but understanding them fully will be easier if you already know something of psychological theories and methods of investigation.

In an important sense, we are all psychologists. We are all interested in understanding behaviour, both our own and that of our parents, children, family and friends. We try to understand why we feel the way we do about other people, why we find certain tasks easy or difficult, or how certain situations affect us; and we try to understand and predict how other people behave, or how their present behaviour and situation may affect their future development. Will a child settle well with a childminder, or do well at school? Will watching violent films on television be harmful? Will a child be bullied at school? Can we teach children to cooperate? What level of moral reasoning can we expect a child to understand?

Nicholas Humphrey (1984) described us as 'nature's psychologists', or *homo psychologicus*. By this he means that, as intelligent social beings, we use our knowledge of our own thoughts and feelings – 'introspection' – as a guide for understanding how others are likely to think, feel and therefore behave. Indeed, Humphrey went further and argued that we are conscious, that is, we have self-awareness, precisely because this is so useful to us in this process of understanding others and thus having a successful social existence. He argued that consciousness is a biological adaptation to enable us to perform this introspective

psychology. Whether this is right or not (and you might like to think about this again after you have read chapter 2), we do know that the process of understanding others' thoughts, feelings and behaviour is something that develops through childhood and probably throughout our lives (see chapter 14). According to one of the greatest child psychologists, Jean Piaget, a crucial phase of this process occurs in middle childhood, though more recent research has revealed how much has developed before this.

If we are already nature's psychologists, then why do we need an organized study of the science of psychology? A professional psychologist would probably answer that it is to try and arrive at greater insight, and greater agreement on contentious issues. Sometimes, common-sense beliefs are divided. For example, attitudes to physical punishment of young children as a form of discipline are sharply divided and polarized in many countries (see chapter 4). Sometimes, common beliefs are wrong. In the course of researching the lives of children of mixed parentage, Tizard and Phoenix (1993, p. 1) reported to a group of journalists that many of the young people in their sample saw advantages in their family situation through the meeting of two distinctive cultures. The journalists responded with incredulity since the findings ran contrary to the popular belief that these children inevitably suffered from identity problems, low self-esteem and problem behaviour!

By systematically gathering knowledge and by carrying out controlled experiments, we can develop a greater understanding and awareness of ourselves than would otherwise be possible. There is still much progress to be made in psychology and in the psychological study of development. We are still struggling to understand areas such as the role of play in development, the causes of delinquency, the nature of stages in cognitive development. Most psychologists would argue, however, that the discipline of child development has made some progress and even in the most difficult areas knowledge has now become more systematic, with theories being put forward. We now know more, for example, about the importance of social attachments in infancy (chapter 4), or the process by which a child learns its native language (chapter 11), or how our understanding of others' minds develops (chapter 14), than previous generations ever did or could have done without organized study.

So, how can we go about this?

■ Development Observed

The biologist Charles Darwin, famous for his theory of evolution, made one of the earliest contributions to child psychology in his article 'A biographical sketch of an infant' (1877), which was based on observations of his own son's development. By the early twentieth century, however, most of our understanding of psychological development could still not have been described as 'scientific' knowledge; much was still at the level of anecdote and opinion. Nevertheless, knowledge was soon being organized through both observation and experiment and during the 1920s and 1930s the study of child development got seriously under way in the USA with the founding of Institutes of Child Study or Child Welfare in university

centres such as Iowa and Minnesota. Careful observations were made of development in young children and of normal and abnormal behaviour and adjustment. In the 1920s Jean Piaget started out on his long career as a child psychologist, blending observation and experiment in his studies of children's thinking (see chapter 12).

Observation of behaviour in natural settings fell out of favour with psychologists in the 1940s and 1950s (though it continued in the study of animal behaviour by zoologists, chapter 2). Perhaps as a reaction against the absence of experimental rigour in philosophy and early psychology, and the reliance on introspection (that is, trying to understand behaviour by thinking about one's own mental processes), many psychologists moved to doing experiments under laboratory conditions. As we will discuss later, such experiments do have advantages, but they also have drawbacks. Much of the laboratory work carried out in child development in the 1950s and 1960s has been described by Urie Bronfenbrenner (1979) as 'the science of the behaviour of children in strange situations with strange adults'.

Durkin (1995, chapter 1) challenged the idea that the best way to understand how a child develops is to remove him or her from his or her usual environment and conduct experiments in laboratory conditions. He argued that development is intimately related to the social context provided by other people and by the wider social structure within which the child grows. Furthermore, individuals themselves also affect their social environment. There is now much more value attached to the study of children in real-life settings despite the methodological challenges that such contexts place on the social scientist.

Schaffer (1996, pp. xiv–xvii) notes other changes in the ways in which psychologists now approach child development. These include the need to understand the *processes* of how children grow and develop rather than simply the *outcomes*, and to integrate findings from a range of sources and at different levels of analysis – for example, family, community, culture.

We hope that in the course of reading this text you begin the process of integrating perspectives – for example, by reflecting on the links to be made by psychologists between the concept of the child's 'internal working model of relationships' (chapter 4) and discoveries about 'theory of mind' (chapter 14). We hope too that you find the opportunity to recognize the complementary virtues of various different methods of investigation and gain a sense that the child's developmental processes and the social context in which they exist are closely intertwined, each having an influence on the other.

What Is 'Development'?

The term 'development' refers to the process by which an organism (human or animal) grows and changes through its life-span. In humans the most dramatic developmental changes occur in prenatal development, infancy and childhood, as the newborn develops into a young adult capable of becoming a parent himself or herself. From its origins much of developmental psychology has thus been concerned with child psychology, and with the changes from conception

and infancy through to adolescence. These are the primary areas covered in this book.

Generally, developmental processes have been related to age. A typical 3-year-old has, for example, a particular mastery of spoken language (see chapter 11), and a 4-year-old has typically progressed further. A developmental psychologist may then wish to find out, and theorize about, the processes involved in this progression. What experiences, rewards, interactions, feedback, have helped the child develop in this way? Two important but different research strategies have commonly been used in this endeavour. These are 'cross-sectional' and 'longitudinal' designs. Each method has advantages and disadvantages.

Cross-sectional design: In a cross-sectional design an investigator might look at several age groups simultaneously. For example, she might record language ability in 3-year-olds and 4-year-olds, at the same point in time. The cross-sectional design is quick to do, and is appropriate if the main interest is in what abilities or behaviours are typical at certain ages. Because of the convenience of the method, the majority of developmental studies have been cross-sectional.

Longitudinal design: In a longitudinal design, the investigator follows certain individuals over a given time period, measuring change. For example, our investigator might have recorded the language ability for a sample of 3-year-olds and a year later visited the same children to get a sample of what they can do as 4-year-olds. Longitudinal designs are generally preferable if the focus of interest is the process of change, and the relationship between earlier and later behaviour. In our example, it is longitudinal data which give us the most ready access to information on what kinds of experience foster language development, and whether individual differences at 3 years of age predict anything about individual differences a year later, at age 4.

Although longitudinal studies are more powerful in this way they have a number of drawbacks. One is simply the possibility of subject attrition – some participants may move away, lose contact, or refuse or be unable to participate by the next time of testing. This could influence the generality of conclusions, especially if the reason for participant loss may be related to the dependent variables of the study.

Another problem with longitudinal designs is that they are time-consuming! In our example a wait of one year may not be too off-putting. But, if you wanted to see whether friendships in childhood related to happiness as an adult (see chapter 4), you might find yourself having to wait 20 years! Some longitudinal studies have now in fact proceeded for this length of time and longer.

A few major studies, which originated in the USA in the 1930s, as well as some nation-wide surveys starting in Britain since the 1950s, have provided or are providing longitudinal data spanning 20, 30 or 40 years (see box 9.1 for an example in New Zealand). Such long-term studies give us some of our most powerful evidence on the nature of development, so far available. However, when a study goes on for so long, another problem may arise. When the study was initially designed decades ago, it may not have asked the sort of questions that we now find most interesting. Any long-term longitudinal study will be dated in its conception. It
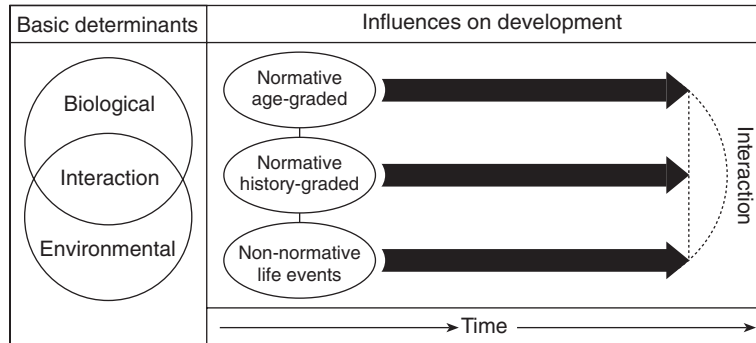
Figure 1.1   Three major influence systems on life-span development: normative age-graded, normative history-graded and non-normative life events. These influence systems interact and differ in their combinational profile for different individuals and for different behaviours (adapted from Baltes et al., 1980).

will also be dated in its conclusions, which will refer to developmental outcomes for people born decades ago. Such conclusions may not always be applicable to today's children. For example, the effects of parental divorce on a child's later adjustment may be different now, when divorce is more frequent and socially acceptable, than 50 years ago when the social stigma attached to divorce in Western societies was much greater (see pp. 121–3).

Baltes's conceptualization of life-span development

Paul Baltes, a German psychologist, has been influential in emphasizing the life-span nature of development and the importance of historical influences (see Baltes et al., 1980). Baltes points out that age-related trends, the traditional staple of developmental psychology, constitute only one of three important influences on development throughout the life-span (figure 1.1). Each of these influences is determined by an interaction of biological and environmental factors (cf. chapter 2), though one or the other may predominate in particular cases.

Of the three kinds of influence, 'normative age-graded' is one that has a fairly strong relationship with chronological age. The advent of puberty at adolescence (see chapter 9) would be an example of a normative age-graded influence with a strong biological component, while entering school at 5 years (in Britain) would be a normative age-graded influence with little biological determination.

'Normative history-graded' influences are those associated with historical time for most members of a given generation (or 'cohort', see below). A famine, for example the Ethiopian famine of the 1980s, would be an example of strong biological determinants on development. The advent of television (see box 6.2), or historical changes in family size (for example the 'one-child' policy in China since the early 1980s) are examples with little biological determination. The attack on

the World Trade Center in New York in 2001 was a historical event with worldwide implications, but especially on people growing up in Afghanistan and the middle East, and in the USA.

Finally, 'non-normative life events' are those that do not occur in any normative age-graded or history-graded manner for most individuals. The effects of brain damage in an accident would be an example with strong biological determinants; the effects of job loss, or moving house, or divorce, examples with less strong biological determinants. All are significant events that can occur in the lifespan of an individual at many age points and at many historical times.

Many developmental studies examine the effects of a particular kind of non-normative life event when it happens, perhaps irrespective of age, or with age as another factor. The effects of divorce on children, mentioned earlier, is one example. Investigators of this topic typically record the adjustment of children, often of a range of ages, over a period of time from when the parental separation occurred. Another example would be the study of the effects of a traumatic event, such as exposure to warfare, or being in an accident such as the sinking of a cruise ship (see chapter 17).

The consideration of history-graded influences leads to further designs for studying development, apart from the cross-sectional and longitudinal ones already mentioned. One of these is cohort design.

Cohort design: in cohort design, different cohorts (i.e. samples of children born in different years) are compared at the same ages. This design will inform us of the impact of historical change. For example, if we compare leisure activities of 8-year-old children born in a western society in 1930, 1960, and 1990, we will see changes influenced by (among other factors) the advent of television in the 1950s, and the advent of computer culture and games in the 1980s.

The characteristics of the three designs mentioned so far are as follows:

Cross-sectional design
Different participants   Different ages   Same historical time
Longitudinal design
Same participants   Different ages   Different historical times
Cohort design
Different participants   Same ages   Different historical times

Yet another design is a combination called cohort-sequential design.

Cohort-sequential design: This combines aspects of all the above three designs to create a very powerful analytic tool in studying developmental processes. As an example of this, we might look at the effects of compensatory preschool programmes (see chapter 17) on children born in 1970, 1975 and 1980, following each cohort longitudinally through from age 3 years to, say, age 18 years. As well as several sets of cross-sectional and longitudinal data, this hypothetical design (figure 1.2) would let us see whether historical change over the last decade or so (for example in educational policy, or the relative position of minority groups in society) had an impact on whatever long-term effects of the programmes might
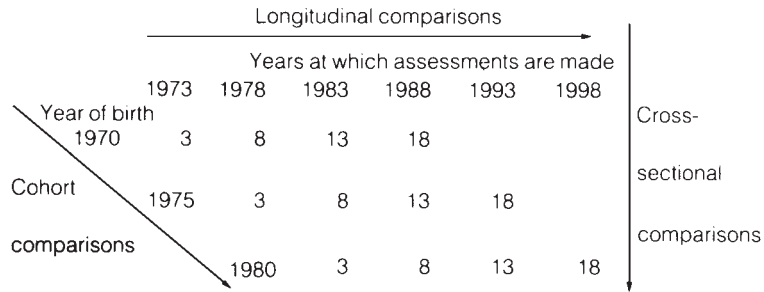
Longitudinal comparisons →

	Years at which assessments are made						
		1973	1978	1983	1988	1993	1998
Year of birth	1970	3	8	13	18		
Cohort comparisons	1975		3	8	13	18	
	1980			3	8	13	18

Cross-sectional comparisons

Figure 1.2 A hypothetical study design, combining cross-sectional, longitudinal and cohort comparisons, to examine the effects of compensatory preschool programmes at different ages and different historical periods. If started in 1973, the study would continue until 1998. The ages of each sample of children from each cohort and at each year of study are shown in years.

be detected. Obviously, this would be immensely time-consuming, and indeed such a study has not been carried out! Even one set of actual longitudinal studies originating in the 1970s has proved a major research undertaking (see chapter 17). So far, cohort sequential designs have been rarely used, and only on a smaller scale. An example is given in box 5.2.

Bronfenbrenner's ecological model of human development

The American psychologist Urie Bronfenbrenner has proposed another influential conceptualization of development (Bronfenbrenner, 1979). He emphasizes the importance of studying 'development-in-context', or the ecology of development. 'Ecology' refers here to the environmental settings which the person or organism is experiencing, or is linked to directly or indirectly. Bronfenbrenner conceives of this ecological environment as a set of four nested systems (see figure 1.3) and as an interaction among the processes of person, context and time.

Most familiar to the psychologist is the 'microsystem' – what an individual experiences in a given setting. For a young child, one microsystem may comprise the home environment with parents and siblings. Another microsystem may be the school environment, with teachers and peers. Most psychological research is carried out at the level of one microsystem, for example looking at mother's talk and child's speech in the home (chapter 11), or peer popularity and aggression at school (chapter 5).

At the next level is the 'mesosystem'. This refers to links among settings in which the individual directly participates. For example, the quality of the child's home environment might affect his or her school performance or confidence with peers.

The third level is the 'exosystem'. This refers to links to settings in which the individual does not participate directly, but which do affect the individual. For example, the mother's or father's work environment may affect their behaviour
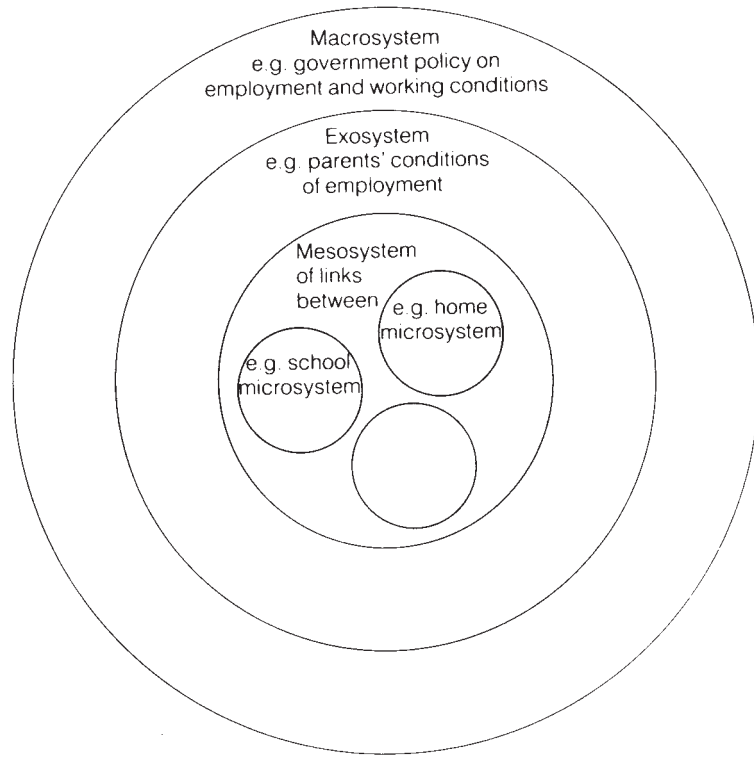
Figure 1.3   The nested circles of macro-, exo-, meso- and microsystems proposed by Bronfenbrenner (1979), with examples relevant to a school-age child.

at home, and hence the quality of parental care. The child does not directly experience the parent's work environment, but he or she experiences the effects indirectly.

The fourth level is the 'macrosystem'. This refers to the general pattern of ideology and organization of social institutions in the society or subculture the individual is in. Thus, the effects of parental stress at work, or unemployment, will be affected by such factors as working hours in that society, rates of pay, holiday and leave entitlement, occupational status, or the degree of social stigma attached to unemployment.

Bronfenbrenner's model illustrates how a decision or change in the macrosystem (e.g. change in employment conditions) may affect the exosystem (parent's work experience) and hence a child's mesosystem and microsystem. This is not controversial in itself. However, recognizing these links does suggest the importance of trying to conceptualize and design psychological investigations extending beyond just the microsystem level.

Bronfenbrenner proposes that we view human development as the process of understanding and restructuring our ecological environment at successively greater levels of complexity. The child first comes to understand its primary care-

givers (chapter 3), then its home and nursery or school environment, then wider aspects of society. Changes in the ecological environment (or 'ecological transitions') are especially important in development. Examples might be: having a new sibling; entering school; getting a job; being promoted; getting married; taking a holiday. (Note the similarity to Baltes's ideas of life events.) At such times the person is faced with a challenge, has to adapt, and thus development takes place. Indeed, Bronfenbrenner feels that seeing how a person copes with change is essential to understanding that person: 'If you want to understand something, try to change it.'

More recently, Bronfenbrenner and Ceci (1994) propose empirically testable basic mechanisms called *proximal processes* through which the genetic potential for effective psychological functioning are realized. These proximal processes lead to particular developmental outcomes, including controlling one's own behaviour, coping successfully under stress, acquiring knowledge and skill, establishing mutually satisfying relationships and modifying one's own physical, social and symbolic environment. Bronfenbrenner's model predicts systematic variation in the extent of such outcomes as a result of the interplay among proximal processes, their stability over time, the contexts in which they take place, the characteristics of the persons involved and the nature of the outcome under consideration.

■ Obtaining Information about Behaviour and Development

As you read through this book, you will see that psychologists have used a wide variety of means to obtain useful information, whatever their theoretical or conceptual orientation has been. Some form of experimental study is perhaps the most common form of investigation reported in psychological books and journals. Nevertheless, non-experimental methods, such as naturalistic observation or field surveys, are also respectable procedures provided there is a clear aim to the research. The crucial variable here is the degree of control the investigator has over what is happening. We shall discuss this in some detail, together with two other aspects of obtaining data – the way behaviour is recorded and the selection of participants. These aspects are also highlighted in the boxes that follow all the subsequent chapters.

What degree of control?

A great deal can be learned from recording behaviour in natural situations or settings. Suppose we were interested in what kinds of help are shown by preschool children to others in distress (chapter 8). Perhaps the most suitable approach here is for the investigator simply to observe children in natural settings such as the home, or ask parents or adults to keep diary records of events. Or, we might try to save time simply by interviewing parents, or giving a questionnaire. The investigator interferes as little as possible, only to the extent of making sure he or she gets reliable data. This kind of approach is most suitable when we do not yet have

much systematic knowledge about the phenomenon, and need to gather this descriptive data. As an example, Judy Dunn and Carol Kendrick (1982) gathered observational records of interactions between siblings, in the first few years of life (see chapter 5). Even though some experimental work had been done on sibling relationships, this study produced a richness of detail and uncovered a wide variety of phenomena that fully justified such a naturalistic approach.

From this kind of study we can learn what kinds of behaviour occur, and how frequently. But do we advance our understanding of the processes involved? To some extent, the answer is yes. For instance, we can carry out 'correlational analyses' of various kinds. In a correlation we examine whether a certain behaviour occurs systematically or more frequently together with some other particular behaviour or in some particular situation. For example, we may find that helpful behaviour by children is correlated with clear communications by the mother (p. 249). Such findings certainly suggest explanations as to the processes involved. Parents who communicate clearly may have children who are more helpful because the communications bring this about. However, can we be confident that this explanation is better than some other, different explanation? Not really. The relation between cause and effect might be reversed: for example, children who are for other reasons helpful may have better relationships with parents, who are thus more willing to take time to explain things to them. Or, some other factor may account for both aspects separately. Perhaps parents who are less stressed and more happy have both more time to communicate to children and less stressed children who are therefore more helpful. In that case, stress would be the crucial factor and not parental communication.

This weakness of correlational evidence is a most important concept to grasp. If you find it difficult, think of this example. Suppose you correlated, from day to day through the year, the number of people wearing shorts and the number of people eating ice cream. You would probably get a positive association or correlation. This does not mean that wearing shorts causes people to eat ice cream, or vice versa; we know that in this case the daily variation in temperature, a third variable, is the likely cause of both.

At several points in this book we will draw out these limitations of correlational methods. The way psychologists have tried to proceed further is to use some form of experiment. In an experiment we focus on one or a small number of variables of interest that we think are important: then we try to exclude other variables from our possible explanations. Three kinds of experiment will be described.

The weakest form of experiment is the 'quasi-experiment' (see Cook and Campbell, 1979, for extended discussion). In a quasi-experiment the variable that the investigator thinks is important is changed naturally, and the investigator watches what happens. For example, in box 6.2 we refer to a before-and-after study in 1955 of the effects on children's behaviour of introducing a new television transmitter in Norwich. The investigators felt that the introduction of the opportunity to watch TV was an important variable and they took the opportunity to measure its effects.

Unfortunately quasi-experiments are not much more powerful than correlational studies at excluding alternative explanations. Usually, we know too little about (i.e. have too little control over) the characteristics of our participants and

the circumstances of the variable that is changing. For example, in the situation just described, which parents first acquired television sets when they were available? They would almost certainly be different in various ways from those who did not acquire television sets (and indeed the study identified some such differences). Also, children might differentially view programmes of certain types, depending on personality and interest. How can we tell whether changes in behaviour are due to watching the programmes, or whether the programme-watching is just a by-product of differences in behaviour due to other factors?

The most powerful way to answer such cause–effect questions is to carry out a 'true' or 'controlled' experiment. We can distinguish field experiments and laboratory experiments, but both share two important features. The first is that there are two or more well-specified 'conditions' that participants can experience. The second is that participants are assigned to conditions in a systematic fashion. In these ways the experimenter seeks to ascribe an outcome definitely to differences between certain conditions. Alternative explanations in terms of other uncontrolled differences between conditions, or between the participants in different conditions, can be excluded.

Let us take further the idea that television viewing may affect children's social behaviour. Suppose we invite children in small groups to a laboratory, where we randomly assign them to one of three conditions. In one condition they see several violent cartoon programmes; in another they see several non-violent cartoons; in the third (called a control condition) they do not watch television at all but do something else, like drawing. Afterwards they go to a playroom and are filmed by the experimenter, who records their social behaviour.

Suppose the experimenter finds a significant difference. Children who watched the violent cartoons are more aggressive to each other in the playroom than those who watched non-violent cartoons, or did drawing. This difference in aggressiveness can confidently be ascribed to watching the violent cartoons. It cannot be explained by systematic differences in the participants (we assigned them randomly) and it cannot be explained by unknown variations in the children's experiences (we chose the cartoons, and made the children sit through all of them).

Sometimes the investigator compares the effects of two or more conditions he or she is interested in (for example, violent and non-violent cartoon films). Sometimes it is appropriate to include a 'control group', which is a condition including all the same experiences except that which the investigator is particularly interested in. The children who experienced drawing, above, were a control group for the general experience of coming to the laboratory and meeting the experimenters. Any differences between the control group and the two experimental groups showed the effects of watching cartoons. Any difference between the two experimental groups further showed the effects of whether the cartoons were violent, or non-violent.

In all experiments we can identify 'independent variables' and 'dependent variables'. Independent variables are those controlled or manipulated by the experimenter: in our example, the experience of watching cartoons, and whether the cartoons were violent or not. The dependent variables are those we

choose to examine for possible effects: in our example, social behaviour in the playroom.

The laboratory experiment allows tight control of assignment of participants and of the independent variables; but is it rather artificial? What do the participants feel about coming to the laboratory? Would they normally choose to watch such cartoons? Can we expect a reasonable range of normal behaviour in this environment? Perhaps not. To some extent we can try to overcome these objections in a 'field experiment'. For example, we might try showing different kinds of television cartoons to different groups of children at a school, or at a summer camp. The children would normally be at the school, or camp, and watching some television might be part of their expected programme.

In general in a field experiment the investigator attempts to combine the rigorous control of experimental design with the advantages of a naturalistic setting (see p. 202 and box 8.2 for examples). This can, at its best, be a very powerful method. However, it is difficult to maintain both experimental control and naturalness, and the field experiment may slip either into becoming a quasi-experiment, or into becoming more constrained and unnatural, like the laboratory experiment.

Thus, in all investigations the naturalness of the setting needs to be balanced against the degree of knowledge and control we have over the setting. Where the balance is best struck depends very much on the kind of behaviour or skill we are interested in. We do want to be reasonably sure that the conclusions we draw from our study apply to the 'real world'. This concern has been labelled as the need for 'ecological validity'. Bronfenbrenner (1979) has defined ecological validity as 'the extent to which the environment experienced by the participants in a scientific investigation has the properties it is supposed or assumed to have by the investigator'. In other words, is it reasonably representative as regards the conclusions we wish to draw from the study? If we felt that the results of a laboratory experiment on cartoon watching were not representative of the effects of real-life television watching, then we would say this experiment lacked ecological validity.

Recording data

Whatever design of investigation we are using, we also have to decide how to record the data. A variety of methods are available. Sometimes several types of data may be gathered in one study.

One method is to make observational records of behaviour (e.g. box 2.1) whereby the investigator watches the participant(s) and makes systematic records of whether certain behaviours occur. Usually the investigator defines certain 'behaviour categories' in advance, and then scores when they occur. Some method of 'time sampling' is often employed to assist in quantifying the scoring (see Martin and Bateson, 1991, for extended discussion). Sometimes the investigator asks the participant(s) to keep his or her own records, perhaps a diary of occurrences (e.g. box 8.1). Again, the participants will probably need some training in what and what not to record in this way.

The method just referred to would be 'non-participant observation' – the observer watches the behaviour from 'outside'. In 'participant observation', the observer is also one of the actors in the situation. For example, in a study of a Chicago gang of adolescent delinquents, Whyte (1943) acted as a gang member in order to get insight into what was really going on. Patrick (1973) described a similar study of a gang in Glasgow, from the insider perspective. This kind of study is more difficult in terms of recording data, but will give unique insights as well.

Another set of methods involves interviews and questionnaires. In an interview, the investigator asks participants about a topic and explores their thoughts, feelings or attitudes with them. Often some degree of structure is imposed on the kinds of questions asked in the interview (e.g. box 15.2). A still more structured approach is to give participants a questionnaire in which they fill in replies to preset questions (e.g. box 9.2). A questionnaire is often given individually, but can be given in groups. A questionnaire sent to large numbers of people is called a 'survey' (e.g. pp. 301–4).

Tests can also be given individually or (in some cases) in groups. In a test the participant may be asked certain questions and also perhaps be asked to carry out certain actions, e.g. solve certain puzzles. The test differs from the interview in that it is designed to measure a particular ability or trait, and it is scored in a strictly defined way that can be compared with normative values obtained earlier in the process of test design (see chapter 16).

Children/young people as researchers

Some studies have gone beyond observing or interviewing children or young people, and have moved to involving them as researchers themselves. So far, this has not generally meant involving them in the research questions to be asked, but it has included involving them in the design of the study, and gathering data. For example the Triumph and Success Project (France, 2000) recruited eight young people aged 15 to 21 years from varying social and economic backgrounds to help undertake research on youth transitions in Sheffield, in northern England. They were involved in designing questionnaires and undertaking surveys and interviews with other young people of their age. This was especially helpful in getting data from ethnic minorities and 'hard-to-reach' groups. However, some young researchers found difficulty in disentangling themselves from the project when it 'finished'.

In a review of over 20 such projects, Kirby (1999) argues that involving young researchers in various aspects of a research project can be an ethical and democratic way of conducting research; has benefits for the young researchers themselves in developing skills, confidence and awareness of issues; and may result in getting more valid data, especially from some young people not easily reached by adult researchers. Some difficulties are that some young researchers may be reluctant to discuss 'sensitive' issues with peers; plus, there may be a tension between their 'inside knowledge' and keeping some 'outside perspective' or objectivity. While there can be some special advantages in involving young researchers, careful thought and planning is essential in making it work.

Reliability and validity

Whatever measuring instrument or method we use, we need to be sure of its 'reliability'. Basically, a reliable method is one that would give the same answer if you, or another investigator, were to repeat the measurement in the same conditions. A straight, firm ruler is reliable, a crooked or floppy one is not. Similarly, if we recorded 'aggressive behaviour' in children, but did not define our behaviour categories or method of time sampling, this would be unreliable; someone else might have a different idea of what is aggressive, and get different results even if watching the same behaviour. Methods need to be carefully specified and tried out if they are to be reliable.

The term 'reliability' is often confused with 'validity': both are very important in any investigation. We have just seen that reliability refers to the recording of data. Validity, in contrast, refers to whether the data we obtain are actually meaningful. Remember the concept of 'ecological validity' we discussed above. Our measurements in a laboratory experiment might be very reliable (well specified and repeatable) but this does not guarantee that they are valid in the sense of meaningful in the 'real world'.

Problems of validity actually arise in all kinds of investigation. If we are making records in a natural setting, we have to beware that the presence of an observer does not change the behaviour being observed. If you stand in a playground recording aggressive behaviour, will less aggression occur than usual because you are there? This is a problem of 'observer effects'. Similarly, in experiments there are 'experimenter effects'. The experimenter may unwittingly help some participants more than others, or score some participants more leniently. One type of experimenter effect is known as the 'Clever Hans' effect. Clever Hans was a horse that apparently could count. If his trainer asked 'what is three and four' Hans would tap with his front foot seven times. However, the German psychologist Oskar Pfungst (1911) discovered that Hans actually relied on subtle non-verbal (and unintentional) cues from his trainer, who inclined his head slightly forward after Hans had tapped the correct number of times. Hans was clever, but not in the way originally thought. The demonstration was a reliable one, but the conclusions drawn initially were not valid.

Participant characteristics

One aspect of validity concerns the representativeness of the participants investigated. If we do a survey of young men's attitudes to sexual relationships, they may not be representative of the views of young women (chapter 9). Or, we may not have enough participants to give us even a reliable source of data.

A data set obtained from one person is called a 'case study'. Normally a case study tells us little about the general population but, if we can obtain very extensive records (for example, the records Piaget obtained of his own children described in chapter 12) or if the person is especially interesting (for example, the

case studies of extreme deprivation described in chapter 17) then this method may be very valuable. A case study may often serve as a source of ideas or hypotheses for later study (e.g. p. 293; fig. 11.1).

Many psychological investigations are done on small samples of some 10 to 50 individuals, who can be brought to a laboratory or observed in a single setting. Sometimes a survey or other investigation is carried out on a large sample of hundreds of participants. Such a sample may be regarded as normative, or representative, of some section of the population. For example, one longitudinal study in Britain included all the children born in one week of March 1946. These could reasonably be taken as representative of children born in Britain in the later 1940s.

■ Working with the Data: Quantitative and Qualitative Methods

Once we have got our data, what do we do with it? There is a continuing debate here about the advantages and disadvantages of qualitative methods, and quantitative methods.

Qualitative methods: here, the emphasis is on the meaning of the behaviour or experience for the person concerned. The data recording methods usually used are unstructured or semi-structured interviews, or participant observation. Often, qualitative researchers obtain transcripts of interviews, and then use specialized methods such as grounded theory, and discourse analysis, to extract dimensions of meaning and experience from these. While clearly not suitable for young children, such methods can be used with older children. An example is a study of girls' bullying by Owens et al. (2000). Qualitative methods can also be illuminating in studies of how parents think about child-rearing (Phoenix et al., 1991).

Quantitative methods: here, the emphasis is on predetermined categories, and the researcher has often already decided what he or she is interested in – they are not 'searching the data' but 'looking for the answer to certain questions'. Often, quantitative researchers use experiments, or data from non-participant observation. Usually statistical tests are carried out to look at correlations, or at differences between subgroups in the sample, and to see whether the results are sufficiently stable or characteristic that it is likely they would be true of larger samples. The means of carrying out simple statistical tests (such as correlation, t test, and chi-square) are described in introductory texts such as Robson (1999), together with the meaning of probability or p values. Examples of the results of such tests are given in many of the boxes in this book.

It is possible to combine both approaches; or, to move from an initial, exploratory qualitative study to a more focused quantitative study as an investigation progresses. Unfortunately, ideological and professional biases often lead to unproductive disputes about these approaches, rather than productive selection of methods that best suit the aims of the study.

Objectivity and bias

Scientific investigation is supposed to be objective, not biased by the personal beliefs or values of the individual investigator or the wider society. In practice, this is not entirely the case. The kinds of problems chosen for study, and the way they are tackled, are inevitably affected by personal or societal ideas of what is important. Some qualitative researchers believe that this is quite intrinsic to research, as the investigator is part of society too; the best the researcher can do is to describe their own orientation and background so that others are aware of it. Quantitative researchers tend to believe that by defining units of measurement closely, and training observers or interviewers, a degree of objectivity can be obtained.

Some areas of psychology may be especially susceptible to decreased objectivity, when personal beliefs are closely involved. Stephen Gould (1996) argued this in the instance of the study of intelligence testing and the view held by some psychologists that there were innate racial differences in intelligence. The kinds of study carried out earlier in the century, and the way those studies were interpreted, clearly reflected bias (for example, racial prejudice) in some investigators. At times this involved misconceived inferences from results, or observer bias in scoring or testing. At extremes it bordered on fraudulence (see next section). Gould in turn has been accused of misrepresenting aspects of his case (Rushton, 1997). Even though objectivity is far from perfect, it is possible to recognize and expose biases, at least after the event. Much more sophisticated studies of the issues involved in race and intelligence have now been carried out, bearing these past errors in mind.

Ethical issues

Whenever an investigation is made with human or animal participants, investigators should have due respect for their rights and welfare. Investigations with animals kept for experimental purposes are usually controlled by strict guidelines, for example by the Home Office in the UK. For human investigations, general principles are of informed consent (by children and/or by parents on their behalf), confidentiality of information obtained, and lack of harm to participants. Societies such as the British Psychological Society have issued ethical guidelines for the planning of investigations. Some investigations may involve some disturbance of privacy, inconvenience to participants, or temporary deception concerning the purpose of the study. Even when legally permissible, any such outcomes should be balanced carefully against the likely benefits from carrying out the investigations. Needless to say, any negative outcomes to participants must be very carefully justified and only accepted under the most unusual circumstances; they should never be a feature of student experiments or investigations. The ethical principles approved by the British Psychological Society are reprinted in appendix A and should be consulted in case of any uncertainty on this issue.

Another ethical issue relates to the accurate reporting of results. It is clearly the duty of investigators to report their results in as accurate and unbiased a way as possible, but there have been occasions when this principle is known to have been violated. The British psychologist Sir Cyril Burt reported data on twins, which he claimed to have gathered for many years, in order to prove that intelligence was largely inherited. His results were published in numerous articles as his sample of twins accumulated. However, it has now been shown beyond reasonable doubt that in the latter part of his life Burt did not gather more data, but invented it (Hearnshaw, 1979). Thus a great deal of his twin data set is believed by most psychologists to be fraudulent, and the conclusions drawn from it unwarranted. Much attention has been drawn to this deception, partly because of the social implications of the theory of hereditary intelligence, and partly because fraud on this scale is believed to be rare. Drawing attention to such misdemeanours hopefully serves to make future occurrences less probable.

What Implications does Psychological Knowledge have for Society?

Bronfenbrenner has argued that many people have potential for development that goes far beyond the capacities that they currently display and has proposed that this untapped potential might be realized through appropriate public policies and through programmes of intervention that could provide the resources and the stability over time that enable these processes to become most effective. He argued that this conclusion is extremely salient in today's society where social changes in both developed and developing countries have 'undermined conditions necessary for healthy psychological development' (Bronfenbrenner and Ceci, 1994, p. 583).

Bronfenbrenner was concerned about what he calls the growing chaos in America's children, youth and families that he saw as being caused by disruptive trends in society over the past four decades and by the continuation of public policies that threaten the ability of the family to perform its role effectively. In fact, alarmist writings about the state of youth and families are not new. Pearson (1983) has shown how worries about the unruliness of adolescents and increase in rates of delinquency and adolescent crime and violence, appear to resurface in each generation. Looking at newspapers, books and journals over a period of some 150 years, he found that each generation was bemoaning rising crime and harking back to a golden age of a generation ago! We can go a long way back with such thoughts – Sommerville (1982) cited a tablet from Mesopotamia which stated 'Our Earth is degenerate in these latter days . . . Children no longer obey their parents'; this was dated to 2800 BC!

However, whether new or not, there are clearly important social problems that developmental and child psychologists have a responsibility to address. As a society we have knowledge of ways in which we can foster competence in the young and on interventions that can act as buffers against dysfunction in the family. Bronfenbrenner was one of the founders of Project Head Start, an intervention that had positive and long-lasting effects on disadvantaged children (Project Head Start is described in chapter 17). He is convinced that the belief

systems of parents, peers, teachers and mentors can change as a function of education, intervention programmes and the mass media; the Internet is also a growing source of influence. We need to ensure that new knowledge, and new technologies, are used effectively for human betterment.

The rights of children

Are we agreed on what human betterment is, and what is best for children? The United Nations Convention on the Rights of the Child (United Nations, 1989) advocates rights on behalf of all children and places emphasis on non-discrimination, acting in the best interests of the child, and listening to the views of the child. The Convention built on earlier legislation by specifying children's rights not only to protection and provision, but also to participation – so giving some political rights to children (we look at the impact of political violence on children's development in box 17.1). In the context of participation, it addressed such contentious issues as child labour and children's rights to freedom of thought and speech. Its recommendations are binding to those countries that ratified it (including the UK, which signed it in 1991; the USA is one country which did not sign).

Lopatka (1992), the chairman of the United Nations working group that drafted the Convention, argued that the rights of the child are universal, yet he also asserted the need to take into account the cultural values of the child's community. However, as Burman (1996) indicates, a major criticism of the Convention concerns difficulties in implementing it in societies where families are very poor, civil liberties are severely constrained or a country is at war. The tension between a child's universal developmental needs and the realities of his or her social situation may be nearly impossible to resolve.

There are similar controversies with the England and Wales Children Act that came into effect in the UK in 1991. The Children Act states that the child's welfare must be paramount and that adults must ascertain what the wishes and feelings of the child are; in legal cases, courts should take into account the emotional needs of the child. The Children Act requires all local authority agencies to work together in the best interests of protecting the child. This means, among other things, that teachers are legally obliged to share their knowledge of abuse or significant harm to the child with other agencies, most frequently social services.

The Children Act appears to be enlightened in shifting the emphasis from parents' rights over their children to their responsibilities towards the young people in their care. When parents divorce, the local authorities have a duty to protect and promote the welfare of the children involved, and the courts must now pay due attention to the wishes of the child. A process of conciliation is now more common because of the Children Act, in line with its intention to benefit children in this situation. At the same time, in practice, courts have the right to judge the child's competence to make autonomous decisions, and may as a result disregard children's wishes in the wider context of 'the best interests of the child'. You can see that it is extremely difficult to achieve the balance between what the child thinks he or she wants at the time against what in the view of adults may be in the longer-term best for the child. And who is right – the adult or the child?

As one step towards the education of young people in the complexities of rights, roles and responsibilities, citizenship education has developed in many European countries in the past decade, with the broad aim of developing in young Europeans a sense of both national and regional identity. Since 2002, schools in the UK, in line with many other European countries, are required to demonstrate that they are providing citizenship education, to be mandatory in secondary schools and recommended in primary schools. The new curriculum teaches young people about social and moral education through emphasis on current issues, rules and laws, rights and responsibilities, democratic processes and the resolution of differences. The development of such a curriculum has arisen from extensive debates about the skills, values and attitudes that will be required of the global citizen in the twenty-first century. The increasingly global environment that we inhabit calls for citizens who, whether they are consumers or employees, should be able to evaluate the developments in science and technology that have transformed our lives in recent years. There are also growing concerns about the need for global citizens to be aware of human rights and social responsibilities in a culturally diverse world. Against a background of widespread racism and xenophobia in societies where substantial minority groups (including asylum seekers) come from other cultures, the Council of Europe (1993) has called for education in human rights to be offered to children from preschool onwards, and for young people to be educated in democratic processes and values, so heightening awareness of social responsibility and a concern for social justice.

The Scientific Status of Psychology

This chapter began by briefly considering the nature of psychology as a scientific discipline. We shall conclude by discussing briefly what is meant by the term 'science', and whether this is what psychologists practice. The nature of scientific inquiry has been written about by philosophers of science: we shall summarize the views of two – Popper and Kuhn.

For a long time it was generally held that science proceeded by gathering factual data, by observation and experiment, and by deriving general laws from these facts. This has been called the 'traditional' or 'inductivist' view. However, throughout the twentieth century, scientists and philosophers of science have put more emphasis on the role of hypotheses or theories in science. A hypothesis, or theory, is a proposition that some relationship holds among certain phenomena. For example, some psychological hypotheses discussed in this book include: that the fetus can learn characteristics of the mother's voice (pp. 86–8); that the first hours of birth are critically important for mother–infant bonding (pp. 82–3); that viewing violent television programmes makes children behave more aggressively (pp. 202–7); that children's development of moral reasoning is similar in different cultures (pp. 265–7); that children cannot understand another's point of view until about 7 years of age (pp. 399–401); that preschool 'Head start' programmes can benefit a child educationally throughout the school years (pp. 573–6).

The 'traditional' view would be that hypotheses such as these are derived from facts we have gathered, and that if we get enough factual support then the theory

will have been 'proved' correct. However, this view is not now generally held. Instead, most scientists and philosophers believe that the role of theory is a primary one, and that theories cannot be proved, only disproved. A most articulate proponent of this viewpoint was Sir Karl Popper (1902–94), who argued that our ideas about the world, or 'common-sense beliefs', serve as the starting point for organizing knowledge from which scientific investigation proceeds. Thus, theory serves a primary role and indeed structures what and how we observe or categorize 'facts', or observations about the world. Psychologists are in a good position to appreciate this argument, as part of their discipline (and part of this book, e.g. chapters 10, 11 and 12) is concerned with how children construct hypotheses about perceptual data and how they gain greater knowledge about the world through forming hypotheses to test against experience. Indeed, we started this chapter by considering how people are 'nature's psychologists' in this sense (see also chapter 14).

Popper considered that science and knowledge progress by advancing hypotheses, making deductions from them, and continuing to do so until some deductions are proved wrong or 'falsified'. The hypothesis is then changed to cope with this. A hypothesis can thus never be finally proved correct, as there is always the possibility that some further observation or experiment might discredit it. A hypothesis can, however, be falsified and it is through this process that science progresses.

You can think about this by examining the hypotheses we have just listed. Have any been falsified (some have)? Did the falsifying lead to better hypotheses (sometimes)? Could any be 'proved' beyond question?

Popper's notion of falsification has been a powerful one, and he used it to distinguish 'science' from 'non-science'. If propositions, hypotheses or theories cannot actually be falsified, then according to Popper, this is not science. It may be interesting and enlightening, like a novel, but it is not science. Not all philosophers of science agree with Popper's approach. At least, not many believe that scientists spend most of their time trying to disprove their theories. A different view was put by Thomas Kuhn (1922–96), who saw a mature branch of any science as having an accepted 'paradigm'. A paradigm is a basic set of assumptions, or way of trying to solve problems. Atomic theory provided a paradigm in the natural sciences, for example.

In psychology, 'psychoanalysis', 'behaviourism', 'sociobiology' (see chapter 2) and the 'information processing' approach (viewing the brain as a computer) could be taken as paradigms in this sense. However, the most influential paradigm informing the present book is the 'cognitive-developmental' paradigm. This links behaviour to the kind of cognitive development or thinking ability expected at the age or level of development the individual is at. Piaget's theory of cognitive development is often taken as a reference point here (chapter 12), though the approach is not necessarily tied to Piaget's ideas.

Kuhn described how a branch of science might develop; it starts in a 'pre-paradigmatic stage' where it would be characterized by rather random fact-gathering, and many schools of thought, which quarrel about fundamental issues. With maturity, one paradigm is accepted and directs the way observations and experiments are made. Kuhn called this phase 'normal science'. Scientists work

within the paradigm, extending and defending it. The paradigm is not rejected unless many difficulties or falsifications accumulate, and in addition a superior paradigm appears. A period of 'revolutionary science' with competing paradigms then emerges, with eventually one proving superior, when 'normal science' resumes.

Kuhn characterized science as having a fruitful paradigm that can unify the efforts and direction of study of many scientists. Falsification has a relatively minor role to play, he argued, since all theories have some anomalies (phenomena which cannot yet be well explained). Only the appearance of another paradigm can really upset things.

Kuhn's ideas have been criticized, and modified, but his idea of a paradigm, while rather vague in practice, has had considerable impact. Psychologists in particular often seem to be claiming that a particular approach or theory is setting up a 'new paradigm'! Kuhn himself seems to have thought that psychology and other social sciences may well still be at a pre-paradigmatic stage. It is indeed true that no single paradigm as yet unites the whole of psychology. Still, certain paradigms (e.g., the cognitive-developmental approach) do seem to be fruitful and capable of bringing together several areas of psychology. Perhaps, after working through this book, the reader may decide for himself or herself what kind of scientific status the study of psychological development has, what it has achieved, and what it may reasonably hope to achieve in the foreseeable future.

■ Further Reading

A readable introductory text on methods of studying behaviour is Martin, P. and Bateson, P. 1991: *Measuring Behaviour: An Introductory Guide*, (2nd edn). Cambridge: Cambridge University Press; it has most detail on observational methods, and on studying animals. A more advanced sourcebook for research methodology and experimental design in psychology is provided by Robson, C. 2002: *Real World Research*, (2nd edn). Blackwell Publishers, while Breakwell, G. M., Hammond, S. and Fife-Schaw, C. 2000: *Research Methods in Psychology*. London: Sage, have a wide-ranging collection of chapters on different issues.

For introductions to qualitative methods see Banister, P. et al. 1994: *Qualitative Methods in Psychology*. Buckingham: Open University Press, or Richardson, J. T. E. (ed.) 1996: *Handbook of Qualitative Research Methods for Psychology and the Social Sciences*. Leicester: BPS Books. There are many good statistics texts available for psychology and the social/behavioural sciences. An excellent basic text is Robson, C. 1999: *Experiment, Design and Statistics in Psychology*, (3rd edn). Harmondsworth: Penguin; while a thoughtful, slightly more advanced text is Dunbar, G. 1998: *Data Analysis for Psychology*. London: Arnold. A useful, thorough and broader text is Coolican, H. 1999: *Research Methods and Statistics in Psychology*, (2nd edn). London: Hodder & Stoughton Educational.

The way in which psychologists can be affected by the social climate of the time, and the ethical issues involved in doing research with social policy implications, is exemplified in Gould, S. J. 1996: *The Mismeasure of Man*, (2nd edn). New York: Norton, and by Tizard, B. and Phoenix, A. 1993: *Black, White or Mixed Race?*

Race and Racism in the Lives of Young People of Mixed Parentage. London: Routledge. The journal *Childhood* gives up-to-date debates on the construction of childhood and the family, children's rights and cross-cultural perspectives on society's responsibilities towards children.

Schaffer, H. R. 1996: *Social Development*. Oxford: Blackwell Publishers, explores the ways in which current models of child socialization have implications for policies in such areas as day care, dealing with antisocial behaviour in young people, and addressing family conflict and breakdown. Durkin, K. 1995: *Developmental Social Psychology*, also published by Blackwell, gives thorough coverage on gender issues, the influence of culture and the impact of research in the social sciences on policy-making around families and young people.

An accessible general overview to ideas in the philosophy of science is in Chalmers, A. F. 1999: *What is this Thing called Science*? (3rd edn), Milton Keynes: Open University Press.

■ Discussion Points

1 Has our knowledge of psychological development advanced beyond 'common sense'?
2 What is meant by 'development' and how can we study it?
3 What are the advantages and disadvantages of carrying out experiments in psychology?
4 What impact has psychological knowledge had on society?
5 In what ways can psychology be considered to be, or not to be, a science?