

CHAPTER

5 The complexity of psychological development

KEY KNOWLEDGE

- the interactive nature of hereditary and environmental factors on a person's psychological development, illustrated through twin and adoption studies
- the role of critical and sensitive periods in a person's psychological development
- the importance of attachment on an individual's emotional development: genetics; temperament and early life experiences (with reference to the work of Harlow & Ainsworth)
- the development of cognitive abilities from concrete to symbolic thinking (with reference to the work of Piaget)
- psychosocial development across the lifespan as an influence on the development of an individual's personality (with reference to the work of Erikson).

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Consider some of the things you do almost daily. You tell the time, make plans, send a text message, go to an online site, buy something, use your imagination, interact with friends, acquaintances and others, wonder about what you might do in the evening, set an alarm and decide when to go to bed. All of these involve psychological, or 'mental', processes. When you were born, you were unable to do any of these. So how did you acquire the knowledge and skills to engage in these activities and the many others of which you are capable? When did you develop these abilities? What role do biological processes such as your genetic make-up play in enabling you to engage in these types of activities? What role do environmental factors play; for example, the influence of your family, friends, culture and society in general?

There are things about each of us that are like *all* other people, there are things about each of us that are like *some* others, and there are also things about us that are unique to each one of us, and like *no* others. What psychological characteristics do we share with others and what characteristics are unique to each one of us? What aspects of who we are remain the same for all of our lives and what aspects change? What influences our development in lasting rather than temporary ways? These are some of the many questions considered in the study of psychological development across the lifespan.

In this chapter we consider normal processes of psychological development and functioning, focusing on aspects of psychological development, particularly cognitive, emotional and personality development.

DEFINING DEVELOPMENT

Psychologists generally use the term **development** to refer to changes that occur over time. Many who study development focus on *lifespan development* — from birth through to and including old age. Many changes also occur during the nine months the fetus is developing in the uterus. However, psychologists focus mainly on development after birth. That doesn't mean that in utero experiences do not affect development. For example, a pregnant female who regularly drinks alcohol or is highly stressed for a considerable part of her pregnancy can adversely affect the development of her fetus, both in utero and subsequently after birth.

Psychologists who study lifespan development aim to understand, describe, explain and predict the many ways in which our thoughts, feelings and behaviour change throughout our lives. A change must be relatively permanent or 'lasting' to be considered a *developmental* change. For example, a short-term loss of memory as a result of a sporting injury, or an improvement in mood after receiving good news are not considered to be developmental changes. Both of these are changes, but they are only temporary and therefore not developmental changes.



FIGURE 5.1 Development involves change and takes place throughout the entire lifespan.

In psychology, the study of lifespan development covers both relatively permanent changes which are common to all individuals, as well as changes which differ between individuals. Knowing the kinds of changes that might be expected at different times assists understanding of what is 'normal' (or 'typical'), what is 'not normal' (or 'atypical') and consequently whether professional assistance should be sought.

Psychologists also use the results from their research on human development to suggest how desirable changes can be best achieved and how undesirable changes can be avoided or overcome. For example, research studies with older people have found that keeping mentally active through regular reading and doing crossword puzzles, Sudoku puzzles and the like, can help maintain mental alertness. Undertaking a variety of novel (new), mentally challenging activities (and coupling with physical exercise) may also help reduce age-related decline in brain function, and possibly even delay the onset of Alzheimer's disease and other forms of dementia.

Although it is defined quite simply, human development is extremely complex. It involves many different aspects and is influenced by many different variables throughout the lifespan.

LEARNING ACTIVITY 5.1

Review questions

- 1 Define development as it is used in psychology.
- 2 Explain the meaning of developmental change compared to other types of change.
- 3 For each of the following individuals, state whether the thought, feeling or behaviour would be considered a developmental change (D) or would not be considered a developmental change (ND). Give a reason for each answer.
 - An eight-month-old infant cries whenever her mother leaves the room.
 - A six-year-old boy has learned to play chess.
 - A 50-year-old person cannot remember anything while anaesthetised during surgery.
 - A 10-year-old girl now feels confident about sleeping away from home without becoming homesick.
 - A 70-year-old woman has learned how to use Skype.
 - A 28-year-old male believes he is ready to move out of his family home and live independently away from his parents.
- 4 Give an example of a change you have experienced which would be considered a developmental change and a change that you have experienced which would not be considered a developmental change.

FIGURE 5.2 Human development is influenced by simultaneously occurring changes in physical, cognitive, social and emotional characteristics. Social, cognitive and emotional development are referred to collectively as psychological development.

AREAS OF DEVELOPMENT

Many different kinds of developmental change occur throughout the human lifespan. Generally, psychologists classify changes which take place in terms of four main areas: physical, social, cognitive and emotional.

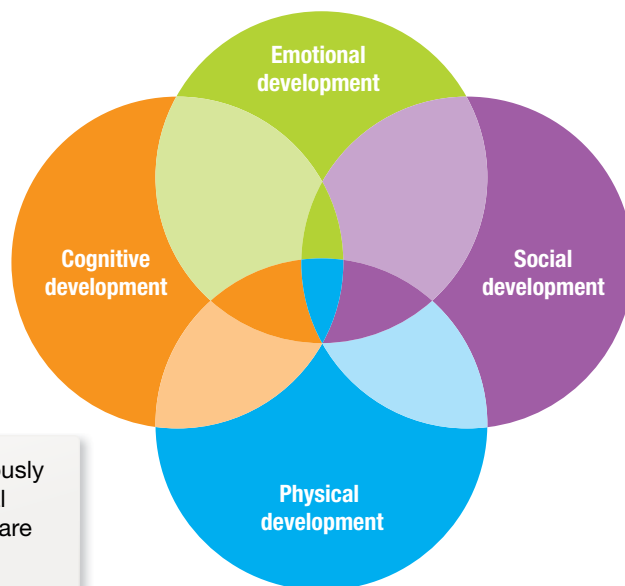
Physical development involves changes in the body and its various systems, such as development of the brain and its nervous system, bones and muscles, motor skills, and the hormonal changes of puberty and menopause.

Social development involves changes in an individual's relationships with other people and their skills in interacting with others, such as the ability to form and maintain close relationships with others in a group situation.

Cognitive development involves changes in an individual's mental abilities, such as reasoning, problem solving, decision making, perception, learning, memory and use of languages.

Emotional development involves changes in how an individual experiences different feelings and how these feelings are expressed, interpreted and dealt with; for example, the way in which anger is expressed by a two-year-old, compared with a 16-year-old or an 80-year-old person.

Many of the changes associated with physical development, such as growth (height and weight), movement (crawling and walking) and changes in physical appearance (such as pimples and body hair), can be directly observed. In contrast, changes associated with social, cognitive and emotional development involve mental processes that occur within the individual and are therefore not directly observable or measurable. Consequently social, cognitive and emotional development tend to be referred to collectively as *psychological development*.



INTERACTION OF DIFFERENT AREAS OF DEVELOPMENT

VCE Psychology focuses on psychological development. However, physical development and psychological development do not occur independently of each other. How you think or feel can influence your physiological state in both subtle and more obvious ways. For example, consider people with the eating disorder anorexia nervosa, who may control their diet in dangerous ways because of the thoughts and feelings they have about their body image. The consequences of behaviours resulting from how they think and feel about body image can potentially have a harmful impact on their physical wellbeing, both in the short term and long term.

There are also times when your physical condition influences your thoughts and feelings, including how you think and feel about other people. For example, when you are feeling tired or stressed you may 'snap' at a friend or at a teacher in response to criticism, something you wouldn't do at a time when you were not feeling tired or stressed. Consider also cases involving people with physical disabilities and how having a disability may affect one's thoughts, feelings and social behaviour in lasting ways.

These examples highlight the complexity of human development, particularly psychological development. Although the different areas of

development are interdependent and many changes occur simultaneously, psychologists often focus on specific areas and/or stages of development for research purposes. Similarly, textbooks such as this one usually present different areas and stages of development separately. This is intended to help simplify the study of how and why individuals change. However, you need to keep in mind that, in reality, divisions between different areas and stages of development are not so clear cut and that you are studying aspects of a *whole* person.



FIGURE 5.3 Inferences about underlying psychological processes are made from observable behaviour. What can be assumed about the cognitions or emotions being experienced by each child in this photo?

BOX 5.1

Stages of lifespan development

Psychologists specialising in the study of human development often divide the lifespan into age-based stages. This is mainly for the purposes of study, research or to describe age-related changes. Commonly used names of stages and estimates of their approximate time frames are:

infancy — birth to two years

childhood — two years to 10 years

adolescence — 10 years to 20 years

early adulthood — 20 years to 40 years

middle age — 40 years to 65 years

older age — 65 years and beyond.

The age range for each stage provides only a very general idea of when each stage begins and when it ends. Each stage should not be considered as starting and ending precisely at the age shown. For example, a person doesn't suddenly move into early adulthood on their 20th birthday. Individuals differ in terms of the age at which they move from one stage of development into the next. An individual's stage of development will also depend on the age-classification system used by the psychologist. For example, some psychologists define adolescence as ending in the mid-20s.

While describing human lifespan stages in terms of labels and age ranges can assist understanding of when in the lifespan particular changes tend to occur, some psychologists consider the age-related stages of limited relevance. They

believe that individuals differ too much in their psychological development and that categorising psychological development into age-related stages does not reflect this.

In learning about the various changes that occur in each stage of the lifespan, it is important to keep in mind that the changes identified for each stage apply to many individuals, but not all. In addition, the kinds of changes that occur in each stage can vary considerably in different cultures and sub-cultures.



FIGURE 5.4 Adolescence is not viewed as a distinct lifespan stage in all cultures. For example, in some Aboriginal cultures, a child is considered to become an adult as soon as puberty is reached and a series of initiation rituals has been performed.

HOW PSYCHOLOGICAL DEVELOPMENT PROCEEDS

Psychological development is a life-long process, which begins at birth and continues through infancy, childhood, adolescence and adulthood into old age until death. People don't stop developing in any specific area just because they reach a certain age or are 'very old'. While many developmental changes and processes tend to peak in childhood and again during puberty, this does not mean that changes in one area or stage of development are more or less important than those in any other area or stage.

There are a number of different theories about the way in which psychological development proceeds as we grow older. It is generally agreed that it occurs in an orderly way in different areas simultaneously and at different rates within each individual. There remain, however,

differing views on whether development is a continuous or discontinuous process.

Continuous versus discontinuous development

Think about your own psychological development for a moment. Did you gradually become the person you are, like the slow, continuous growth of a seedling into an enormous gum tree? Or did you experience sudden, distinct changes in developing into the person you are today, in the same way a caterpillar changes into a butterfly (Santrock, 1992)?

Some psychologists view development as involving gradual and ongoing change without sudden shifts. For example, abilities in the earlier stages of development provide the basis of those required for the next stages. This means that we simply get better or increase in ability with age.

However, continuous change involving increasing ability does not necessarily continue throughout the entire lifespan. Development of one or more psychological characteristics may occur on a shorter time scale. Intelligence (as measured by an intelligence test) is an example. Generally, as children grow older they become more intelligent and this tends to level off during adolescence.

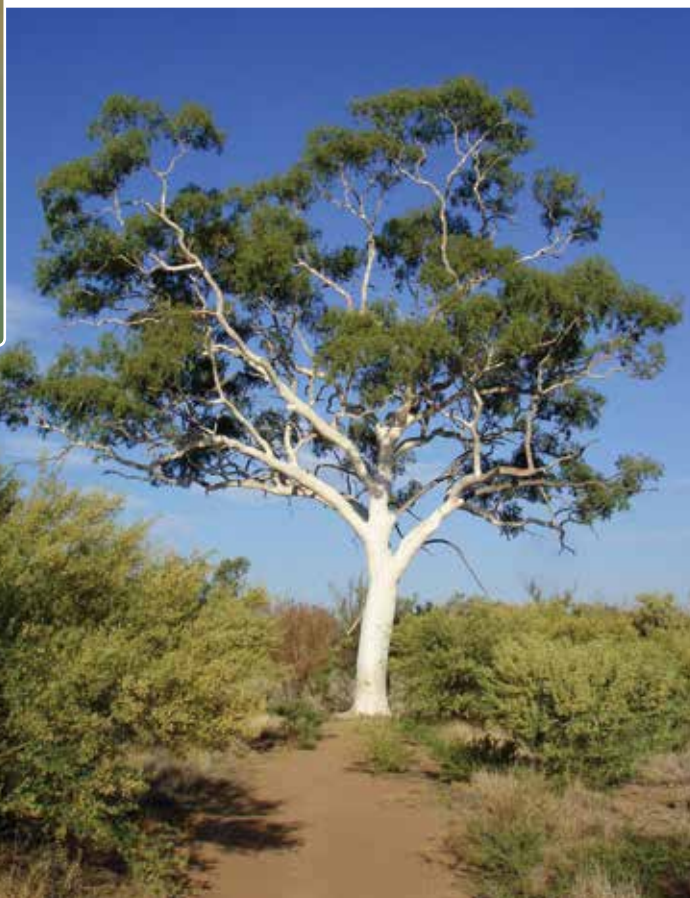


FIGURE 5.5 Is development a slow, continuous process or are there sudden and distinct changes?

Some aspects of development can also involve decreasing ability. They get worse as we grow older, not better. For example, at around six months of age, young infants can quite easily distinguish between very slight variations in non-native speech sounds — those sounds that are not a natural part of their first language. As a result of their experience with their native language, and particularly after they start to utter meaningful words at around one year of age, infants gradually lose their ability to tell the difference between speech sounds that are not used within their native language (Slater, Johnson and Muir, 2011). Despite these variations, continuous development can be generally represented as a single, smooth line, as shown in figure 5.6(a).

Other psychologists view development as a discontinuous process. Psychologists who support this view believe that development involves distinct and separate, step-like stages, with different kinds of abilities occurring in each stage. According to this view, the development of certain abilities in each stage, such as specific ways of thinking, feeling or socially interacting have identifiable start and end points. Although some types of thinking, feeling or behaving may seem to appear suddenly, it is likely that these have been developing gradually for some time.

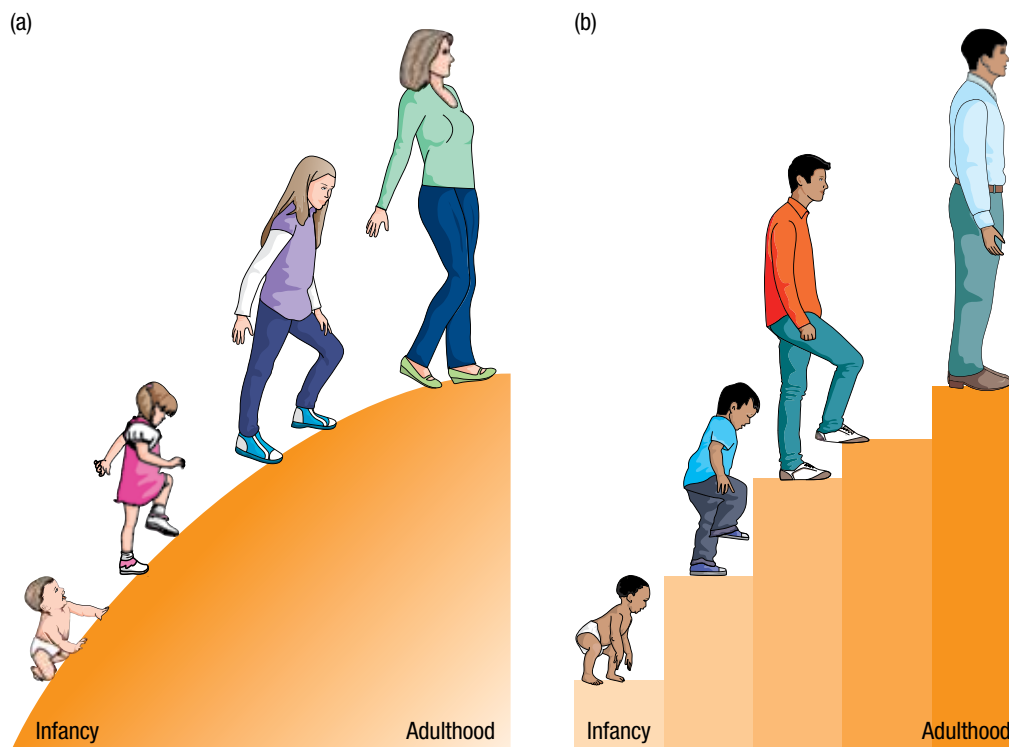


FIGURE 5.6 Some psychologists describe development as continuous (a), whereas others describe development as discontinuous, involving distinct and separate stages (b).

Sequential nature of development

Psychological development occurs in an orderly sequence rather than in a haphazard way. There may be bursts and spurts in development or even loss of a very specific ability, but the overall pattern is one of an orderly sequence under normal circumstances. Sequences of development usually begin with simple thoughts, feelings or behaviours and progress to more complex ones.

An overall, orderly sequence of change is observable in many areas of psychological development, such as in the use of language (from gurgling and squealing through uttering individual words to using sentences) and in the development of social play (from playing alone to playing alongside other children to playing cooperatively in a group). Although it is possible (but unusual) to skip a step in the development of a particular ability, development generally follows a particular order. For example, a person will usually be able to count before they can add numbers.

Quantitative and qualitative changes

Psychologists often describe developmental changes in both quantitative and qualitative terms. *Quantitative changes* are variations in the quantity, or 'amount' of a thought, feeling or behaviour. These changes are usually expressed as numbers. For example, the number of words spoken in relation to age is a quantitative change,

as is the increase in the amount of knowledge children acquire about the world around them as they develop.

Qualitative changes are those that vary in 'quality', 'kind' or 'type'. They are changes that make the individual different from the way they were before. For example, at four years of age you probably had very little understanding about concepts such as 'justice' and 'honesty', whereas you now understand and can probably accurately describe these concepts. Unlike quantitative changes, qualitative changes are more difficult to describe precisely and are usually described in words rather than in numbers.

Individual differences in development

Although there are similarities among people in patterns of changes experienced in different areas of psychological development, no two individuals develop at exactly the same rate or in exactly the same way. There are many differences *between* individuals in their development. Some individuals develop more slowly or more quickly than others – in some, most, or all areas of development.

There are also many differences *within* individuals in their development. For example, an individual may be very shy as a child and adolescent, only to suddenly become confident and outgoing during early adulthood or middle age. Similarly, an individual may have relatively well-developed cognitive abilities, but experience difficulties in expressing emotions verbally and in interacting socially with others.

Change in different areas occurs at its own pace within an individual. Each person has a unique genetic make-up and set of life experiences which interact continuously, shaping their particular course of development throughout their lifespan.



FIGURE 5.7 No two individuals develop at exactly the same rate or in exactly the same way at any time in the lifespan, even if they are identical twins.

LEARNING ACTIVITY 5.2

Review questions

- 1 (a) Name and describe three main areas of psychological development and give an example of a developmental change that occurs within each area.
(b) In which of the three areas of development would the collection of psychological characteristics called 'personality' be categorised, or should it have its own category? What about moral development which involves change over time in our understanding of right and wrong?
(c) Suggest another aspect of psychological development like those in (b) above which raise questions about their classification in one of the three areas.
- 2 What is meant by the view that 'developmental changes occur simultaneously in different areas'? Explain with reference to an example different from that used in the text.
- 3 In what way do continuous and discontinuous views of development differ?
- 4 Give an example, other than one used in the text, which illustrates the 'sequential nature of development'.
- 5 Complete the following table. In the left column write a list of developmental changes you have experienced

that could be described as quantitative. In the right column write a list of developmental changes you have experienced that could be described as qualitative. Your first entries in each column could be the examples given in the text.

Quantitative changes	Qualitative changes

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Word copy of table

- 6 Explain the meaning of individual differences in development 'within the individual' as compared to 'between individuals'.
- 7 Outline a potential benefit and a potential limitation of organising and describing the development of human psychological characteristics in terms of age-related changes.
- 8 Suggest an explanation of why psychological development is often described as 'extremely complex'.

LEARNING ACTIVITY 5.3

Visual presentation showing the complexity of psychological development

Use an original example presented as a diagram(s), photo(s) or some other visual medium to demonstrate the role of each of following concepts in psychological development:

- interaction between development in different areas
- continuous vs discontinuous development
- sequential nature of development
- qualitative and quantitative changes
- individual differences in development.

LEARNING ACTIVITY 5.4

Data analysis on individual differences in development

The following table contains data on the development of two individuals. These data show ages at which various developmental milestones were identified by the parents of each child.

Milestone	Annabelle	Habib
First social smile	4 months	2 months
First word	8 months	10 months
First cried in response to mother being out of sight	9 months	11 months
First counted	18 months	22 months
First sang a song	2 yrs	2 yrs 2 months
Played interactively with another child	3 yrs 10 months	3 yrs 4 months
Read independently	4 yrs 6 months	5 yrs 6 months

Answer the following questions with reference to the data.

- Which developmental milestones did Annabelle reach first?
 - Which developmental milestones did Habib reach first?
- What do the data indicate about the variations in psychological development between individuals?
- Categorise the data into the three areas of psychological development — cognitive, social and emotional, or use one or more other categories of your own.
 - Compare the data of the two children. What conclusions might be drawn when comparing each child in terms of cognitive, social and emotional development (or any other category you may have used)?
- What are some possible explanations of differences in terms of socio-cultural factors?
- Would it be accurate to explain the differences in terms of sex? Give a reason to explain your answer.

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Practical activity
— variations in development within individuals

INTERACTION OF HEREDITARY AND ENVIRONMENTAL FACTORS IN SHAPING PSYCHOLOGICAL DEVELOPMENT

Human psychological development is a complex process that is subject to many different influences throughout the entire lifespan. Generally, the various factors influencing development of our psychological characteristics can be classified into one of two broad areas — heredity (nature) and environment (nurture).

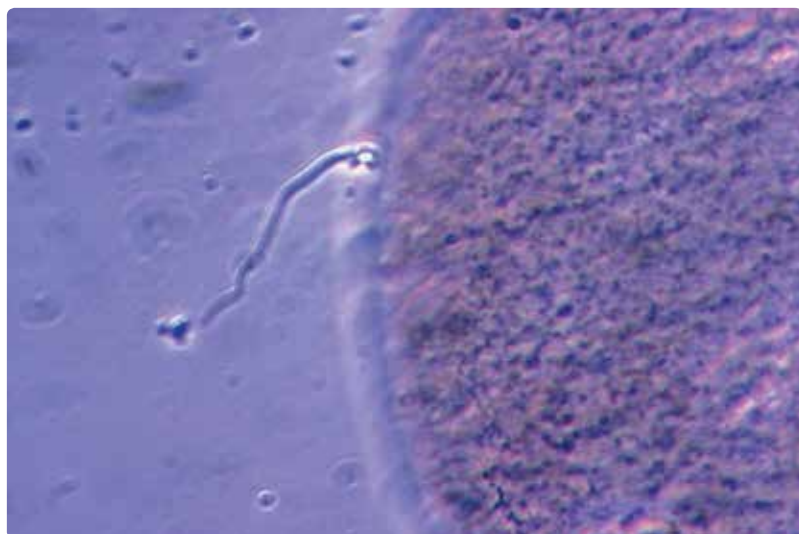


FIGURE 5.8 When one of the millions of sperm that surround the ovum penetrate it, conception occurs.

Heredity involves the transmission of characteristics from biological parents to their offspring via genes at the time of conception. At conception, the male's sperm cell fertilises the female's egg cell (ovum). Both the sperm and ovum contain structures called chromosomes which carry the genes from each parent. During fertilisation, the sperm and ovum combine to form a new cell (zygote) with a unique combination of genes (see box 5.2 on page 185).

It is well established that the genes we inherit from our parents influence many aspects of our physical development; for example, our blood type, eye and

hair colour, body shape and the likelihood of developing certain physical illnesses or disorders. Our genes also influence less obvious aspects of our physical development, such as the rate at which our brain and nervous system will grow and mature, the course of their growth and maturation, our brain's chemistry and functioning, and when certain hormones will be produced, such as those that trigger the onset of puberty.

Given the important roles our brain, nervous system and hormones play in our thoughts, feelings and behaviour, it is evident that our genes also influence our psychological development. For example, it is clear that psychological characteristics such as intelligence and personality have a genetic component and are therefore influenced to some extent by heredity.

As with physical illnesses and disorders, genes are also believed to influence the onset of some psychological (or mental) disorders. For example, schizophrenia, depression and use of certain types of drugs have all been linked to changes in brain chemistry and brain functioning. And, brain chemistry and brain functioning are genetically determined in a significant way. This suggests that these disorders probably have a genetic component. However, this does not mean, for example, that a child born to a parent with schizophrenia *will* inherit schizophrenia. Rather, research evidence suggests that having a biological parent with schizophrenia will increase the *likelihood* of developing this disorder, compared with someone who does not have a biological parent with schizophrenia (Gottesman, 1991; Plomin et al., 1998).

Environmental factors also play an important role in shaping psychological development. In psychology, the term **environment** is used to refer to all the experiences, objects and events to which we are exposed throughout our entire lifetime. Environmental factors that influence psychological development include whether you have brothers and sisters, how you are brought up, your friendship groups, schooling, occupation, income level, whether you have a partner, your religion, ethnic origins, what you are exposed to in the media, whether you experience a major stressful life event, serious illnesses, and other personal and sociocultural factors. The influence of some of these factors is less obvious or significant than others, but all can impact both individually and collectively on the kind of person we become and the psychological changes we experience during our lifetime.

Nature versus nurture

Many of the early psychologists believed in *either* the hereditary (nature) *or* the environmental (nurture) view of development. Those who adopted the biological perspective believed that heredity primarily determined our psychological development. Some even believed that, like physical development, *every* aspect of our psychological development was determined by our genes. They believed individuals, for example, inherited their social skills, musical ability, personality and intelligence. Although some acknowledged that environmental factors could influence development of psychological characteristics, essentially who we become was considered to be 'locked in' by our genes at the time of conception.

Another group of psychologists believed that heredity had little to do with the development of psychological characteristics. These psychologists adopted a strict behaviourist perspective. They believed that the environment in which an

individual is raised and lives, which includes all their experiences, was primarily responsible for determining what they would become. These behaviourists almost totally ignored the influence of genes in development. Their basic assumption was that the mind of a newborn is totally empty and the development of all thoughts, feelings and behaviour could be explained in terms of a person's learning throughout their life. Any differences between people were seen to be the result of differing environmental experiences. Most behaviourists believed that, given the 'right' environment, anything was possible; for example, someone with the abilities of Wolfgang Mozart, Usain Bolt or any of the Nobel Prize winners referred to throughout this text could be produced, irrespective of their genetic make-up.

For many years psychologists debated whether it was heredity *or* environment that determined how we developed. This became known as the nature (*heredity*) versus nurture (*environment*) debate. Over time, research evidence has consistently shown it is neither one nor the other that is solely responsible for shaping development – *both* hereditary *and* environmental factors interact to shape human development.

Psychologists now consider the nature versus nurture debate to be resolved. They focus on trying to understand *how* hereditary and environmental factors combine or *interact* in influencing our thoughts, feelings and behaviour. Through their research, psychologists and other scientists also try to establish *how much* heredity and environment each contribute to the development of particular psychological characteristics.

Psychologists are in general agreement that our individual development begins with the genetic instructions we inherit at conception and that these instructions provide the building blocks, or 'blueprint', for the development of our psychological (and physical) characteristics. The environment interacts with our inherited potential to determine how the genetic plan unfolds.

Genes do not directly activate any mental process or behaviour. Instead, they consist of DNA that contains the relevant information. The expression of this information will be influenced by numerous factors, especially environmental factors (OECD, 2007).

Almost every experience a person has in their life has the potential to impact in some way on their psychological development. However, some environmental factors exert a greater influence at some stages of the lifespan than in others. The experiences that may influence one person's development may also have little or no impact on another person's development. For example, a person who has genes that may contribute to the onset

of depression (called a 'genetic predisposition for depression') may not actually develop depression until they experience a stressful life event, such as the loss of a loved one. Similarly, a person who loses a loved one and does not have a genetic predisposition for depression is less likely to develop depression (Kendler et al., 1995).

These examples also illustrate the fact that environmental experience can affect whether or not genes become active and are expressed. There is a considerable amount of research evidence that environmental experience can and does influence the expression of our genes. These research findings have emerged from the field of epigenetics.

Epigenetics is the study of factors other than genetic ones that control how and when each gene is expressed. Epigenetic factors do not change the DNA or pre-programmed instructions in genes, but they influence how our genes express the traits we inherit from our biological parents.

Psychologists are particularly interested in differences in gene expression that are related to environmental factors. These types of epigenetic changes can last for a lifetime and their effects can have significant effects on how the genes work. Changes in gene expression can result from a wide range of experiences, including chronic stress, traumatic events, drugs, culture, and disease (Kolb & Whishaw, 2014).

Some psychologists have also suggested that a person's genes can influence the kind of environmental experiences they have. For example, a genetic predisposition towards antisocial behaviour may lead an adolescent to seek the company of others who engage in antisocial behaviour, in turn, encouraging further antisocial behaviour (Burton, Westen & Kowalski, 2012).

As yet, the technology available to researchers is not able to detect exactly how much of a particular psychological characteristic or behaviour may be attributable to either heredity or environment. Nor do psychologists know the specific environmental factors required to interact with genes to produce a particular psychological characteristic or behaviour (Plomin et al., 1998).

However, they do know that what was the nature *versus* nurture debate is now the nature *and* nurture debate which considers the extent of the contribution of both nature and nurture to development. Both are essential to all aspects of psychological development. We are all active players in the process of psychological development, starting at birth. As infants, for example, we are not passive recipients of the environment, like a blank sheet of paper on which the environment writes. All the abilities and potentials with which we are born will influence our environmental experience which may then modify our development in significant ways.



FIGURE 5.9 Most behaviourists believed that, irrespective of genes and given the right environment, anyone could develop the creative ability of Wolfgang Mozart or the speed of Usain Bolt, the fastest runner in the world.

LEARNING ACTIVITY 5.5

Reflection

Comment on whether nature or nurture has been more influential in shaping your development.

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Weblink

Mini documentary
on nature vs nurture
6m 15s

Role of maturation in development

Genes also play an important role in shaping the *course* of development through a process known as maturation. Maturation is a developmental process which is automatic and internally programmed. **Maturation** refers to the orderly and sequential developmental changes which occur in the nervous system and other bodily structures controlled by our genes.

This suggests that the development of all individuals follows the same process or pattern, unless there is significant interference from environmental factors. That is, we all go through predetermined, maturationally dependent phases. For example, in language development, the ability to 'talk' starts with sounds that are unrecognisable as meaningful words. We then develop the ability to say individual words, then the ability to string two or three words together into a phrase such as 'I want biscuit'. By about two years of age we are usually able to construct short sentences and by three years of age we can construct and use grammatically correct sentences.

In order to speak using sentences, the relevant areas of our brain must be maturationally ready, or developed sufficiently to process sounds and enable us to understand words. In addition, the muscles in our mouth, particularly the tongue and lips, must also be sufficiently developed so that we can move and coordinate them in the manner required to form and speak words.

Many developmental changes are affected by maturation. For example, most children sit before they stand, draw shapes before recognisable objects and count before they can apply a mathematical formula. Similarly, puberty occurs for most people between 10–14 years of age and most people peak in their physical strength in late adolescence or early adulthood, then begin to decline in middle age.

Principle of readiness

An individual's physical development lays the foundation for the onset of many aspects of psychological development. This reflects the principle of readiness, that maturation creates the readiness which determines the onset of particular mental processes and behaviours.

The **principle of readiness** states that unless the necessary bodily structures and processes are sufficiently mature, be they muscles, bones, the brain, nerves, neurons or neurotransmitters then no amount of practice will produce the particular mental process or behaviour.

It is only when an individual is maturationally ready that the thought, feeling or action can occur.

The principle of readiness is used by Victorian educational authorities in determining the age at which it is appropriate for children to start formal schooling. In the past, parents could enrol their child at school after they had turned four years of age — the age at which they were believed to be maturationally ready to learn in a classroom situation. However, on the basis of psychological research evidence on the maturational readiness of children to learn in a school environment, children must now be five years of age or older by 30 April of the year they start school (or at least four years and nine months of age or older when they begin Prep).

In summary, while there are undoubtedly individual variations as to when each developmental 'milestone' occurs, the *order* in which these milestones occur seems connected to the process of maturation.

CLOSE TO HOME JOHN MCPHERSON



"Stan, will you knock it off!
He will walk when he's ready to walk!"

FIGURE 5.10

BOX 5.2

Process of genetic inheritance

The inheritance of genetic information begins at conception. When conception takes place, the ovum (egg cell) from the mother and the sperm from the father unite to form a *zygote*. Each ovum and sperm cell contains structures called chromosomes (figure 5.11).

The zygote receives chromosomes from both the mother and the father. Chromosomes come in 23 pairs (making a total of 46). One of each pair of chromosomes comes from the mother via the ovum and one of each pair comes from the father via the sperm cell.

A *chromosome* is a threadlike structure found in the nucleus of almost every cell in the body. Each chromosome consists of a string of smaller structures called genes. The *genes* contain the instructions for the development of characteristics. Genes are the basic unit of heredity. Genes also normally come in pairs — one gene of each pair comes from the ovum chromosome and the other from the sperm chromosome. Thus, an individual receives only half of each parent's total genes and which genes an individual receives from each parent is a matter of chance.

Genes provide the 'blueprint' or 'plan' for our development. For some characteristics, only one pair of genes

determines it, as in the ability to roll your tongue.

However, for most characteristics, a number of pairs of genes work together. Psychological characteristics such as personality, musical ability and abilities associated with intelligence are believed to be influenced by the interaction of many gene pairs.



FIGURE 5.11 Humans have 23 pairs of chromosomes. Males and females differ only on the 23rd chromosome pair, with males having an X and Y chromosome (shown) and females having two matching X chromosomes.

Nucleus

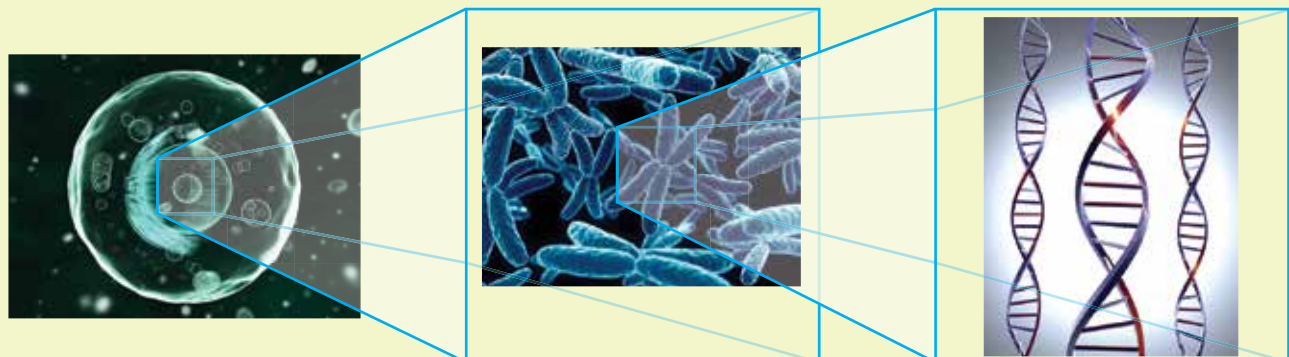
(the inner area of a cell where chromosomes and genes are located)

Chromosome

(threadlike structure made largely of DNA)

Gene

(segment of DNA; determines our individual biological development)



Cell

(the basic structural unit of a living thing)

DNA

(a spiralling, complex molecule containing genes)

FIGURE 5.12 The nucleus of each of the trillions of cells in your body contains 46 chromosomes. Each chromosome contains a coiled chain of the molecule called DNA. Genes are segments of DNA which contain a code that directs the production of proteins — the building blocks of development.

BOX 5.3

Human Genome Project

The Human Genome Project (HGP) began in 1990. Its aim was to identify and develop a complete 'map' and understanding of all the human genes. Our combination of genes is known as our *genome*. Completed in April 2003, the HGP gave humans the ability, for the first time, to read nature's complete genetic blueprint for building a human being (National Human Genome Research Institute, 2015).

Researchers from various countries throughout the world collected blood and sperm samples from large numbers of donors. Female donors contributed only blood samples, whereas male donors contributed either sperm or both sperm and blood samples. Every cell in the body (including neurons and glial cells) contains a complete set of our genetic information.

By collating data from these samples, researchers have been able to determine that humans have about 20 500 genes, the same number as mice! They have also identified which chromosome and specifically where on the chromosome particular genes are located, creating a 'genetic map'. The function of many, but not all, genes has also been identified. For example, more is now known about specific genes which may be involved in the onset of Parkinson's disease or various mental disorders.

The information obtained from the HGP can be thought of as the basic set of 'inheritable' instructions for the development and function of a human being. Although each human being has a unique combination of genes, the data published from the findings of the HGP does not represent an exact map of each individual's genetic make-up. Rather, it provides an overall picture of the genetic map of the human species.

One of the benefits of the HGP is that it has enabled researchers to develop more than 2000 genetic tests that enable us to find out whether we are at risk of developing a particular disorder that is influenced by one or more specific genes. Knowing in advance that there is a risk of developing a disorder enables health care professionals to research specific strategies that may delay its onset; for example, by managing diet or providing early medical intervention (NHGRI, 2015)

In April 2013 Barack Obama, who was then the American president, announced the BRAIN Initiative (Brain Research through Advancing Innovative Neurotechnologies, also called the Brain Activity Map Project). It is based on the Human Genome Project and has the goal of mapping the activity of every neuron in the human brain to enable understanding of the function of all the brain's neural networks.

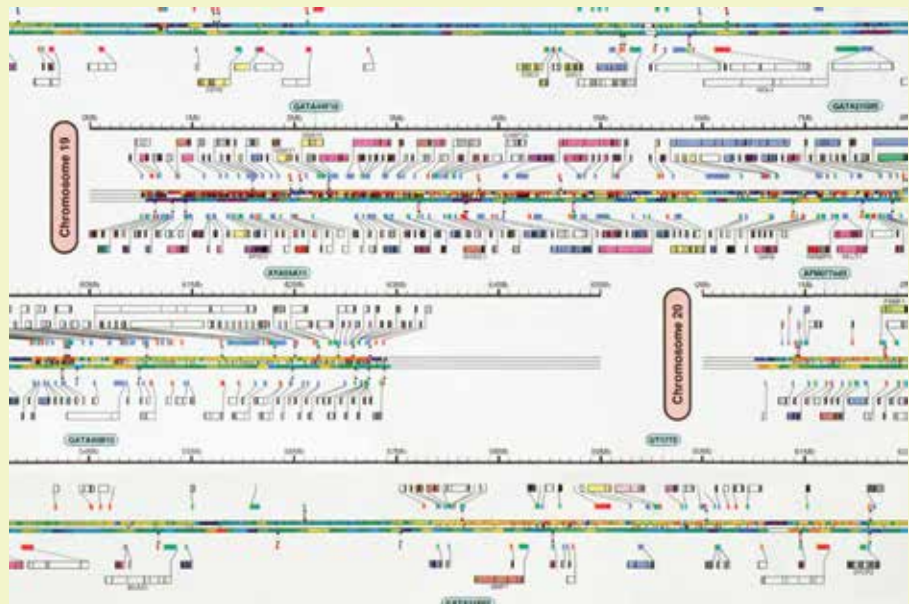


FIGURE 5.13 A genome map featuring some of the DNA details for two of the human chromosomes (numbers 19 and 20)

LEARNING ACTIVITY 5.6

Review questions

- 1 Define heredity and environment as used in psychology.
- 2 Briefly explain, with reference to an example, how hereditary and environmental factors can influence psychological development.
- 3 What is the main focus of contemporary psychologists interested in the role that heredity and environment play in shaping psychological development?
 - (a) What is maturation?
 - (b) Give examples of two different psychological abilities which are influenced by maturation in their development. Explain why maturation is relevant in each of your examples.
 - (c) What is meant by the term principle of readiness in relation to maturation?
 - (d) Explain with reference to the principle of readiness why some students may have difficulty understanding an algebra formula in year 7 but may understand the same formula in year 10.
 - (e) What advice about maturation would you give to Stan who is shown in figure 5.10 on page 184? Will experience help the child to walk earlier? Why?

LEARNING ACTIVITY 5.7

Reflection

Do humans actively shape their own environments and contribute to their own development, or are they passively shaped by forces beyond their control? What do you think? Briefly explain your answer.

LEARNING ACTIVITY 5.8

Identifying the influence of heredity and environment on psychological development

Construct a table with two columns, one with the heading 'Heredity' and the other with the heading 'Environment'. In each column, list several psychological characteristics which you think are more likely to be influenced by either heredity or environment.

Discuss your list with other class members. What amendments did you make to your answers on the basis of your discussion?

SENSITIVE AND CRITICAL PERIODS IN PSYCHOLOGICAL DEVELOPMENT

Many psychologists believe that there are particular times during development when environmental factors are more likely to have a greater impact on psychological development, either negatively or positively. Some also distinguish between sensitive periods and critical periods.

Sensitive periods

A **sensitive period** is a period of time during development when an individual is more responsive ('sensitive') to certain types of environmental experiences or learning. Outside this period of time, the same environmental influences need to be stronger to produce the same positive or negative effects.

Sensitive periods occur frequently during pre-natal development before birth when the individual is going through rapidly occurring changes in physical growth and development. Some psychologists have also identified sensitive periods in psychological development during the post-natal period when developmental changes are not as rapid.

Sensitive periods are sometimes described as 'windows of opportunity for learning' because they are the optimal, or best possible, times for the relevant learning to occur. For example, certain skills and knowledge, such as those of oral language acquisition, are believed to be more easily acquired during a sensitive period. If these skills and knowledge are not acquired during the sensitive period, they may be acquired at a later time, but it

will usually take more time, be more difficult and the learning may not be as successful.

Generally, the sensitive period for learning to speak our native language is up to the age of about 12 years, with the window gradually closing from about age seven. At birth, however, it seems that we are ready to learn to speak the language of whichever culture we happen to be born into. For instance, we are able to distinguish almost all the differences in sounds that are expressed in the various languages used throughout the world. By the age of about one, this ability to perceive differences in language sounds is refined. We become more sensitive to the differences relevant to our language environment and less sensitive to differences important in other languages. Although we can learn to speak a second language at any time after childhood, if acquisition occurs before the ages of five to seven years, our competence will be like that of a native speaker.

Sensitive periods indicate that brain development goes through specific periods during which some synaptic connections are most easily made and some neural pathways are most easily formed, assuming there is exposure to the appropriate environmental stimulus. The rapid increase in the number of synapses during synaptogenesis early in development may reflect the brain preparing itself to respond to certain types of experiences as if it is getting ready for the learning of 'experiences' that are 'expected' during a sensitive period.

Generally, sensitive periods tend to last for relatively short periods of time for physical characteristics and longer periods for psychological characteristics. A significant positive or negative environmental influence which occurs during a sensitive period can have long-lasting effects on the individual's development. This does not mean, however, that if disruption to development occurs during a sensitive period, any damage will necessarily be permanent and can never be made up (Kolb & Whishaw, 2014; OECD, 2007; Slater, Johnson & Muir, 2011).



FIGURE 5.14 The sensitive period for learning to speak our native language is up to the age of about 12 years, with the window gradually closing from about age seven.

Critical periods

A **critical period** is a specific period in development during which an organism is most vulnerable to the deprivation or absence of certain environmental stimuli or experiences. Critical periods have identifiable start and end times, thereby tending to begin and end suddenly, rather than gradually (if at all) as do sensitive periods.

For example, a brain injury or being deprived of a particular kind of environmental input at specific times after birth can significantly impact on the development of an underlying neural pathway and this becomes increasingly more difficult to correct later in life. Experiments with animals raised from birth have demonstrated this. If, for a certain time after birth, one eye of a cat, monkey or human is kept closed or does not function properly because of some abnormality such as a cataract, that eye will be forever blind. The changes responsible for this loss of visual function occur in the visual cortex. In cats, monkeys and humans, the visual cortex fails to develop normally if one eye is kept closed after birth.

However, the critical period after birth during which closing one eye can produce permanent visual problems varies between species. In cats and monkeys, the critical period extends to about 6 months of age. Over this period, the effect of closing one eye (by stitching it closed) becomes progressively less. Closing it for the first two months after birth produces a much greater visual impairment than closing it for the fifth or sixth months. In humans, the critical period seems to last for about the first six years of life. Keeping one eye closed for only a few weeks in the critical period is believed to produce a measurable visual impairment (Thompson, 2000).

Imprinting is the best known example of a critical period in development. For example, a newly hatched mallard duckling will attach to ('imprint on') and follow the first noisy moving object encountered after birth. Under natural conditions, this 'object' is the duckling's mother. Once it begins following the moving noisy object, it generally will not follow anything else but that object. After about 10 minutes of following the object, the duckling will have formed an ongoing attachment to it.

Imprinting behaviour was first identified by Austrian zoologist Konrad Lorenz (1937), who described imprinting as a form of learning. Lorenz demonstrated that the young birds would also follow him everywhere if he was the first noisy moving object they observed.

Other researchers subsequently identified a critical period during which imprinting can occur. For example, American psychologist Eckhard Hess (1972) found that if a mallard duckling is too young or too old, imprinting will not take place. But if a duckling between 13 and 16 hours old follows a moving object, then imprinting will occur. Thus, the critical period for imprinting in a mallard duckling is the three-hour period when the bird is between 13 hours and 16 hours old. After this time, imprinting is difficult to achieve. This may reflect a decline in the plasticity of the duckling's brain after 16 hours of age.

It is debatable whether any behaviour comparable to imprinting occurs among people, although human infants in all cultures do form attachments to mothers and other caregivers through prolonged experience with them following birth. However, psychologists have yet to identify any specific critical period for any human mental process or behaviour (OECD, 2007).



FIGURE 5.15 These young ducklings imprinted on Konrad Lorenz and followed him everywhere. There is a critical period soon after birth during which this attachment behaviour will occur under natural conditions.

LEARNING ACTIVITY 5.9

Reflection

Some parents are keen to advance or 'hurry' their infants through the development sequence at a faster pace than would normally occur to give them a 'head start' in their schooling. They try to ensure their child will be ready for school but may even be more advanced than other children and maintain that advantage through their school years. Comment on this strategy with reference to psychological development concepts.

Case studies of Genie and Isabelle provide insights into a sensitive period for learning language

For many years, psychologists debated the existence of a sensitive period for learning language — whether our brain is especially sensitive to learning to speak our native language during a specific period in time. Generally, psychologists who believe that a sensitive period for oral language exists, propose that the sensitive period is between infancy and puberty. They argue that if the language speaking skills and knowledge are not acquired during this sensitive period, the individual will be unable to catch up completely at a later stage, no matter how much help they get.

How can psychologists test whether a sensitive period exists? One way would be to place infants in solitary confinement until adolescence and then expose them to language for the first time. Of course, it would be unethical (and illegal) to do this. A way around this is to study the cases of infants and young children who have been abandoned or isolated by their parents and have therefore been deprived of opportunities to learn to speak their native language until they were rescued, sometimes after many years of solitude. One of the best-known case studies involved a child known as ‘Genie’.

In 1970, authorities discovered 13-year-old Genie whose parents had locked her in a tiny room from the age of 20 months. During each day she was usually tied to a chair. At night she was confined to a sleeping bag that was like a straitjacket. Her abusive father rarely spoke to her except for occasional screaming or to ‘bark’ at her because he considered her to be ‘no more than a dog’. Her mother, a physically abused wife who lived in terror of her husband, barely cared for Genie. She had as little interaction with her as possible, sometimes uttering only a word or two. There was no television or radio in the home. If Genie made the slightest sound, her father hit her with a large piece of wood.

Psychologists reported that Genie hardly seemed human when she was found. She did not know how to chew or stand up straight and she was not toilet trained. She drooled uncontrollably and often spat on anything that was nearby, including herself and other people. When she was first tested by psychologists, the only sounds she could make were high-pitched whimpers. She understood only a few words, probably learned shortly after she was discovered.

Genie was initially placed in a hospital rehabilitation clinic and then a foster home. Throughout this period, psychologists worked intensively with Genie and she made rapid progress. Genie developed physically and learned some basic rules of social behaviour. Gradually, she began to understand words and use short sentences such as ‘Genie go’, ‘No more eat soup’ and ‘Another house have dog’. However, Genie’s use of language continues to remain abnormal after many years. She can say many words and put them together into sentences, but she still has problems with pronunciation and can’t form sophisticated sentences as most adults her age can (Curtis, 1977; Wade & Tavis, 1990).

Evidence from case studies of children such as Genie indicates that there may be a sensitive period in oral

language learning. If the child misses the opportunity to learn language during that time, it seems that learning to speak one’s native language is much more difficult.



FIGURE 5.16 This picture was drawn by Genie, who lived in isolation and was mistreated for many years. It shows one of Genie’s favourite pastimes — listening to psychologist Susan Curtis play classical music on the piano. Genie’s drawings were used with other case study information to describe and explain her psychological and social development.

Comparison with a case study of another isolated child provides additional evidence. ‘Isabelle’ was hidden away by her mother and given only enough care to stay alive. Her mother, who was deaf, is believed to have never spoken to her. At the age of six, Isabelle was discovered by other adults and brought into a ‘normal’ environment. When Isabelle was found, she could not utter any words. Assessments by a psychologist indicated that her cognitive development was below that of a normal two-year-old.

But within a year Isabelle had learned to speak many words, her tested intelligence was normal for her age and she started attending a normal school. Thus, Isabelle at seven years, with one year of intensive language practice, spoke about as well as other children in her grade at school, all of whom had about seven years of practice (Gleitman, Fridlund & Reisberg, 2004). Compared with Genie, Isabelle had been given the opportunity to learn to speak her native language during the sensitive period.

Psychologists believe that after age 12, developing fluency in speaking one’s native language is difficult to achieve. Acquisition of the oral language skills and knowledge usually takes more time, is more difficult and the language learning is often not as successful.

eBook plus

Weblinks

- BBC documentary on Genie 53m 6s
- Extract from BBC documentary on Genie 3m 21s

TWIN STUDIES AND ADOPTION STUDIES

Investigating the relative influences of heredity and environment on some aspect of psychological development is challenging because of the need to strictly control genetic or environmental variables of research interest to measure their effects over time. For instance, it is impossible to isolate an individual from all environmental influences to investigate the influence of genes on a specific psychological characteristic. Even keeping a person locked in a bare room without any outside human contact, despite being unethical and illegal, still provides a type of environment. For example, if a newborn infant were placed in isolation for an extended period of time and seemed to be withdrawn when they were later assessed, would this indicate that being withdrawn is genetically determined or could it be the result of the unstimulating environment?

There are, however, ways of overcoming such difficulties so that valid and reliable research data can be obtained. In an attempt to understand the relative influences of heredity and environment, psychologists have access to a number of different research methods to assist in their investigations. Two methods involve studying similarities and differences between people who share and do not share genes and environments. These research methods are commonly called twin studies and adoption studies.

Twin studies

Twin studies involve research using identical and/or non-identical twins as participants. The two types of twins result from different biological processes. **Monozygotic** (or **identical**) **twins** are formed when a single ('mono') fertilised egg splits into two in the first couple of days after conception (when a zygote). These twins share 100% of their genes since they developed from the same sperm and egg combination. Studies of monozygotic twins can provide valuable information to psychologists because any differences which later develop between them can be attributed to differences in their upbringing and experiences — that is, their environment.

Dizygotic (or **fraternal**) **twins** develop when the female produces two separate ova (eggs) which are independently fertilised by two different sperm cells. They can be the same or opposite sex and are not genetically identical. They share 50% of their genes and their genetic similarities are comparable to other brothers and sisters.

If a characteristic is mainly influenced by heredity, monozygotic twins are likely to be similar in that characteristic. However, if a characteristic is influenced more by the environment, then

monozygotic twins could show significant differences in that characteristic.

Twin studies have most commonly been used to conduct research on the development of personality and intelligence as these psychological characteristics can be easily measured using personality or intelligence tests. For example, in five research studies across different countries, 24 000 pairs of identical twins were compared on two personality traits believed to be present to some extent in all people — extroversion (outgoingness) and neuroticism (emotional instability). The combined data showed that identical twins living in the same family environment were more alike on these characteristics than were fraternal twins living in the same family environment. This led researchers to conclude that heredity played a significant role in the development of these broad, psychological characteristics (Loehlin, 1992).

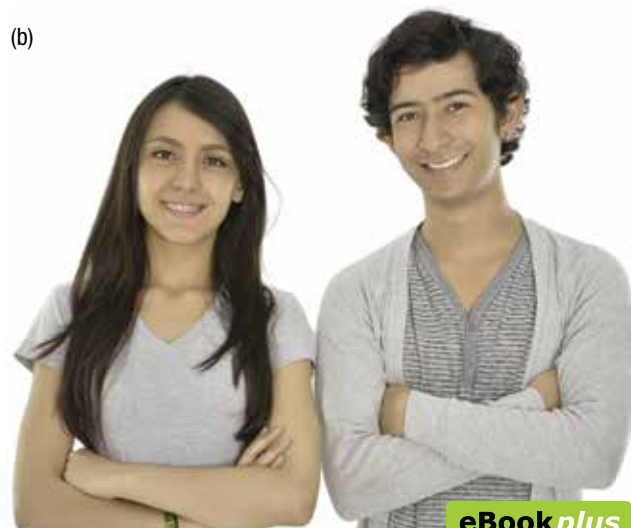


FIGURE 5.17 (a) Monozygotic twins have an identical genetic make-up. (b) Dizygotic (fraternal) twins are no more alike than siblings in genetic make-up and appearance.

eBookplus

Weblinks

- Video on twin studies 4m 12s
- Tutorial on twin studies and adoption studies

Through studying twins, psychologists have been able to gain a better understanding of which psychological characteristics are more likely to be influenced by environmental factors. In one American longitudinal ('long term') study of 400 pairs of twins (both monozygotic and dizygotic) in America, researchers studied the development of intelligence of twins from birth to the early school years, periodically taking measurements of intelligence (to obtain IQ scores). From the outset, the monozygotic twins were very similar to one another in intelligence and, by the time they began school, each of the monozygotic twins showed almost identical strengths and weaknesses in their mental abilities. Fraternal twins were also similar to one another, but significantly less than identical twins (McGue et al., 1993). This study, and others with similar findings, suggest that intelligence is, at least, partly determined by heredity. It also seems that monozygotic twins who share similar environments as well as their identical genetic structure achieve similar scores on intelligence tests.

While twin studies seem to provide a sound basis for judging the differences between the influences of heredity and environment on development, there are a number of issues to consider before accepting these findings without question. Identical twins are often viewed by parents, and sometimes by themselves, as being a 'unit' and they are often treated in a similar manner. Identical twins may also be more inclined to do things together than fraternal twins. Thus, to say that any differences between identical twins are definitely the result of hereditary factors is risky, as

identical twins may often be exposed to the same environmental factors. Some of their similarities, therefore, could also be attributed to environmental factors.

Adoption studies

Psychologists also use information from research with children who have been adopted, and therefore have no genetic similarity to their adopted parents, to learn about the influence of heredity and environment on psychological development. By examining the similarities and differences of adopted children and their adopted and biological parents, psychologists can gain an insight into the relative influences of heredity and environment on a range of psychological characteristics. Similarities between children and their adoptive parents would suggest environmental influence is greater, whereas similarities between adopted children and their biological parents would indicate inherited influence is greater.

Studies of adopted children have provided considerable support for the view that inheritance plays a significant role in an individual's intelligence. They show that the scores on intelligence tests achieved by adopted children are much more similar to the IQ scores of their biological parents than with those of their adopted parents even though their adoptive parents had raised them since birth. Because the children did not spend time living with their biological parents, the most likely explanation for the similarity in IQ scores involves heredity (Santrock, 1992).

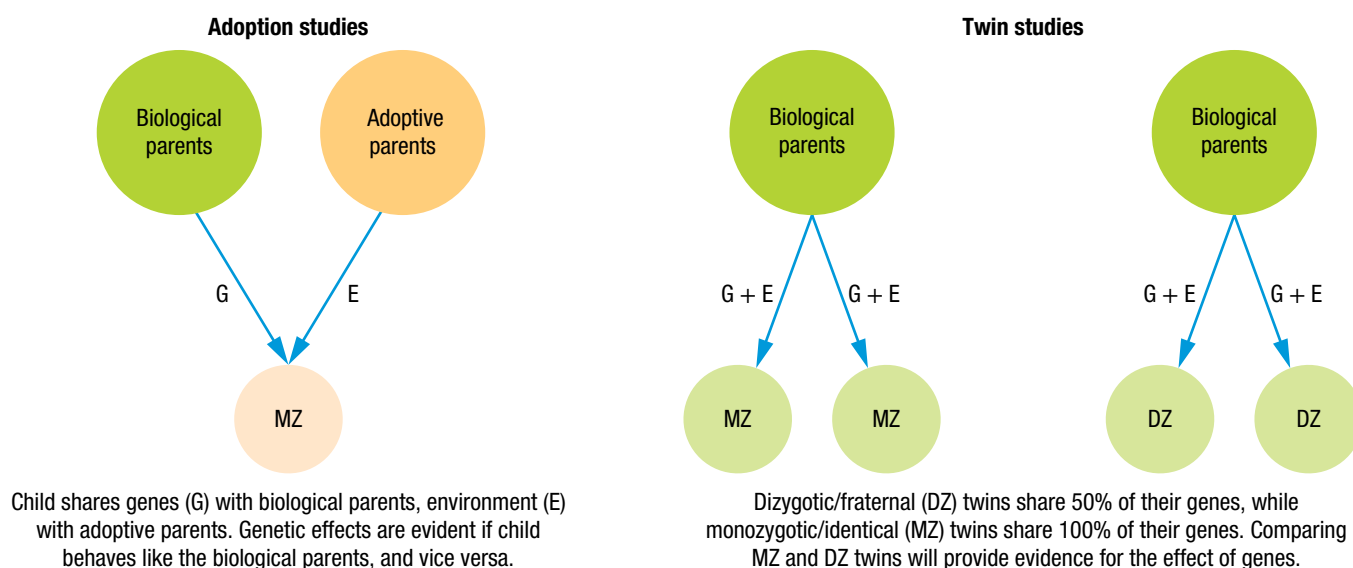


FIGURE 5.18

BOX 5.5

IQ scores and genetic relatedness in shared and non-shared environments

Psychologists usually study the role of inheritance in human intelligence (as measured by IQ) by examining the IQ scores of people who are biologically related to one another in varying degrees. Figure 5.19 shows different kinds of relationships between people, with a number known as a correlation coefficient next to each kind of relationship. These numbers have been derived from the results of over 100 correlational studies – a non-experimental research method used to investigate the type and strength of the relationship between two or more variables (see box 2.1, pages 44–5). Unlike experimental research, there is no attempt to manipulate any variable. The researcher simply assesses the relationship between the variables of interest.

It is evident in figure 5.19 that there is a very high correlation (0.86) between identical twins reared together and their IQ scores. This means that in the case of identical twins who are as closely related as anyone can be in terms of their genetic inheritance and who also have a largely shared environment, it can be concluded that if one such twin has a high IQ score then the other twin is likely to have a high IQ score too. Similarly, if one of these twins has a low IQ score then the other is also likely to have a low IQ score.

Note that some correlations in figure 5.19 are not as high and therefore as strong as all others. For example, cousins, who are the least genetically related family members, have a very low correlation of 0.15. Note too that as the genetic relatedness of people becomes more remote, the strength of the correlation between genetic relatedness and IQ score decreases. This suggests that

the more closely related two people are in terms of their genetic inheritance, then the more alike their IQ scores will be. Such data provide strong evidence for the role of heredity as an important factor which influences intelligence (as measured by an IQ test).

Importantly, these data also provide evidence for the role of the environment, such as where and how the children are raised. This is evident in the different correlations for identical twins reared together (0.86) and identical twins reared apart (0.72). It seems that this difference could be due to the role of environmental factors, such as where they are reared.

Many other research studies have established that the environment in which we are raised has a very significant effect on intelligence. For example, there is little doubt that formal education such as schooling impacts on intellectual development and IQ scores. Generally, the longer a child remains in school, the higher their IQ will be (Gazzaniga & Heatherton, 2006; Neisser, 1998; Plomin & Spinath, 2004).

It is impossible to completely separate the effects of heredity and environment on intelligence, since they interact constantly from the time of conception throughout the entire lifespan. Psychologists believe that variations in intelligence can be attributed to both hereditary and environmental factors, but which has the greater influence is very difficult to judge.

There is general agreement that inherited genes probably set the upper and lower limits of an individual's intellectual capabilities and environmental factors play a significant role in determining whether an individual will reach their genetically determined potential.

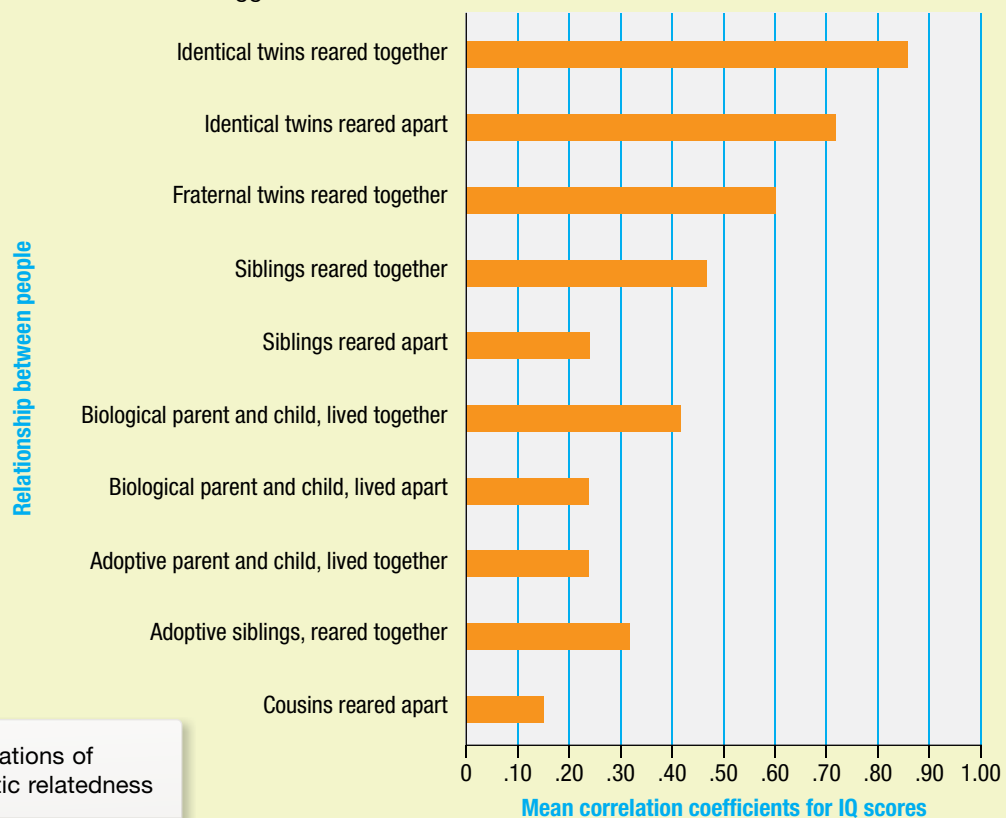


FIGURE 5.19 Correlations of IQ scores and genetic relatedness

BOX 5.6

Experimental research on the development of self-recognition and emotions

Experiments are commonly used to study psychological development. For example, the following experiment was designed to investigate the relationship between the ability of infants to recognise themselves and their ability to experience certain emotions (Lewis et al., 1989).

Hypothesis

Infants who recognise themselves as having blush on their nose when looking in a mirror will show the emotions of embarrassment or fear by looking away (embarrassment) or through certain facial expressions and vocalisations (indicating fear), whereas infants who are unable to recognise themselves as having blush on their nose when looking in the mirror will not show these emotions.

Participants

Twenty-seven infants in three age groups:
9–12 months (average 10.5 months)
15–18 months (average 17 months)
21–24 months (average 22.5 months)

Conditions of the experiment

All infants were in a laboratory setting with their mothers. They all experienced three conditions.

Condition 1. The infant, seated in a high chair, was approached by a female stranger who walked slowly toward the infant, touched the baby's hand, turned and left the room.

Condition 2. The infant's mother placed the child in front of a one-way mirror.

Condition 3. The infant's mother applied a dab of nonscented blush on the infant's nose while pretending to wipe the infant's face. The infant was again placed in front of the mirror.

Variables

The infant's facial expressions were videotaped through the one-way mirror and coded. Observers measured the following behaviours:

- self-recognition — defined as nose touching
- fear/wariness/crying — defined by certain predetermined facial expressions and vocalisations
- embarrassment — defined as smiling followed by the infant looking away and moving their hands to touch their hair, clothing, face, or other body parts.

Results

Twenty-three out of 27 infants showed a wary face when approached by the stranger. No infants showed a wary face when placed in front of the mirror. Ten infants touched their noses when they saw the dab of red blush. Older infants were significantly more likely to touch their noses than younger infants. Eight of the 10 who showed self-recognition also showed signs of embarrassment. Infants who did not show self-recognition did not show embarrassment.

Conclusions

Wariness was the typical response to a stranger, not fear. Furthermore, wariness did not require self-recognition. However, embarrassment did require self-recognition.

LEARNING ACTIVITY 5.10

Review questions

- 1 In what way is the timing of experience relevant to psychological development?
- 2 Distinguish between sensitive periods and critical periods in psychological development with reference to two key points.
- 3 What is a possible relationship between sensitive/critical periods and brain development in infancy and childhood?
- 4 (a) Why is it important that infants and children are frequently exposed to speech?
(b) If a child has not acquired their native language by a certain age, is it possible that the child will never master the language? Explain your answer.
- 5 What is imprinting and what does it involve?
- 6 (a) Explain how twin and adoption studies have been used to study the genetic and environmental influences on personality and intelligence.
(b) What have these studies found?
(c) Explain how you could use twin and adoption studies to investigate the influence of heredity and environment on the development of aggression.

LEARNING ACTIVITY 5.11

Analysis of research on self-recognition and emotions

Read the summary of the experiment on the development of self-recognition and associated emotional responses in box 5.6. Analyse the research and its results and conclusions by answering the following questions.

- 1 Write a possible aim for the experiment.
- 2 Identify the IV(s) and DV(s) of the experiment.
- 3 Suggest a reason to explain why infants of different ages were used as participants.
- 4 Which infants were in the experimental group and which infants were in the control group?
- 5 What do the results suggest about self-recognition and emotions?
- 6 Could these conclusions be generalised to
(a) the population
(b) all infants? Explain your answer.
- 7 One of the emotions the infants were expected to show was fear. What ethical considerations might this raise?

ATTACHMENT AND EMOTIONAL DEVELOPMENT

Attachment is a relationship between two people in which each person feels strongly about the other. In infancy, **attachment** refers to the emotional bond which forms between an infant and another person.

Infants form attachments with those people most deeply involved with them, usually the main caregivers such as the mother and father. Many infants develop strong attachments to both parents. However, it is not uncommon to have a strong attachment to the mother but not the father, or vice versa. Infants are also capable of developing different and separate attachments with other people who have significant involvement in their lives, for example, an older sibling, a grandparent or childcare worker in a daycare centre.

Generally, infants under 6 months of age do not fully recognise their caregivers on an individual basis from visual cues alone. In the same way that they smile indiscriminately, they happily accept comfort from anyone who provides it to their satisfaction. Although from about two months of age they may show negative reactions when their main caregiver departs or turns their attention elsewhere, nearly anyone who provides the desired comfort or attention will quickly be accepted as a substitute.



FIGURE 5.20 Infants are capable of developing different and separate attachments with a range of people who have significant involvement in their lives; for example, an older sibling or grandparent. Attachment is observed in all cultures.

Between about six and eight months of age there is usually a dramatic departure from the earlier pattern of accepting comfort from just about anyone. This period marks the development of a special attachment to the main caregiver who is usually the mother. Infants are likely to cry and cling when their main caregiver leaves and to react with aversion to anyone else who tries to comfort them. At this stage infants are in the process of developing their first meaningful attachment to another person. The attachment will be specific for this person, or stronger for that person than for others.

There is considerable research evidence that the attachment(s) formed during infancy, particularly in the first 12 months of life, influences the individual's emotional development, both in the short term and into adulthood. For example, early attachment is linked to the development of trust and security, whereas absence can result in anxiety and inner turmoil. Individual differences in emotional sophistication between children of the same age have also been linked to the type of attachment relationship the child forms. Some children are very skilled in reading and analysing emotions, while others are somewhat slower in grasping the basics of emotional understanding. Similarly, some children will be more emotionally resilient than others and can therefore more easily adjust to and recover from events that cause upset or anxiety. These early differences can persist throughout the lifespan (Meins, 2011).

Ainsworth and the Strange Situation procedure

American psychologist Mary Ainsworth (1913–1999) is one of the best-known researchers and theorists on attachment. Ainsworth and her colleagues (1978) devised a method for assessing attachment in a laboratory setting that has since been used by many other researchers. They used the term Strange Situation to describe their procedure.

eGuideplus

Weblinks

Video series on
Ainsworth's research



FIGURE 5.21 American psychologist Mary Ainsworth, circa 1985 (1913–1999). (Photo: Dr Patricia M. Crittenden)

The **Strange Situation** is a standardised test for measuring the attachment relationship a child has with their parent. It is typically conducted during infancy between 9–18 months of age. The infant and caregiver are taken into an unfamiliar room containing some age appropriate toys. Then the infant is exposed to a series of separations and reunions involving the caregiver, the infant and a stranger. Typically, the room is equipped with a one-way mirror, and the entire procedure is video recorded for later scoring.

An example of the sequence of separations and reunions is shown in table 5.1. The infant's behaviour in each episode is observed and recorded; for example, the infant's willingness to play with the stranger, their behaviour when left alone in the room and their reactions to the caregiver leaving and returning.

Ainsworth conducted many research studies on attachment using the Strange Situation procedure. She found that infants show attachment through behaviour that promotes closeness or contact with the person to whom they are attached. These behaviours included crying to attract the caregiver's attention, crying when held by someone other than the caregiver and stopping when taken by the caregiver, clinging physically to the caregiver, particularly in the presence of a stranger, looking at the caregiver when separated but in sight and lifting arms to be picked up by the caregiver. She also identified different types of attachment.

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Video showing infant responses in the Strange Situation 5m 24s

eGuideplus

Weblink

Video on Strange Situation research 7m 27s

The Strange Situation continues to be used in child development research. It has further enhanced understanding of attachment and has highlighted more than just attachment types. For example, its use has identified the patterns of attachment-related behaviour called stranger anxiety and separation anxiety. *Stranger anxiety* refers to an infant's wariness or cautiousness when a stranger such as an unfamiliar adult is present. *Separation anxiety* is indicated by an infant's distress when they are separated from their main caregiver.



FIGURE 5.22 A mother, infant and stranger in a Strange Situation experimental setting

TABLE 5.1 The stages of the Strange Situation test

Stage	Time frame	Episode	People in the room	Attachment behaviour observed
1	30 seconds	Experimenter leaves caregiver and infant to play	caregiver, infant, experimenter	
2	3 minutes	Caregiver sits while infant plays	caregiver, infant	Use of caregiver as secure base
3	3 minutes	Stranger enters and talks to caregiver	stranger, caregiver, infant	Stranger anxiety
4	3 minutes	Caregiver leaves; stranger lets infant play, offers comfort if needed	stranger, infant	Separation anxiety
5	3 minutes	Caregiver returns, greets infant, offers comfort if needed; stranger leaves	caregiver, infant	Reactions to caregiver's return
6	3 minutes	Caregiver leaves	infant	Separation anxiety
7	3 minutes	Stranger enters and offers comfort	stranger, infant	Stranger anxiety; ability to be comforted by stranger
8	3 minutes	Caregiver returns, greets infant, offers comfort, lets infant return to play	caregiver, infant, experimenter	Reactions to caregiver's return

Source: Adapted from Ainsworth, M.D.S., Blehar, M.C., & Walters, E. (1978). *Patterns of attachment: A psychological study of the Strange Situation*. Hillsdale, New Jersey: Lawrence Erlbaum.

Types of attachment

According to Ainsworth (1982), infants can form different types of attachment with their caregivers. These can vary in terms of how strong the connection is and the kind of connection. The strength of each attachment also depends to a large extent on how sensitive and responsive the caregiver(s) is to the infant's needs. The infant's responsiveness is also a factor in the type of attachment that is formed.

Following extensive research on attachment types, Ainsworth and her colleagues (1978) proposed that there are two main categories of attachment – secure and insecure attachment. Ainsworth further separated insecure attachment into two types – resistant attachment and avoidant attachment. Consequently, when Ainsworth described attachment types, she generally described them in terms of three types – secure attachment, insecure resistant attachment and insecure avoidant attachment.

Secure attachment

An infant who has formed a secure attachment shows a balance between dependence and exploration. The infant uses the caregiver as a 'home', or safe base from which to venture out and explore an unfamiliar environment, but shows some distress and decreases exploration when the caregiver departs. When the caregiver returns, the infant is enthusiastic and seeks physical contact with them.

Securely attached infants feel safe and are able to depend on their caregivers. The infant's moderate distress at their caregiver's departure suggests that they feel confident that the caregiver will return. About 65% of one-year-olds are securely attached.

Insecure avoidant attachment

The infant does not seek closeness or contact with the caregiver and treats them much like a stranger. The

infant rarely cries when the caregiver leaves the room and ignores the caregiver upon their return. Research findings suggest that this attachment type may be the result of neglectful or abusive caregivers. About 20% of one-year-olds are in this category.

Insecure resistant attachment

The infant appears anxious even when their caregiver is near. They become very upset when separated from the caregiver. When the caregiver returns, the infant approaches them, cries to be picked up, then squirms or fights to get free, as though it is not sure about what it really wants.

This attachment type is thought to result from caregivers who are not very responsive to their infant's needs. It is assumed the infant feels they cannot depend on their caregiver to be available to them if needed. About 12% of one-year-olds are in this category.

Ainsworth (1982) found that the patterns of behaviour associated with each type of attachment tend not to change over time unless there are significant changes in life circumstances for either the caregiver or the infant. However, she believed the nature of the attachment may change if the caregiver substantially changes the way in which they interact with the infant, particularly the way in which they respond to the infant's expressed needs.

The different attachment types have been linked to different outcomes in the short term and long term. For example, research findings suggest that adults who formed secure attachments as infants tend to have good self-esteem, seek social support when they need it, have trusting, lasting relationships and are comfortable sharing feelings with their friends and partners. Those who have had insecure early attachment may experience anxiety, inner turmoil, lack trust in others and are reluctant to form close relationships with others (Bachman & Zakahi, 2000).

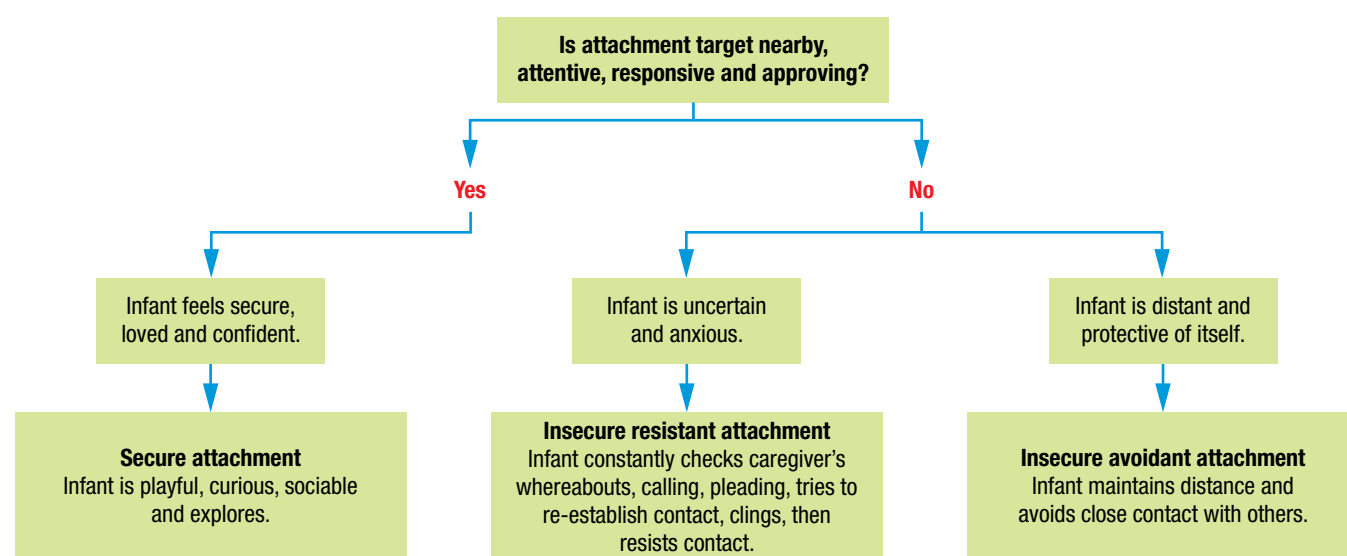


FIGURE 5.23 Attachment types and behaviours

Factors influencing attachment

What factors govern the development and emergence of attachment? Among those that have been proposed are a genetic predisposition to form an attachment, the infant's temperament and the infant's experiences early in life.

Genetics

The concept of attachment was first proposed by British psychiatrist John Bowlby (1907–1990). Bowlby (1969) argued that all infants have an inborn, 'primary drive' to form an attachment with a caregiver. He considered the infant–caregiver bond to be important in two ways.

First, the bond forms the foundation for healthy emotional development later in life. Second, the bond has an 'evolutionary' function, which, according to Bowlby, improves the infant's chances of survival. A close emotional connection with a caregiver keeps the infant and caregiver physically close, thereby increasing the helpless and dependent infant's chances of survival. For example, when the infant is physically close, the caregiver can keep a watchful eye on their safety and intervene if danger threatens (Bowlby, 1988).

Bowlby suggested that infants use genetically inherited abilities such as crying, smiling, gazing, vocalising and clinging to get near to their main caregiver, or to get their caregiver's attention. These behaviours bring about attachment responses from the main caregiver who has a biological need to be near to and to protect their infant. For example, the main caregiver responds to the infant's 'attachment signals' by caring for it with nurturing behaviours such as feeding, touching and cuddling.

Bowlby maintained that attachment develops in a fixed, age-related sequence and that the consistency with which infants progressed through the different phases provided evidence of the biological and evolutionary basis of attachment (see table 5.2).

Bowlby also proposed that mothers are the best caregivers for infants. He believed 'nature' intended the mother to be the primary caregiver; that is, females are genetically programmed to be the best and therefore the main caregiver.

Many psychologists also believe that infants may have a preference to form an attachment to the mother, but this is not necessarily a natural, biologically programmed tendency. Infants tend to develop an attachment to the mother because the mother is usually the person who takes on the role of main caregiver. However, research findings indicate that even when the mother is the person who performs the routine tasks of looking after the infant and spends more time with it than anyone else, she will not automatically be the infant's attachment target.

Neither is there widespread agreement among psychologists that humans have a biological, pre-programmed need to form an attachment or that the infant's genes influence the quality of the attachment. A more widely held view is that humans may inherit a capability to form an attachment, but the type and quality of the attachment is influenced by a complex interaction of many different factors; for example, the respective characteristics of the infant and caregiver and the quality of the interaction which takes place between them.



FIGURE 5.24 British psychiatrist John Bowlby (1969) argued that all infants have an inborn, 'primary drive' to form an attachment with a caregiver and that mothers are the best caregivers.

TABLE 5.2 Bowlby's phases of attachment

Phase	Approximate age of onset and duration	Infant characteristics
1. Pre-attachment	0–2 months	Little differentiation in social responses (e.g. smiling, crying, vocalisations) to familiar and unfamiliar people. Accept comfort from anyone who provides it to their satisfaction
2. Laying foundations of attachment	2–7 months	Starting to recognise caregivers but does not usually show attachment responses upon separation
3. Clear-cut attachment	8 months – 2 years	Protest or anxiety at being separated from their caregivers and become wary of strangers. May cry or cling when caregiver moves away and react negatively to anyone else who tries to provide comfort
4. Goal-directed partnership	2+ years	Increased independence and recognition that their caregivers have goals and plans that sometimes make separation necessary

Temperament

An attachment relationship is two-way. Both individuals involved in the relationship play an active role in establishing the bond. The caregiver plays an important part in the emergence of attachment, but the type of attachment formed also depends to some extent on the infant's behavioural characteristics. There is considerable research evidence that infants differ at birth in their basic response tendencies. Some will cry a lot, others will be placid, some will be active, some less so, and so on. These types of behaviours have been associated with temperament.

Temperament has been defined and measured in various ways by different psychologists who have studied it. Most definitions refer to **temperament** as our characteristic way of reacting to people, objects and events. For example, temperament may be considered as the 'style' with which we behave and includes such characteristics as the speed and intensity of emotional reaction when frustrated or uncomfortable, whether we are easy-going, calm and readily adapt, or very fussy, irritable and slow to adapt. Many psychologists believe our temperament provides the foundations of personality development or at least significantly influences its development (Thomas & Chess, 2009).

Temperament is also widely regarded as having some degree of genetic basis. Differences in temperament are found in infants across all cultures and tend to persist throughout childhood and into later years. For example, some newborns typically display positive moods, are non-irritable, relaxed and adapt easily to new routines, food, people and situations. Others are more intense, irritable, fussy and less adaptable.

One of the early and best-known research studies on infant temperament classified infants as having one of three temperaments:

- *easy*: even tempered, usually content or happy, and open and adaptable to new experiences such as the approach of a stranger or their first taste of a mashed vegetable. They have regular feeding and sleeping habits, and they usually tolerate frustration (e.g. being retrained) and discomfort (e.g. dirty nappy).
- *difficult*: these infants are active, irritable, and irregular in their daily feeding and sleeping habits. They often react negatively and quite extremely to changes in

their routine and are slow to adapt to new people or situations. They cry often and loudly, and are inclined to throw a tantrum when frustrated or uncomfortable.

- *slow-to-warm up*: these infants tend to be more inactive than active, somewhat moody and only moderately regular in their daily habits. Like difficult infants, they are slow to adapt to new people and situations, but they tend to respond mildly, rather than in an intense, negative way. For example, they may resist a cuddle by looking away from the cuddler rather than by screaming. They eventually adjust, showing a quiet interest in new foods, people, or places. (Thomas, Chess & Birch, 1970).

Researchers have also found that an infant's temperament can influence a caregiver's responsiveness to the infant and the appropriateness of their response. In turn, these can impact on the infant and influence the growth and quality of an affectionate bond. For example, the main caregiver of an infant who is usually cheerful, relaxed, adaptable and has a regular pattern of 'eating, eliminating and sleeping' will find it easier to identify the infant's needs and respond appropriately than would the caregiver for an infant who is moody, tense, fussy and has irregular habits (Bukato, 2008; Charlesworth, 2014; Sigelman & Rider, 2012).

It is also possible that a caregiver's attitudes to an infant will be influenced by the infant's temperament. For example, a caregiver may develop and show less affection for an infant with a 'difficult' temperament than they would for an infant with an 'easy' temperament.



FIGURE 5.25 The infant's temperament can influence a caregiver's responsiveness and the appropriateness of their response.

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Weblink

Video of two pioneering researchers discussing temperament 8m 25s

Early life experiences

Attachments usually form within the first 6–7 months or so. Therefore, the infant's experiences during this period are important. A great deal of the infant's time throughout this vital period is with the primary caregiver who is meeting its needs. The human newborn, however competent it may be, cannot survive unless responsive adults attend to their needs and protect them from environmental hazards. Ainsworth (and Bowlby) proposed that infants form attachments with those people most closely involved with them. This is usually the main caregiver, most commonly the mother.

It is not until about 12 months of age that most infants start to use recognisable words. Up until that time, they rely on other ways to communicate their moods, feelings and needs. For example, they use body language such as smiling, gazing, reaching, squirming and clinging, and vocalisations such as crying and babbling. A secure attachment is most likely to be formed with the person(s) who is most sensitive to these signals and responds appropriately. Ainsworth (1983) referred to this factor as the *sensitive responsiveness* of the caregiver and believes that it is crucial in the type of attachment formed between an infant and caregiver.

In one study, Ainsworth (1983) compared how mothers with securely attached infants and mothers with insecurely attached infants responded to signals of discomfort from their infants. She found that mothers with securely attached infants were more sensitive to their infants and responded more appropriately throughout the first year of their infant's life. They were quickest to respond when their infants cried, and were able to more accurately identify the cause of the crying and the remedy required.

Not only were they more responsive in detecting when the infants cried because of hunger, but they were also very responsive to the infants' signals in terms of when to stop feeding and how quickly or slowly the feeding should proceed. By contrast, mothers with insecurely attached infants tended to lack awareness of what their infants were feeling or needing. They had less physical contact with their infants and their caregiving activities appeared to revolve more around their own interests and moods than those of their infants. The mothers of insecurely attached infants also tended to be less interested in mothering in general. It is likely

that this influenced their responsiveness and their overall style of parenting.

The sensitivity and responsiveness of the caregiver are vital aspects of early life experience and play an important role in the type and strength of attachment which occurs with an infant. Attachment appears to thrive when the caregiver is sensitive to and appropriately interprets and responds to the infant's signals. However, not all main caregivers act in this way.

One factor which may account for inappropriate responsiveness by a caregiver is their general attitude towards parenting. This is influenced by a complex interaction of many other factors, some of which can be traced to the early experiences of the parents. Situational factors can also influence the infant–caregiver relationship; for example, the type of relationship between the parents, involvement of others in the parenting, the number of other children, being in paid employment, and adequacy of the family income and housing.

One factor which has been found to influence the responsiveness of the caregiver is the caregiver's views of their own early parenting experiences. American psychologists Inge Bretherton and Everett Waters (1985) interviewed parents of insecurely attached infants and compared their recollections of childhood with those of parents of securely attached infants. They found that many of the parents of insecurely attached infants had failed to form a secure attachment during their own infancy or had experienced a traumatic loss of an early attachment figure. Many also reported being rejected or feeling unloved by their parent(s) and severe loneliness during childhood.



FIGURE 5.26 The caregiver's 'Sensitive responsiveness' is an important early life experience that influences the type and strength of the infant's attachment.

Although it is reasonable to expect that secure attachment is promoted by the mental health condition of parents, especially mothers, research studies have generally provided contradictory results. A majority of studies, however, have found that mothers diagnosed as having post-natal depression were more likely to develop insecure attachment relationships with their infants (Gervai, 2009; McMahon et al., 2006).

Research studies over the last three decades have also identified other factors associated with the infant's early life experience that can affect the type and quality of attachment relationships. These are often described as *demographic factors* and include family income, family size, parental age and education and major stressful life events within the family, such as loss of a parent, birth of a sibling, severe illness, marital breakdown and ongoing presence of a new romantic partner of the main caregiver (Gervai, 2009).

The infant's and caregiver's cultural background also influences their relationship. For example, German parents tend to strongly encourage independence and discourage clingy behaviour, fearing that if they are too responsive to cries they will 'spoil' their infants. This has been suggested as a reason why many German infants make few emotional demands on their parents and are often classified as having an avoidant attachment when assessed in the Strange Situation. By contrast, Japanese infants, who are rarely separated from their mothers early in life and are encouraged to be dependent on their mothers, become highly distressed by separations such as those to which

they are exposed in the Strange Situation. As a result, they are more likely than non-Japanese infants to be classified as having a resistant attachment (Sigelman & Rider, 2012).

In 1986 American psychologists Mary Main and Judith Solomon identified a fourth attachment type which they called **insecure disorganised attachment**. When in the Strange Situation, these infants were often inconsistent or showed contradictory behaviours when separated or reunited with their caregivers. For example, when reunited with a caregiver they might seek close contact but would do so by moving slowly back towards the caregiver or approach with their head turned another direction as avoiding eye contact. These infants also tended to respond to reunions with fearful or odd behaviours such as rocking themselves, ear-pulling or freezing (Main & Solomon, 1986).

Researchers who investigated early life experiences associated with insecure disorganised attachment have linked it to factors such as infant maltreatment, hostile caregiving, post-natal depression and the mother having an unresolved trauma or experienced loss through separation, divorce, and death. However, research studies have also found insecure disorganised attachment among infants in families where none of these variables is evident and the 'middle-class family' lifestyle appears 'normal'. So, psychologically inappropriate parenting practices do not fully explain insecure disorganised attachment in an infant. The origins of this attachment type seem to be highly complex and much remains to be learned (Meins, 2011).



FIGURE 5.27 A secure and healthy attachment is most likely when the caregiver is sensitive and appropriately responsive to the infant's signals.

BOX 5.7

Childcare: positive or negative effects on attachment?

Some parents who contemplate childcare worry that their child will prefer the childcare provider to them and that the childcare centre will be harmful to the infant–parent attachment relationship. However, most psychologists believe that these early separations do not weaken the attachment relationship between the parent and the infant.

A longitudinal ('long-term') study was conducted in 10 different cities in America to investigate the attachment relationship between mothers and their infants at one, six and 15 months of age, some of whom had been attending childcare and others who had not attended childcare. The results supported the view that childcare had no negative effects on mother–infant attachment and children cared for out of the home actually appeared less insecure when their mothers were not in sight than did children cared for only in the home (NICHD Early Child Care Research Network, 1997).

The attachment relationship between a caregiver and child seems to be affected more by the *quality* of the time rather than the *quantity* of time they spend together. What seems to be most important is that the infants have a consistent and warm relationship with their caregiver(s) (Crockenberg & Litman, 1991). However, if a child is placed in childcare because of family breakdown or the mental or physical health of one or both parents, then a disrupted or insecure attachment may develop (Vaughan, Gore & Egeland 1980).

As long as the main caregiver works by choice, provides 'good' quality childcare arrangements and develops a warm and caring relationship during the times they spend with their infant, the 'fear' or anxiety that the infant–caregiver attachment relationship will be adversely affected appears to be unnecessary. Some psychologists suggest that good quality childcare can actually enhance the relationship between the infant and caregiver(s).



FIGURE 5.28 Placing an infant in childcare does not necessarily weaken the infant–caregiver attachment relationship.

LEARNING ACTIVITY 5.12

Review questions

- 1 Explain the meaning of attachment.
- 2 Why is attachment described as a two-way relationship?
- 3 When do attachments form?
- 4 What is the relationship between attachment and emotional development?
- 5 (a) What is the Strange Situation?
(b) List five behaviours that could be used as indicators of attachment within and outside the Strange Situation.
- 6 Name and describe four attachment types.
- 7 Construct a table to summarise factors influencing the development of attachment. Ensure you briefly describe, explain and give a relevant example(s) of each factor.
- 8 (a) Consider Ainsworth's research studies using the Strange Situation. Given her research had the potential to cause psychological distress to infants, what ethical standards would Ainsworth have been required to address in order to be given permission by an ethics committee to conduct her study? Explain your selection of each standard.
(b) Do you think Ainsworth's research should have been allowed to proceed? Explain your answer with reference to relevant ethical standards.

LEARNING ACTIVITY 5.13

Reflection

Comment on the view that an infant's mother is the best person to be its primary caregiver. Ensure you consider relevant psychological theory and research evidence.

Harlow's experiments on attachment in monkeys

At around about the same time Ainsworth was developing her theory on attachment in human infants, American psychologist Harry Harlow was undertaking research on attachment in rhesus monkeys. Harlow conducted a number of experiments to investigate factors influencing the development of attachment by infant monkeys to their mothers.

In one of his best-known experiments, Harlow (1958) studied the role of breastfeeding in infant–mother attachment. He used eight infant rhesus monkeys which had been separated from their mothers at birth.

The monkeys were individually reared in cages, each of which contained two surrogate mothers. A *surrogate* is anyone or anything which 'substitutes for' or 'plays the part of' something else. As shown in figures 5.30(a) and (b), the surrogate mothers were made of wire mesh and were roughly the same size and shape as real monkey mothers. One of the

surrogates was covered in terry-towelling cloth and the other was left uncovered. A feeding bottle was attached to one of the surrogates in the same area where a breast would be on a real mother. Half of the animals were in cages with the feeding bottle on the cloth surrogate and the other half were in cages with the feeding bottle on the wire surrogate. Harlow proposed that if an infant's attachment to its mother was based primarily on feeding, the infant monkeys should have preferred and become attached to whichever surrogate mother had the bottle.



FIGURE 5.29 American psychologist Harry Harlow (1905–1981)

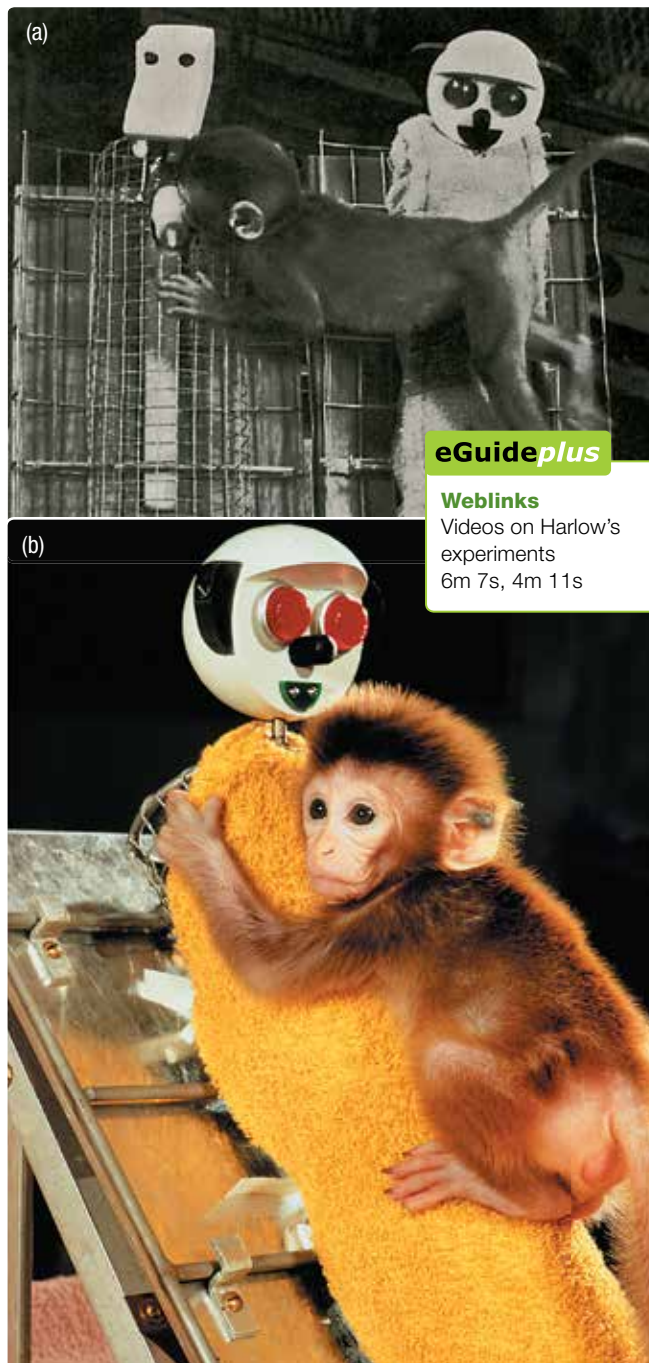


FIGURE 5.30 (a) Monkey feeding from wire surrogate mother (b) Monkey clinging to cloth surrogate mother

Harlow found that regardless of which surrogate provided the nourishment, the infant monkeys spent more time with the cloth surrogate than the wire surrogate. Although the infants in the two groups drank the same amount of milk and gained weight at the same rate, all eight monkeys spent far more time climbing and clinging to the cloth surrogate than they did the wire surrogate. By the age of about three weeks, all of the monkeys were spending around 15 hours a day in contact with the cloth surrogate. No animal spent more than an hour or two in any 24 hour period on the wire surrogate.

The monkeys' preference for the cloth surrogate was particularly evident when they were emotionally distressed. In order to create a stressful condition, Harlow put various frightening objects in the monkeys' cages; for example, a mechanical forward-moving spider (see figure 5.31), or a teddy bear that beat a drum. The frightening object was placed repeatedly in each monkey's cage and set in motion.

Harlow found that the majority of infant monkeys sought first contact with the cloth surrogate, regardless of whether or not it had the feed bottle. The terrified monkeys were observed to cling to the cloth mothers, rubbing their bodies against the cloth surrogate. Those monkeys who first sought contact with the wire surrogate through blind terror soon left it for the contact comfort of the cloth surrogate, even if the wire surrogate had the feed bottle.

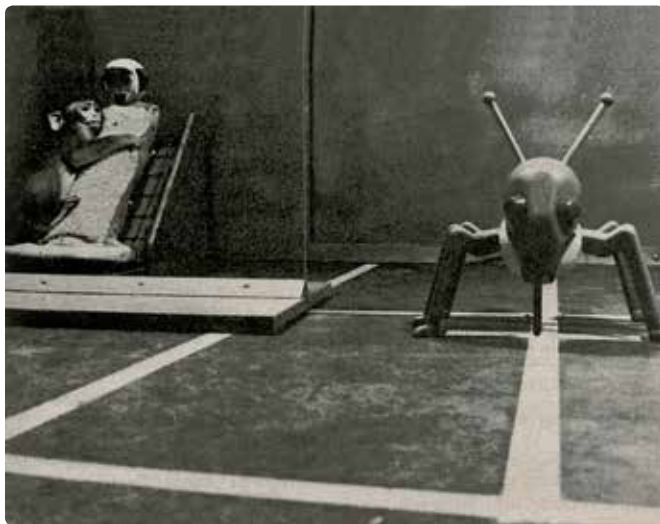


FIGURE 5.31 When a frightening toy spider was placed in their cage, infant monkeys tended to seek comfort from the cloth surrogate, even if the surrogate did not have the feed bottle.

On the basis of these results, Harlow concluded that 'contact comfort', which was provided by the softness of the cloth covering, was more important than feeding in the formation of an infant rhesus monkey's attachment to its mother. He generalised his findings

to suggest that contact comfort was also likely to be a crucial factor in human infant–parent attachment.

Although these findings were based on monkeys, they considerably influenced the views of psychologists in relation to human infant–caregiver attachment. Until this time, many psychologists believed that infants became attached to their mothers through a simple kind of learning called classical conditioning whereby the mother became associated with food. In Harlow's experiment, attachment of the monkeys was not based on food rewards. Instead, contact comfort emerged as a more important factor in attachment.

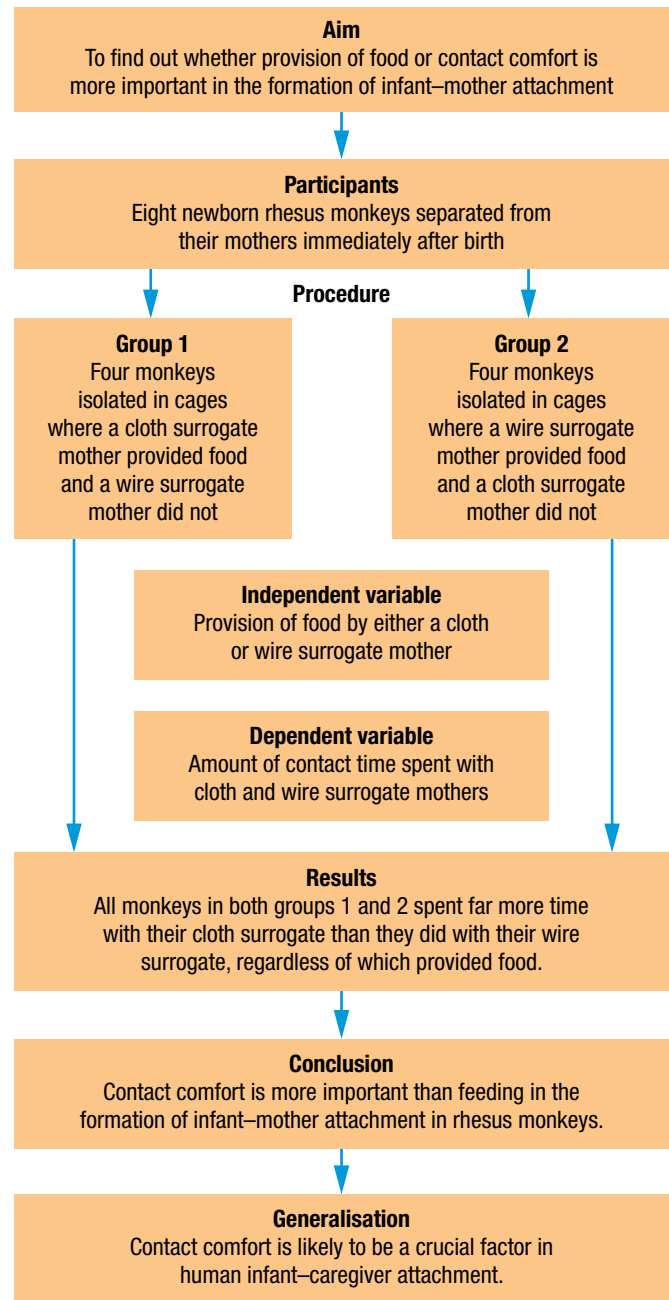


FIGURE 5.32 A flow chart of Harlow's (1958) experiment



FIGURE 5.33 Infant monkeys isolated for three months showed disturbed social and emotional responses when reunited with other monkeys.

Other animal experiments by Harlow

In further experiments, Harlow found that contact comfort was not the only important variable in attachment. For example, Harlow, Dodsworth and Harlow (1965) privated a group of rhesus monkeys to prevent them from having any social contact.

Privation involves removing the opportunity to satisfy a need, in this case, the need for social contact. The monkeys were taken from their mothers just after birth and totally isolated in cages. One group of infant monkeys was isolated for three months, another group for six months and a third group for 12 months. There was also a fourth group, a control group of infant monkeys who were 'normally reared' (in cages with their mothers and other monkeys).

The use of a control group enabled the three groups who experienced different periods of isolation to be compared with one another and with a group that had not experienced any social isolation. Otherwise the effects of isolation could not be measured accurately.

Harlow and his colleagues found that after three months privation, the infant monkeys were emotionally disturbed and their social behaviour was impaired. When released individually into the company of 'normally reared' same-age monkeys daily for 30-minute periods, they crouched in the corner of the cage with their heads buried under their arms, avoiding any contact and social interaction. Gradually, however, their individual and social behaviours improved. After about 12 months, their behaviour was almost the same as that of the monkeys in the control group.

The monkeys privated for six months were much more severely impaired in terms of their social behaviour. They isolated themselves even more than the three-month group, spending more time crouched in the corner avoiding social interaction. They had also

developed self-destructive behaviour such as biting themselves and pulling out clumps of their own hair.

Compared to the control group monkeys, they were severely withdrawn and socially incompetent. When released into the company of 'normally reared' monkeys they preferred to be alone and would not join in the playful activities of the other monkeys. Over time, their behaviour improved until it resembled that of monkeys in the control group. But improvement occurred more slowly than that of the group privated for three months.

The infant monkeys isolated from all social contact for the first 12 months of life were extremely socially impaired. They were totally withdrawn, unable to relate socially to other monkeys, self-destructive and completely disinterested in anything going on around them. In the company of the 'normally reared' monkeys they were fearful, rarely moved about and avoided all contact and interaction. When they were housed with normally reared monkeys, their behaviour improved very slowly, but not in all areas.

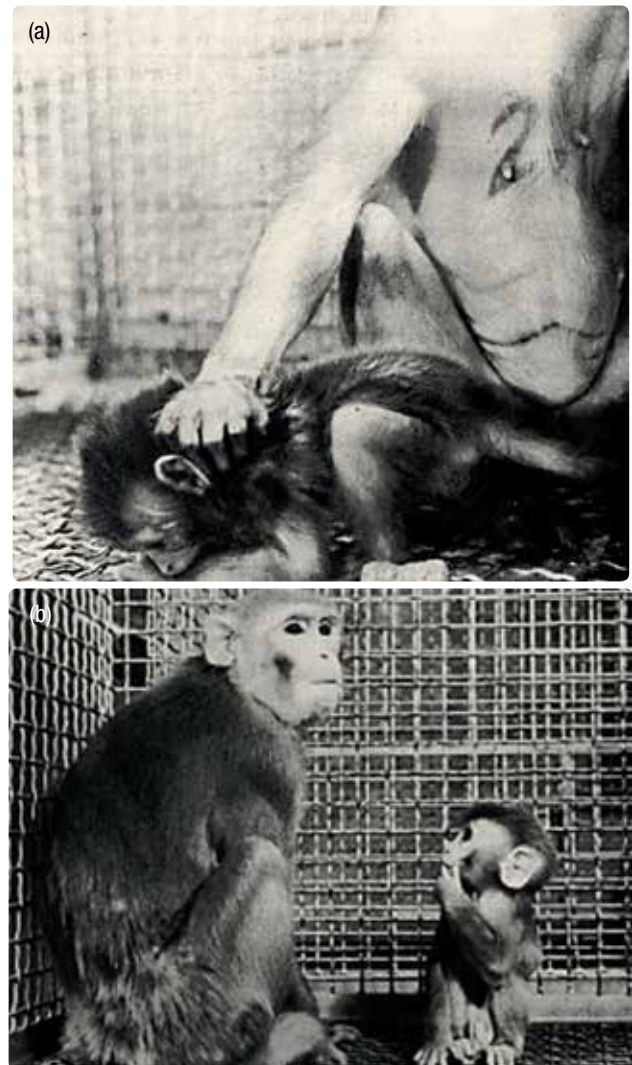


FIGURE 5.34 (a) 'Motherless mother' monkey pushing her infant's face against the floor; (b) 'Motherless mother' showing disinterest in her infant

Harlow also used rhesus monkeys to investigate factors influencing *maternal behaviour* in attachment. In a series of experiments, he discovered that female rhesus monkeys reared in total isolation for the first 12 months of life and then artificially impregnated (called 'motherless mothers') became completely inadequate mothers.

Each of these monkey mothers consistently avoided her baby and did not appear to care at all when separated from it. The mother would also violently abuse her baby when it approached her for contact or feeding. For example, one mother 'sometimes bit her infant' and 'occasionally crushed the infant's face and body to the floor'.

However, not all of Harlow's 'motherless mothers' behaved in this way. Some reared their infants in an

adequate manner. These mothers had experienced some limited contact with other baby monkeys when growing up, whereas the others had not. It appeared that positive social experience with same age mates had limited the potential harmful effects of growing up motherless (Harlow, Harlow & Hansen, 1963; Seay, Alexander & Harlow, 1964).

Harlow's experiments with rhesus monkeys have enabled psychologists to better understand factors which influence attachment, and the effects of different attachment experiences on emotional and social development. However, rhesus monkeys and humans are psychologically different in many ways. Care must be taken in generalising about human experience based on animal experiments.

BOX 5.8

Harlow's views on using rhesus monkeys in experiments

Harlow elected to use monkeys in his research to overcome the limitations of using human participants. He believed they were a suitable alternative to people because, in his view, they have much in common with the human species and, therefore, results of his experiments could be generalised to people. Harlow specifically chose rhesus monkeys for what he believed were important practical advantages:

We use rhesus monkeys because they were the first monkeys over which one could have disease control. And they were the first monkeys that one could breed at will — our will, not theirs. Finally, the rhesus monkey is a standardised Old World monkey. New World monkeys are far different creatures and show more variability. And apes pose other problems. The chimpanzee is too big, too expensive, and too dangerous.

In defence against criticisms that inducing stress in laboratory monkeys was 'sadistic', Harlow referred to his experiments on mental disorders and use of play therapy to treat these:

You will never learn the factors that produce depression and other pathological syndromes in the

wild. You will never find the biochemical variables underlying such syndromes in the wild... You will never get definitive data by observing (in the wild). Take play. You could study play in the field for millennia and no one would have found its meaning. But our laboratory work gave the basic answer... (We found) that play is probably the best therapy (for depression). We know this is true for monkeys and it would probably be true for human beings (if psychologists were prepared to use it)... After one study in which monkeys had been totally socially isolated from birth to six months, the monkeys were completely rehabilitated through play therapy.

Harlow also attempted to deflect criticism that the caged monkeys used in his studies tended to produce behaviours that do not occur in the wild. In his view, there was little which was 'so damn good about the wild anyway... The feral environment is pretty bad'.

Based on an interview with Harlow in Tavris, C. (1973, April). A conversation by way of collision, with Harry F. Harlow. *Psychology Today*, pp. 65–74.

LEARNING ACTIVITY 5.14

Analysis of research by Harlow, Dodsworth & Harlow (1965) on privation

Part A

Construct a flow chart which identifies the key features and stages in the Harlow, Dodsworth and Harlow (1965) experiment involving infant rhesus monkeys. An example of a flow chart is figure 5.32 on page 203. Ensure you include a possible research hypothesis.

Part B

Answer the following questions.

- 1 What are the operational IV and the DV in this experiment?
- 2 What do the findings of the experiment suggest about the development and importance of infant–caregiver attachment among humans?
- 3 Outline one advantage of the research design. For example, why did Harlow choose to use the experimental method for this study rather than some other method?
- 4 What is one advantage and one disadvantage of using animals in psychological research?
- 5 Would Harlow's experiments be approved by ethics committees today? Explain with reference to relevant ethical standards and practices.
- 6 To what extent can the findings of animal research studies on attachment be applied to humans? Explain your answer.

DEVELOPMENT OF COGNITIVE ABILITIES

Children view the world very differently from adolescents and adults. For example, it is not unusual for a young child to believe that the sun follows them from place to place when they walk outside, or that dreams come through the window at night.

As with other areas of psychological development, cognitive development cannot be directly observed. Infants and young children who have not yet adequately developed their language skills are unable to report what they are thinking or explain their actions. Therefore, much of what psychologists know about cognitive development, particularly in early infancy, must be inferred from observable behaviour.

Many early psychologists believed that infants were not capable of much thinking. Infant behaviours were seen as random and occurring without purpose. Some psychologists saw infants as 'empty vessels' — as unresponsive organisms with limited perceptual abilities and little capacity to learn, remember or think.



FIGURE 5.35 Because she cannot tell us what she is thinking, should we assume that she is not capable of thought?

Psychologists have since learnt a great deal about the capabilities of infants and children in many areas of development. The changed view of the cognitive capabilities of infants was mainly initiated as a result of the pioneering work of Swiss psychologist Jean Piaget. His theory on the development of cognitive abilities was first translated into English in the 1920s but did not attract a great deal of attention until the late 1950s. Since then, researchers have tested and refined various elements of his theory and many current views about how thinking develops are based on Piaget's theory.

However, Piaget's interpretation of some of his research findings has been challenged by psychologists. It is now believed that he probably described children as having more limited cognitive abilities than they actually do and that they can think and reason in more sophisticated ways in particular stages than Piaget proposed. For example, some of the key cognitive accomplishments described by Piaget in different stages have been found to occur much earlier in development than he suggested.



FIGURE 5.36 Swiss psychologist Jean Piaget (1896–1980)

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Video featuring Piaget outlining aspects of his theory 13m 4s

Key principles of Piaget's theory

Piaget (1952, 1960) viewed cognitive development as a process of adaptation to the changing world around us. On a daily basis, **adaptation** involves taking in, processing, organising and using new information in ways which enable us to adjust to changes in our environment. This happens through two closely related processes which he called assimilation and accommodation.

Assimilation

Assimilation is the process of taking in new information and fitting it into and making it part of a pre-existing mental idea about objects or experiences. Through assimilation, we explain or make sense of new information in terms of what we already know. For example, a young child may see a truck and call it a car, simply because a car is the only type of vehicle for which the child has a pre-existing mental idea.

Similarly, if the child is given a toy hammer for the first time while using a wooden spoon for stirring in a pot, the hammer may also be used to stir the pot because the child has assimilated the hammer into a pre-existing mental idea. Through assimilation, both the truck and the hammer have become part of what the child knows about the world and the child will be able to recognise them in the future. However, the child will also eventually learn that a hammer is used to do things other than stirring. Pre-existing mental ideas can change through experience and doing so is evidence of adaptation.

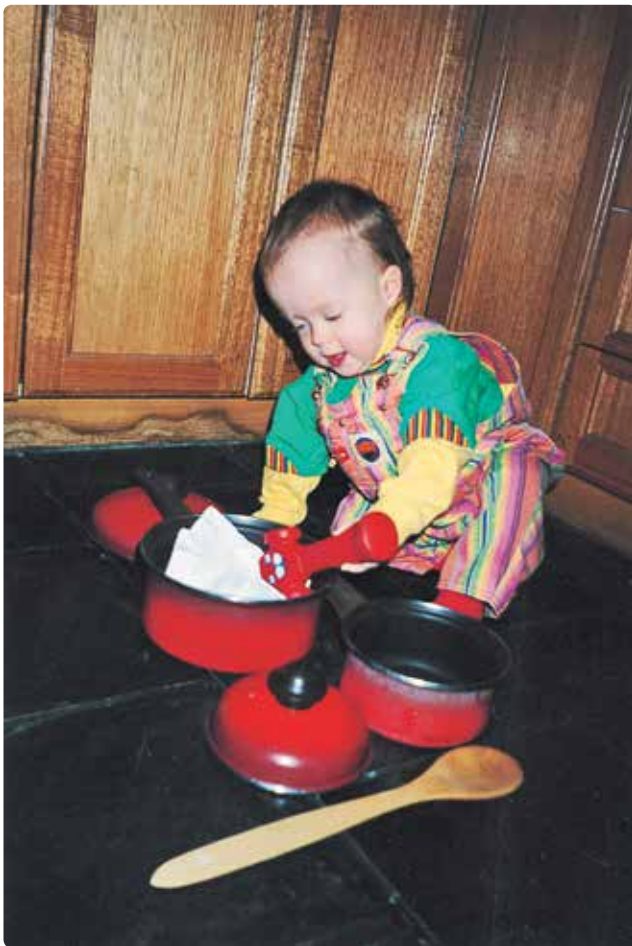


FIGURE 5.37 The child has assimilated the new object of a toy hammer by using it for stirring in the pot, as she does with a wooden spoon. This demonstrates the infant's attempt to understand new information (a hammer) by applying existing information (using the hammer like a wooden spoon).

Accommodation

Sometimes we cannot assimilate new information into a pre-existing mental idea, regardless of how hard we try. It simply won't fit because we can't change it in any way to link it in with what we already know. In this case, we are forced to adjust a pre-existing mental idea to deal with the new information.

Accommodation involves *changing* a pre-existing mental idea in order to fit new information. This is a more advanced process than assimilation. Whereas assimilation is used to fit new information without changing it, accommodation involves changing pre-existing information (or mental idea) so the new information may be included.

Piaget (1952) illustrated the relationship between assimilation and accommodation with an example of an infant's sucking behaviour. Infants can suck at birth. Sucking is an innate (inborn), reflexive behaviour, so it does not need to be learnt. The sucking reflex is important for survival because it enables the infant to feed from a nipple on a breast.

When placed on a nursing mother's breast, infants demonstrate *assimilation* by using a nipple in the activity of sucking. However, not all objects can be sucked in exactly the same way. For example, when presented with a teat on a bottle, infants try to assimilate the teat in the activity of sucking because this new object (and situation) is like a nipple (and the situation of sucking from a nipple).



FIGURE 5.38 Trying to drink milk from her rattle (assimilation), this infant will eventually develop an understanding that rattles only make noise (accommodation).

If they are unsuccessful in achieving the result they require (i.e. obtaining milk), infants have to modify their behaviour by changing the shape of their mouth, the placement of their gums, the amount of suction used, the rhythm of the activity and so on. These changes demonstrate *accommodation*.

Consider the case of 18-month-old Alexandra who points to a full moon and says 'ball'. She has assimilated the object of the moon into her existing mental idea of circular-shaped objects which is built mainly around her experience with balls. When she is older, she will be able to understand that there are differences between a full moon and a ball, even though they are both circular. When she recognises the moon as being different from a ball, she will have accommodated it.

Schema

Assimilation and accommodation also enable a child to form a **schema** — a mental idea of what something is and how to act on it. Piaget called these the basic building blocks of intelligent behaviour which we use both to understand and to respond to situations. *Schemata* (the plural of schema) can be thought of as 'units' of knowledge, each representing some aspect of the world. For example, your schema for Christmas may include presents, Christmas tree, Santa, shopping, money, summer and holiday. Someone else may have a different schema that includes church, Jesus, birth, family, giving and so on.

We learn and develop schemata for all kinds of things — ourselves, other people, objects, school, university, jobs, actions, experiences, events and so on. For example, you might have a schema about catching a train to travel to the Melbourne CBD. The schema is in the form of a pattern of behaviour stored in your memory. It may include checking the relevant timetable, getting to the train station, validating a Myki, boarding the train when it stops at the station, and so on. Whenever you want to catch a train to the CBD, you retrieve this schema from memory and apply it to the situation.

According to Piaget (1952), we are born with some basic schemata for survival purposes, such as the sucking and grasping reflexes. These are *action schemata* which are ready for use and interaction with the world at birth. We modify these schemata and develop new schemata through everyday life experiences.

Our schemata become more and more sophisticated as we mature and our environment expands. They are continually modified as we adapt to the changing world through assimilation and accommodation. This ongoing process underlies cognitive development throughout the entire lifespan. When Piaget described the development of a person's intellectual ability, he was referring to increases in the number and complexity of the schemata that a person had learned.



FIGURE 5.39 A schema is a mental idea of what something is and how to act on it. We learn new schemata for all kinds of things, including how to use a Myki machine.

LEARNING ACTIVITY 5.15

Review questions

- 1 (a) What does cognitive development involve?
(b) Give examples of general and specific abilities which are likely to be associated with cognitive development.
- 2 (a) Explain the meaning of adaptation.
(b) What role does adaptation play in cognitive development?
- 3 (a) (i) What does assimilation involve?
(ii) List three recent examples where you have been in a situation requiring you to assimilate new information.
(b) (i) What does accommodation involve?
(ii) Describe a situation when you were required to accommodate new information and thereby changed your view of the world or people.
(c) Explain the difference between assimilation and accommodation.
(d) Give an example, not used in the text, to illustrate the way in which assimilation and accommodation can work together.
- 4 (a) Explain what Piaget meant by the term schema.
(b) Give two examples of inherited schemata.
(c) Describe two examples of schemata you have formed, one school related and one non-school related.
(d) What role do schemata play in cognitive development?
- 5 Explain the roles of assimilation and accommodation in:
 - (a) adaptation
 - (b) schemata formation.

Piaget's four stages of cognitive development

According to Piaget (1952), we all move through a predictable sequence of four different stages in developing our thinking and other mental abilities. As we progress through these stages (and their various sub-stages), our thinking becomes increasingly sophisticated. It develops from being relatively basic and self-centred, through being able to use words and pictures to represent something (*symbolic thinking*), to not being reliant on being able to see, visualise, experience or manipulate in order to understand something (*abstract thinking*). The same sequence is followed by everyone regardless of our culture. Each stage is linked to an approximate age range. But this does not mean that we move from one stage to the next on our birthdays. Nor can a stage be skipped.

Piaget proposed that individuals do not develop the mental capabilities of a later stage without first having acquired those of an earlier stage. Furthermore, the rate at which each person passes through the stages may vary. Some people may reach a stage more

quickly or slowly. This is due to differences in biological maturation (e.g. brain development) and personal experiences, both of which interact in influencing each individual's cognitive development. However, everyone will pass through the four stages in the same order. In addition, not all individuals necessarily reach stage four. For example, some people with intellectual disability or severe brain damage may never proceed beyond the first or second stage.

As well as describing a predictable sequence of four stages through which we progress, Piaget outlined key *cognitive accomplishments* that individuals achieve in each stage. He also described thinking styles typical of each stage. According to Piaget, what people know is not as important as the way in which they think and how they acquire mental abilities.

Sensorimotor stage (0–2 years)

This first stage spans from birth to about two years of age. In the **sensorimotor stage**, infants explore and learn about the world primarily through their senses and motor (movement) activities, hence the term 'sensorimotor'.

In the first months of an infant's life, the various types of incoming sensory information and motor skills are not coordinated. The infant does not realise that they can reach for a toy or dummy which is less than an arm's length away. After the first three months, however, most infants begin to integrate sensory and motor information and can start to coordinate their behaviour to grasp an object or turn towards a noise.

With increasing mobility, the infant's world expands quickly. At about the same time as the infant begins to crawl (around eight months of age), they learn the concept of object permanence (although researchers have since found infants as young as three months may have this ability). **Object permanence** is the understanding that objects still exist even if they cannot be seen, heard or touched. Before object permanence is understood, 'out of sight' really is 'out of mind' for infants; that is, if something cannot be seen, then it does not exist.

Prior to acquiring object permanence, the infant may follow an object with their eyes, but they stop following it when it disappears from view. For example, they will watch the family dog walk past them, but if the dog goes into another room they show no interest in where it might have gone. However, once they have acquired object permanence, they will search actively for an object of interest even if they can no longer see it. For example, they might look towards where they last saw the dog before it moved out of sight.



FIGURE 5.40 In the sensorimotor stage, infants construct their understanding of the world by coordinating their sensory experiences with motor abilities.

According to Piaget, object permanence may explain why a game of peek-a-boo is so much fun for infants. Each time the object disappears, it ceases to exist for the infant. Whenever the object reappears, it is as if a whole new object has been created out of nothing. In Piaget's view, object permanence is an ability which infants gain through coordinating their sensory input, but only after much trial-and-error learning.



FIGURE 5.41 Object permanence at about 8 months of age is the key cognitive accomplishment of the sensorimotor stage. For younger infants, 'out of sight' is 'out of mind'.

Piaget proposed that object permanence is a key cognitive accomplishment of the sensorimotor stage. Older people take object permanence for granted — for example, you know this textbook still exists when you look away from it or put it in your school bag.

The sensorimotor infant also develops the ability to carry out **goal-directed behaviour** — to perform and successfully complete a sequence of actions with a particular purpose in mind. This ability becomes increasingly sophisticated as the infant's sensorimotor skills mature along with the ability to coordinate these skills. For example, the infant learns that a desired object located out of reach on a coffee table may be obtained by using the table to pull themselves up to a standing position and therefore to where the object is reachable.

LEARNING ACTIVITY 5.16

Designing a test for key sensorimotor accomplishments

Piaget described two key cognitive accomplishments of children during the sensorimotor stage:

- an understanding of the concept of object permanence
- the ability to carry out goal-directed behaviour.

For each of these accomplishments, suggest an ethically appropriate way to test whether an infant in the birth to two-year age group has accomplished the ability. The test should be suitable to investigate whether object permanence can be acquired earlier than proposed by Piaget.

Pre-operational stage (2–7 years)

At about two years of age each infant moves from the sensorimotor stage to the pre-operational stage of cognitive development. This age marks the end of infancy and is also a time by which a significant amount of language acquisition has occurred. The thinking of the pre-operational child is much more sophisticated than that of one- to two-year-olds.

As children progress through the **pre-operational stage**, they become increasingly able to mentally represent objects and experiences; that is, to think about and imagine something in their own mind. This further develops their ability to think in more complex ways.

An important development during this stage is increasing use of **symbolic thinking** — the ability to use symbols such as words and pictures to represent objects that are not physically present. Evidence of symbolic thinking is seen in pretend play; for

example, when a pile of sand becomes a turtle, a box becomes a television and endless numbers of make-believe friends share an imaginary tea party or adventure. Other examples of children engaged in symbolic thought can be seen in their use of language and production of drawings.

eGuideplus

Weblink

Video with demonstrations of Piaget's experiments 6m 17s

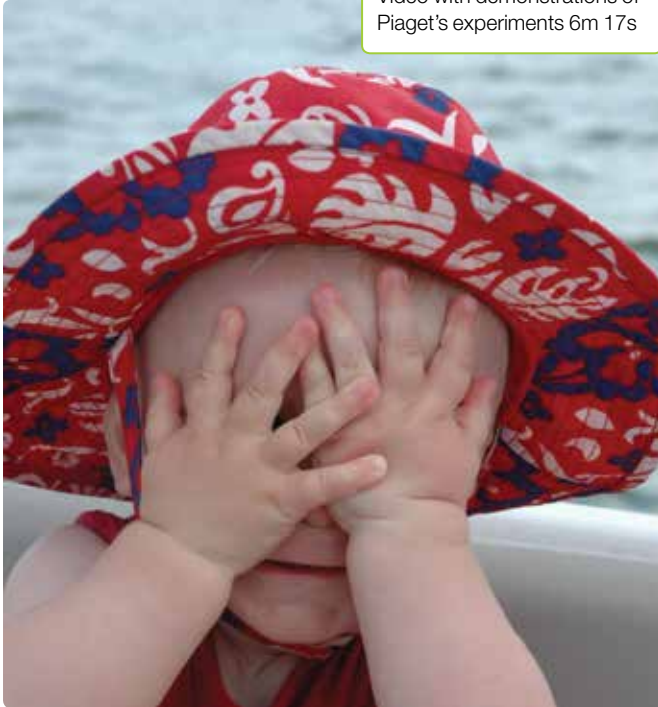


FIGURE 5.42 'Egocentric' children think others see the world in the same way they do. When told to hide they cover their eyes; because they can't see themselves, they think others can't see them either.

According to Piaget, children in this stage are unable to or have difficulty in considering another person's view. Piaget called this **egocentrism** – the tendency to perceive the world solely from one's own point of view. In using this concept, Piaget was not referring to selfish behaviour. He was indicating that pre-operational children are capable only of seeing the world from *their* point of view. When a young child stands in front of a TV and blocks everyone else's view or asks a string of questions while you are concentrating on your homework they are not being selfish. They are demonstrating their egocentric thinking.

It is not until towards the end of the pre-operational stage that a gradual shift from egocentric to *decentred* thinking has occurred. They no longer see themselves as being at the 'centre' of the world all the time. They can think about situations from multiple perspectives, not just their own.

BOX 5.9

An experiment by Piaget to study egocentrism

Piaget proposed that pre-operational children use egocentric thinking. They see things from only their own point of view and have difficulty doing so from another person's perspective.

In one experiment to study egocentrism, Piaget used a diorama apparatus. As shown in figure 5.43, this consisted of three model mountains made of papier-mâché. Each mountain was a different size, shape and colour and each had a different landmark on top. One mountain had a hut, one had a cross and one was covered in snow.

The child was first asked to walk around the diorama and become familiar with the landscape from all sides. Once the child had done this, they were required to sit facing the three mountains and a doll was placed behind the first mountain. The researcher then asked the child, 'What can the doll see?' The child was then shown several pictures of the mountains from different viewpoints. One picture was the view of the mountains from where the child was seated. The procedure was repeated with the doll in front of the second mountain and then the third mountain. Each time, the child was asked the question about the doll's viewpoint and was required to select one of the pictures.

Piaget found that four-year-old children always selected the picture which showed what *they* could see, while six-year-olds often showed awareness of different perspectives. Only seven- and eight-year-olds consistently chose the correct picture. They had developed the ability Piaget called *decentred* thinking, enabling them to consider situations from different perspectives, not just their own.

Researchers have since questioned the appropriateness of the three mountains task for young children; for example, that it may not be a suitable, interesting or motivating problem. Using other test materials, such as familiar cartoon characters from popular television programs, they have found the potential for understanding another's point of view is present in children as young as three and four years of age.

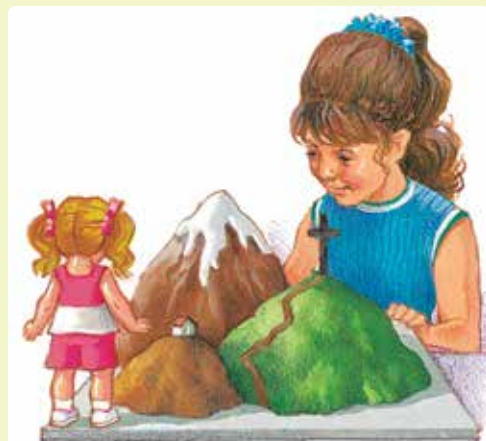


FIGURE 5.43 Piaget's three-mountain task

Children in the pre-operational stage also use a thinking style called animism. **Animism** is the belief that everything which exists has some kind of consciousness (awareness). For example, a rusty tricycle may be thought of as 'sick', a tall tree may be described as 'old' and a child who hurts their knee after bumping into a coffee table may 'smack' the 'naughty' table.

Piaget proposed that animism was linked to egocentric thinking. Pre-operational children unable to see things from another person's point of view assume that everyone and everything is like themselves. They have emotions and can feel pleasure and pain, so they think objects can too.



FIGURE 5.44 The snowman has collapsed and the three younger children are concerned about its welfare. One girl described it as 'sick', another as 'sore' and the other as 'hurt'.

Another key cognitive accomplishment in the latter part of the pre-operational stage is called **transformation** — understanding that something can change from one state (form or structure) to another. For example, earlier in the pre-operational stage, a child presented with an ice-block in a glass could identify both the ice-block in its solid state and the liquid after it had melted, but the child could not explain or understand the melting process.

While the thinking of a pre-operational child is significantly more sophisticated than that of one- to two-year-olds, the pre-operational child can focus on only one quality or feature of an object or event at a time. This process is known as **centration**. Five-year-old Jack's play with tokens demonstrates this. When 12 tokens are arranged into two equal lines of six opposite each other, he can correctly identify the lines as being the 'same'. However, when the second row of tokens is bunched up as a group, Jack believes there are more tokens in the line than in the group, because 'it looks more', even though he had correctly counted the tokens in both original lines and watched the second line being narrowed into a tighter group. In this test, Jack is *centring* because he appears to be focusing on

only the *length* of the row in judging the tokens and he seems unable to also consider *quantity* and *space*.

This example also highlights another of the key cognitive accomplishments of children in the latter period of the pre-operational stage — reversibility. Jack is incapable of mentally reversing the process he saw. **Reversibility** is the ability to mentally follow a sequence of events or line of reasoning back to its starting point. This includes being able to recognise that something can change and then return to its original condition. It is a more sophisticated mental process than counting backwards; for example, understanding that a deflated ball can be pumped up again and put back into play, or that an ice-block that melts is not necessarily gone forever — the liquid can be frozen again to re-create the ice-block.

The following example of egocentric thinking by three-year-old Alexandra also illustrates her *inability* to use reversibility.

Adult: *Do you have any brothers or sisters?*

Alexandra: *Yes, a sister.*

Adult: *What is her name?*

Alexandra: *Sienna.*

Adult: *Does Sienna have a sister?*

Alexandra: *No.*



FIGURE 5.45 Reversibility is the ability to mentally follow a sequence of events or line of reasoning back to its starting point, such as understanding that a deflated ball can be pumped up again and put back into play.

LEARNING ACTIVITY 5.17

Analysis of research on the ability to distinguish between appearance and reality

A psychologist observed that her 2½-year-old son became frightened when an older child put on a Batman mask. The younger child behaved as if the mask had actually changed the wearer into Batman. The psychologist was intrigued by her son's apparent confusion between appearance and reality and decided to conduct research to find out the age when children have developed the ability to distinguish between appearance and reality.

The psychologist devised an experiment using Maynard, a well-behaved black cat. Her sample consisted of four children of friends and relatives. The children were aged from three to six years, with one child aged three, another four, and so on. At the start of the experiment, Maynard was presented to all the children and they all said that he was a cat. After they played with Maynard for five minutes, the psychologist hid the top half of Maynard's body behind a screen while she strapped a realistic mask of a ferocious dog onto his head (see figure 5.46).

As she removed the screen, the psychologist asked a set of questions to assess the children's ability to distinguish between the animal's real identity and its appearance: 'What kind of animal is it now?' 'Is it really a dog?' 'Can it bark?' The strength of the children's ability to distinguish appearance and reality was measured on an 11-point rating scale. Children who said that the cat had turned into a dog were given a score of one, while children who said that the cat only appeared to turn into a dog but could never really become one were given a score of 11.

As shown in figure 5.47, the three-year-old focused almost entirely on Maynard's appearance. The child said Maynard had actually become a ferocious dog and might bite them. The six-year old was amused by this, having understood that the cat only looked like a dog. The four- and five-year olds showed considerable confusion. They didn't believe that a cat could become a dog, but they did not always answer the psychologist's questions correctly.

The psychologist concluded that young children experience confusion between appearance and reality but have a better understanding of the difference between appearance and reality by age five. By the age of six, it is likely that children will be able to distinguish between appearance and reality.

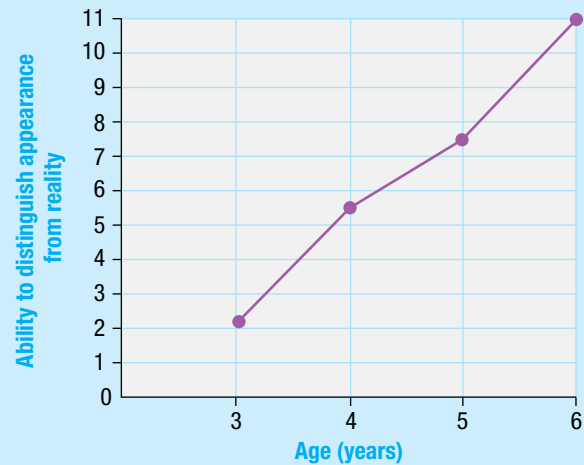


FIGURE 5.47 Age-related increase in children's ability to distinguish appearance from reality

- 1 Suggest a relevant research hypothesis.
- 2 Identify the experimental design.
- 3 Describe the results of the research.
- 4 What criticisms can be made of the sample in terms of:
 - (a) size
 - (b) representativeness?
- 5 Is the conclusion valid on the basis of:
 - (a) sample size
 - (b) representativeness of the sample?
- 6 Can the results be generalised to other children aged three to six years? Explain your answer.
- 7 Suggest a sample and sampling procedure that would better enable the results to be generalised to a specific population and have external validity.
- 8 Is this research ethical? Give reasons for your answer.

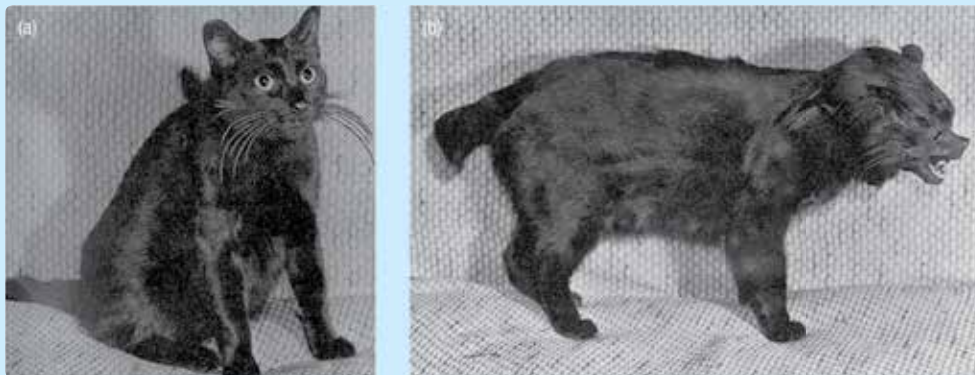


FIGURE 5.46 (a) Maynard the cat (b) Wearing the ferocious dog mask

LEARNING ACTIVITY 5.18

Data analysis – dreaming in pre-operational children

The following extract comes from a conversation between Piaget and a preschool child aged six years and six months. The data was collected during a case study Piaget conducted with a small group of children to find out about their dreaming.

- Piaget: *Do you know what a dream is?*
 Child: *When you are asleep and you see something.*
 Piaget: *Where does it come from?*
 Child: *The sky!*
 Piaget: *Can you see it?*
 Child: *Yes when you're asleep.*
 Piaget: *Could I see it if I was there?*
 Child: *No.*
 Piaget: *Why not?*
 Child: *Because you wouldn't be asleep.*
 Piaget: *What do you dream with?*
 Child: *The mouth.*
 Piaget: *Where is the dream?*
 Child: *In the night.*
 Piaget: *Where does it happen?*
 Child: *In the bed – on the pillow.*

Source: Piaget, J. (1929). *The child's conception of the world*. London: Paladin. 114.

- 1 What kind of data was collected in the case study – quantitative or qualitative?
- 2 How does the child describe what a dream is?
- 3 Does the child think the dream comes from an 'internal' or 'external' source? Explain your answer with reference to the data.
- 4 What kind of thinking is the child using? In your answer, refer to Piaget's descriptions of thought processes of pre-operational children. Give evidence from the child's responses to support your view.
- 5 Is the thinking of the preschool child typical of children in this stage of cognitive development? Explain with reference to Piaget's theory.

Concrete operational stage (7–12 years)

The child is now capable of true logical thought and can perform mental 'operations'. According to Piaget, a *mental operation* involves the ability to accurately imagine the consequences of something happening without it actually needing to happen. For example, at this age, the child can easily tell you that if it rains when on a family picnic everyone might get wet. Similarly, adding two numbers 'in your head' is an example of a mental operation.

In the concrete operational stage, however, mental operations can only be applied to 'concrete' objects or events that are immediately present and can therefore be touched, seen or experienced in some way through the senses. This is why Piaget used the terms 'concrete thinking' and 'concrete operational'.

A key cognitive accomplishment for a child in this stage is understanding conservation. **Conservation** refers to the understanding that certain properties of an object can remain the same even when its appearance changes. The concept of conservation can be applied to any form of measurement, including volume, mass, number and length.

Piaget's best known example is *conservation of volume* using liquid poured into different shaped containers. For instance, eight-year-old Olivia can recognise that if she pours cordial from a tall, thin glass into a short, wide glass, the volume (amount) of cordial remains the same (figure 5.48). However, Olivia's four-year-old brother Sam, who is still in the pre-operational stage, will believe that the short glass has less cordial than the tall one because it is shorter.

Even if Olivia pointed out that no cordial was subtracted when pouring, and even after she poured the cordial back into the original glass to demonstrate that the amount had not changed, Sam would still claim there is less liquid in the short glass (and more in the taller glass). Sam tends to focus his attention on a single property of the glass – its height. This means that he is *centring*, a characteristic of pre-operational thinking.

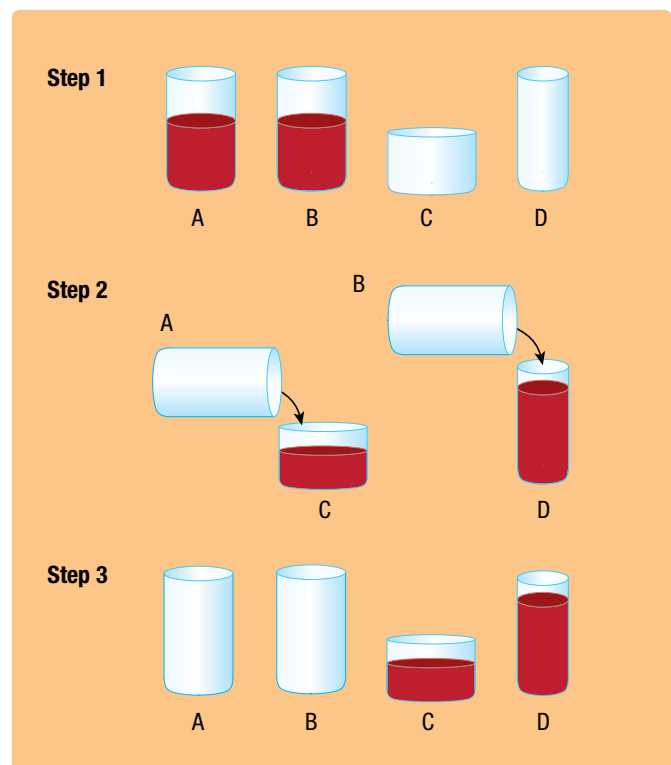


FIGURE 5.48 Conservation of volume. A child who understands this concept recognises at step 3 that, despite the different size of the glasses, C and D hold the same amount of liquid.

Conservation of mass involves understanding that the mass (matter) of an object remains the same even when it changes its appearance. This means that children are able to deal with the fact that two identical play dough balls of the same size still have equal amounts of play dough even if one is changed into the shape of a sausage or flattened to look like a disk (figure 5.49). Similarly, children who can conserve mass know that their body weight will remain unchanged when they move from sitting cross-legged on the floor to standing up straight.



FIGURE 5.49 Conservation of mass. A child who can conserve mass will realise that, despite the changed shape of ball 2, balls 1 and 2 still have the same amounts of play dough.

Piaget also described a conservation of number and length. In a *conservation of number* task, a child might be shown two rows of lollies, with each laid out as shown in A in figure 5.50 below. The experimenter then makes one of the rows longer by spreading out the lollies, as shown in B.

The child who can conserve number will realise that there are just as many lollies in each row. In everyday life, they will also know that four biscuits or blocks will remain constant in number regardless of whether they are spread out on a table or stacked into a tower.

In a *conservation of length* task, a child might be presented with two objects such as pencils, as shown in figure 5.51 below.

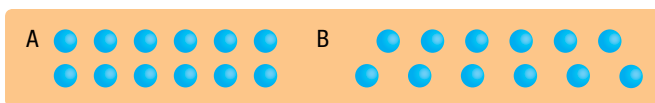


FIGURE 5.50 Conservation of number. A. The child sees two identical rows of lollies (or other objects) and says there is the same number in each row. B. The lollies in one row are spread out and the experimenter asks if the rows have the same number of lollies.

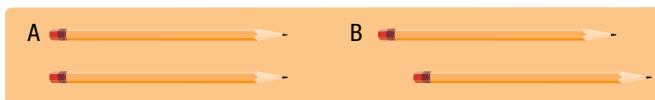


FIGURE 5.51 Conservation of length. A. the child sees two identical pencils (or other objects) that are equal in length. B. One of the pencils is moved slightly and the researcher asks if one pencil is longer than the other.

The child who can conserve length will realise that neither pencil has changed in length. In everyday life, they will also know a skipping rope is the same length regardless of whether it is laid out straight or rolled up.

Recent research indicates that the different types of conservation are not all achieved at the same age during the concrete operations stage and there are also cultural differences. Generally, in Western cultures, conservation of number tends to be achieved first, then conservation of length, mass and volume. But each type can be achieved earlier or later depending on experience and the type of test used.

Another key cognitive accomplishment in the concrete operational stage is the ability to organise objects or events into categories based on common features that set them apart from other categories. This is called **classification**. To test this, Piaget showed children 20 wooden beads, 18 of which were brown and two were white. Each child was then asked three questions:

1. Are all the beads wooden?
2. Are there more brown beads or white beads?
3. Are there more brown beads or wooden beads?

Preoperational children usually answered the first two questions correctly but answered question 3 by stating there were more brown beads than wooden beads. Concrete operational children usually answered all three questions correctly. For question 3, they realised that there were more wooden beads because the white beads were also wooden. They had understood that the feature of colour was a sub-category of the overall category of wooden (which can have several sub-categories).

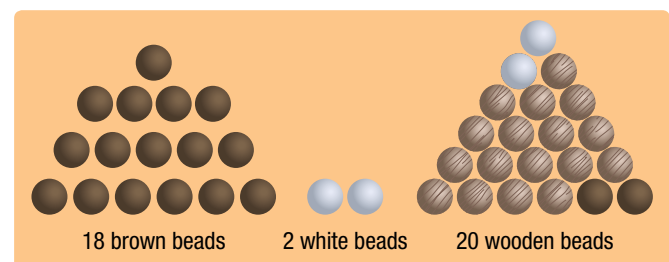


FIGURE 5.52 Assessing understanding of classification — are there more brown beads or wooden beads?

Formal operational stage (12+ years)

When many young adolescents enter secondary school at 12 or so years of age they are usually in Piaget's final stage of cognitive development. More complex thought processes are evident and their thinking becomes increasingly sophisticated through the combined effects of brain maturation and life experience. Some of the tasks used by Piaget to assess formal operational thinking involved processes of scientific inquiry, as in the pendulum problem described in box 5.10 on page 217. He believed that formal scientific reasoning is one of the most important characteristics of formal operational thinking (Inhelder & Piaget, 1958).

A key cognitive accomplishment in this stage is **abstract thinking** — a way of thinking that does not rely on being able to see, visualise, experience or manipulate in order to understand something (as required in the concrete operational stage).

For example, someone in the formal operational stage will be able to achieve an accurate understanding of the concepts of time and distance — what it means for something to have happened in 200 BC or how far 4000 kilometres really is. They will truly understand what freedom or fairness mean, the isms (such as racism, sexism and communism), the consequences of a parent losing their job, and why ethical issues need to be considered when conducting human research. They will also further develop their ideas about their own beliefs (such as whether God exists), their values (judgments about what is important or worthwhile in life) and morality (distinguishing between actions on the basis of 'right' or 'wrong').

Formal operational thinking also involves the ability to solve problems systematically. For example, this occurs when you develop strategies to solve a problem, identify a range of possible solutions, formulate hypotheses as possible explanations and test different solutions in an orderly way.

This type of thinking makes it easier to solve algebra and geometry problems than in any previous stage. And when considering a casual work vacancy, you may weigh up possible clashes with homework and sport training, the kind of work to be done, the pay rate, the work location, transport options, how many hours you can work and whether you are qualified before you actually apply.

Another type of logical thinking called deductive reasoning is also achieved. *Deductive reasoning* involves using logical rules to draw a conclusion from two or more pieces of information which are believed to be true. For example, consider the conclusion drawn below.

*If Sam sleeps in she will be late for school.
Sam was late for school.
Therefore Sam slept in.*

Deductive reasoning can be a useful way of solving some problems based on known information. However, the conclusion reached is not always correct even if it is logically reached. Consider this example.

*All elephants have big ears.
My teacher has big ears.
Therefore my teacher is an elephant.*

Idealistic thinking is also possible during the formal operational stage. For example, adolescents often think about the most desirable characteristics of themselves and others. They often compare themselves and others to a perfect standard and strive towards being like their ideal person. They have the ability to envisage alternatives to current national or global issues, but sometimes without fully considering what is realistically possible in a given time frame.

However, adolescents are able to realistically think about their future and what is possible, then make plans and set in place processes to achieve their goals. While a child at an earlier stage can identify that they want to be a truck driver or an astronaut, most children, prior to reaching the formal operational stage, do not have an accurate concept, or any concept at all, of what it means to be a truck driver or an astronaut. Nor do they have any real understanding of the steps involved in becoming either of these.



FIGURE 5.53 In the formal operational stage we can use abstract thinking to solve complex algebra problems at school.

BOX 5.10

An experiment by Piaget to assess formal operational thinking

One experiment used by Piaget to assess formal operational thinking involved the 'pendulum problem'.

Participants were shown several different weights which could be hooked on the end of a piece of string to make a pendulum. They were then asked to choose the length of the string, the weight to be attached and the height at which the weight should be released.

The problem involved working out which of the three factors (length, weight or height), or combination of factors, determines the speed at which the pendulum will swing. The solution involves changing one of the three factors while keeping the other two constant and seeing if it has any effect on speed.

Piaget found that children in the pre-operational or concrete operational stages randomly change one or more of the factors (length, weight or height), rather than changing them or testing their respective effects in a systematic and logical way. Consequently, children in these stages tend to find it difficult to solve the pendulum problem.

However, someone in the formal operational stage approaches the problem-solving task in a more systematic way and discovers more quickly that the length of the string is the factor that determines the speed of the pendulum (that is, the shorter the string, the faster a pendulum swings).

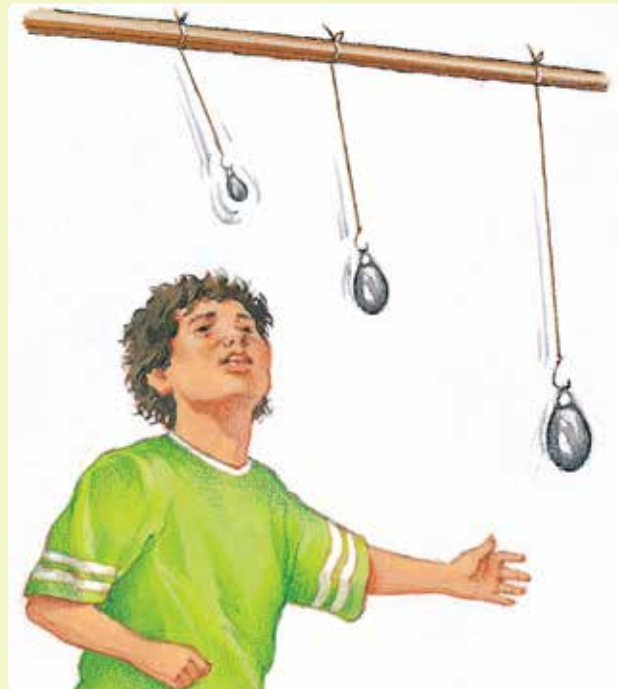


FIGURE 5.54 Does length, weight or height determine the speed at which a pendulum will swing?

LEARNING ACTIVITY 5.19

Summarising Piaget's theory

Complete the following table to summarise the various age-related stages of Piaget's theory, common ways of thinking and key cognitive accomplishments in each stage. Include a brief description of each accomplishment.

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Word copy of table

Stage	Approx. age range	Common ways of thinking	Key cognitive accomplishments

LEARNING ACTIVITY 5.20

Reflection

Comment on whether teachers should consider Piaget's theory when planning their courses and lessons.

LEARNING ACTIVITY 5.21

Media analysis

Many YouTube videos demonstrate key cognitive abilities or accomplishments in each of Piaget's stages. Some have been prepared by professionals for educational purposes and others by parents. Some are more informative or accurate than others.

Find a short non-professional video on each of the following:

- object permanence
- conservation of volume

- conservation of mass, number or length
- classification.

For each video:

- name the cognitive ability
- identify the stage and approximate age when it is accomplished
- outline the task shown
- identify the author
- comment on how accurately the video represents the ability and its accomplishment
- include a weblink.

PSYCHOSOCIAL DEVELOPMENT

Like Piaget, the German-born psychologist and psychoanalyst Erik Erikson (1902–1994) developed a stage theory of development, but focusing on personality development. His theory describes the impact of certain social experiences on personality development at various stages of the entire lifespan.

Erikson (1950) based his theory on extensive research mainly using case studies. He studied a range of people living in different cultures (for example, Denmark, Germany, wealthy American adolescents and indigenous Sioux Indians). He also made intensive studies of the lives of important historical figures (such as Martin Luther King who led the freedom movement for African-Americans in the 1950s and 1960s).

Erikson believed that personality development occurs through a combination of the effects of psychological processes which take place within individuals (*psycho*) and the experiences of individuals during their lifetimes, particularly their interaction with other people (*social*). This is why he called his theory **psychosocial development**.

Erikson viewed psychosocial development as a progression through eight sequential stages, with each stage corresponding with a different period in the lifespan. In each of these stages, the individual has to deal with a different psychosocial crisis that is normal for people at that time in life.

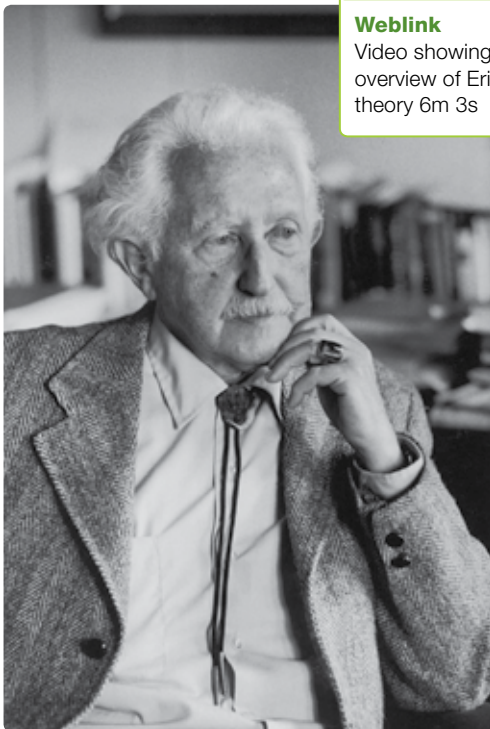


FIGURE 5.55 Erik Erikson (1902–1994)

eGuideplus

Weblink

Video showing an overview of Erikson's theory 6m 3s

A **psychosocial crisis** is a personal conflict an individual faces in adjusting to society. Each crisis involves a struggle between two opposing tendencies, one of which comes from our internal personal needs and the other from the demands of society, but both are experienced by the person. According to Erikson, our personality is shaped by how we deal with or resolve the psychosocial crises. The satisfactory resolution of these crises leads to a healthy personality and a productive lifestyle.

In relation to Erikson's theory, a *crisis* is not a catastrophe but a turning point in life. The way in which each crisis is resolved can have either a *positive* (good) or *negative* (bad) outcome, depending on the individual's ability to deal with that crisis. Erikson used the term crisis in the way that doctors do.

A crisis is like a patient being in a 'serious condition' for a period of time, at the end of which the patient takes a turn for the better or worse. However, Erikson did not believe that failure to resolve any psychosocial crisis will necessarily have consequences which are permanent or irreversible. He believed that setbacks in any stage can eventually be overcome with proper attention, care and love.

As shown in table 5.3, each of the eight crises involves a conflict between two characteristics which are the opposite of one another. One is a positive aspect and the other a negative aspect. Erikson believed that successful resolution of each crisis should be in favour of the positive characteristic. Erikson added, however, that the opposite negative aspect must also exist to some degree if healthy personality development is to occur. Therefore, resolution of the trust versus mistrust crisis in stage 1 involves developing the right mix of trust (to allow intimate relationships) and mistrust (for self-protection).

TABLE 5.3 Erikson's eight psychosocial stages

Stage	Age	Developmental period	Psychosocial crisis
1	birth to 12–18 months	early infancy	trust versus mistrust
2	18 months to 3 years	late infancy	autonomy versus shame or doubt
3	3 to 5 years	early childhood	initiative versus guilt
4	5 to 12 years	middle and late childhood	industry versus inferiority
5	12 to 18 years	adolescence	identity versus identity confusion
6	18 to 25 years	young adulthood	intimacy versus isolation
7	25 to 65 years	adulthood	generativity versus stagnation
8	65+ years	late adulthood	integrity versus despair

According to Erikson, the ages at which people go through each of the eight stages can vary because of each individual's unique life experiences. However, the order in which individuals progress through the stages is fixed. Erikson believed that it is necessary to experience each crisis (but not necessary to resolve each crisis) before proceeding to the next stage.

Erikson also believed that different stages can overlap, so it is possible for an individual to be dealing with more than one crisis at any particular time. For example, the crisis of trust versus mistrust in stage one is not necessarily resolved during the first 18 months of life. It can arise again in each successive psychosocial stage. It is possible to gain basic trust in early infancy then lose it later because of a negative social experience in some later stage in life. In addition, an individual may fail to resolve a crisis at one time but resolve that crisis in a later stage.

Erikson's description of the eight psychosocial stages is a 'picture' of what is *ideal*. According to Erikson, the better an individual deals with a psychosocial crisis in any stage, the healthier their psychosocial development and therefore personality development. However, not being able to resolve a crisis does not prevent the individual from moving into the next stage. Regardless of whether a psychosocial conflict is successfully resolved, individuals move into the next psychosocial stage because they mature and because of their changing social situations. However, according to Erikson, if a conflict is not resolved, it will have a negative effect on the individual's personality development and adjustment to society.

Erikson used the term **trust** broadly to refer to the views and expectations that infants develop about their world. He believed that when an infant has developed a healthy sense of trust, they will view the world as a predictable, safe, caring and happy place. When the world is predictable, the infant can anticipate reactions; for example, being able to rely on being fed when hungry, knowing that a cuddle and care will be given when they are hurt, or that help will arrive if they are stuck under a chair while crawling around a room. A predictable world also includes the knowledge that a frown or a firm 'no' will be a consequence of inappropriate behaviour.

According to Erikson, if an infant is to develop into a person who is trusting and trustworthy, the quality of care they receive is important. The infant whose needs are met when they arise, whose discomforts are quickly removed, who is cuddled, played with and talked to, forms a view of the world as a safe place and of people as caring, helpful and dependable.

Sometimes an infant's cry is answered immediately, sometimes it is ignored briefly then answered and sometimes the crying infant can be ignored and left for long periods. When infants' needs are not consistently recognised, their world can become unreliable and unpredictable. When care is inadequate, irregular or even rejecting, **mistrust** can develop. According to Erikson, if infants develop a strong sense of mistrust, they will become anxious and insecure. They may become fearful and suspicious toward the world and people in it, and this may continue to later stages of psychosocial development.

LEARNING ACTIVITY 5.22

Review questions

- 1 What does the term psychosocial mean?
- 2 Define psychosocial development.
- 3 Describe the relationship between psychosocial development and personality development.
- 4 What was Erikson's main source of research data?
- 5 (a) What is a psychosocial crisis and why is it said to occur?
(b) Give an example of a psychosocial crisis.
- 6 What is meant by the idea that resolution of a crisis should include the 'right mix' of both the positive and negative aspects? Explain with reference to an example.
- 7 How often might a particular psychosocial crisis occur in the course of a lifetime?

Stage 1: Trust versus mistrust (0 to 12–18 months)

Stage 1 involves a conflict between trust at one extreme and mistrust at the other. According to Erikson, to progress through this stage in the best way, the infant needs to develop the right balance of trust and mistrust.



FIGURE 5.56 Infants develop trust when their world is predictable; for example, being able to rely on being cuddled when they need it.

Erikson believed that, under certain circumstances, developing a sense of mistrust rather than trust can form the basis of antisocial behaviour later in life. On the other hand, trust in infancy builds the foundation for a lifelong expectation that the world will be a good and safe place.

The trust versus mistrust crisis is generally not resolved totally in infancy. It can arise again in later stages. For example, children who enter school with a sense of mistrust may, over time, learn to trust teachers who take the time to show them that they are trustworthy. It is also possible to gain basic trust in infancy and lose it later. Sometimes people who develop a sense of trust in infancy can lose it because of experiences later in life; for example, if a trusted partner betrays you by cheating on you.

Stage 2: Autonomy versus shame or doubt (12–18 months to 3 years)

Stage 2 involves a conflict between autonomy at one extreme and shame or doubt at the other. Erikson believed that successful attempts by infants to establish their independence as they become increasingly mobile and competent during these years contributes to a sense of autonomy.

Autonomy refers to the ability to do things independently and the feelings of self-control, self-confidence, self-reliance and competence which accompanies this. We have autonomy when we are in a position to make our own choices and act on those choices; for example, when we choose to stay where we are or to go somewhere else, or when we choose to do some particular thing or not do it.

Alternatively, a sense of being too dependent on others can lead to a lack of self-confidence, self-consciousness and feelings of **shame** or **doubt** about our capabilities. Although it is desirable for autonomy to be developed in stage 2, Erikson believed that a certain amount of self-doubt about our capabilities is appropriate. Infants need to know the right balance between what they can do, what's safe to do and what they should do, compared with the activities for which they are not yet ready.

According to Erikson, the psychosocial crisis of autonomy versus shame or doubt is based on the infant's developing motor and cognitive abilities. This is the time when infants gain more and more control over their bodies and aspects of

their behaviour. They learn to control some of their impulses and to feel pride in their accomplishments. Toddlers begin toilet training in this stage and exercise autonomy when they gain some control over their bowel and bladder. Both to toddlers and to caregivers this is an important achievement. Language skills are also important in developing autonomy. As infants get better at making themselves understood, they feel more powerful and become more independent.

During the second year of life, when infants can move about on their own and have discovered that they can cause events to occur, they begin to show their independence. They often want to explore, investigate and do things by themselves. The infant not only talks and walks, but also climbs, opens and closes things, pushes and pulls, holds and lets go. They take pride in these new accomplishments and often want to do things without help; for example, feeding themselves, buttoning clothes or flushing the toilet. In many respects, this second psychosocial stage is an 'all by myself' period.

Autonomy builds on the sense of trust developed in the first stage. Erikson believed that infants who have a well-developed sense of trust are also best prepared to become autonomous. This is because the caregiver is seen as a safe 'base' from which the infant can explore the world with increasing independence.

As time passes, these infants move further from their caregivers, often happily playing by themselves with only occasional glances to check that safety and security are nearby. By gently encouraging independence, by not immediately responding to every single request from the infant and by respecting the fact that the infant is an active, inquisitive person, caregivers promote the infant's development of autonomy.



FIGURE 5.57 An infant's eagerness to use a spoon to eat demonstrates their increasing autonomy.

If caregivers recognise the infant's need to do what they are capable of doing at their own pace and in their own time, then the infant develops a sense that they can control their muscles, their impulses, their behaviour and their environment — they have a sense of autonomy. However, when the infant's caregivers do for the infant what the infant is capable of doing themselves, they reinforce a sense of shame and doubt.

When caregivers are consistently overprotective and restrict what the infant is permitted to do, make fun of unsuccessful attempts at independence and criticise 'accidents' (for example, wetting, dirtying, spilling or breaking things), infants can develop an excessive sense of shame with respect to other people and they begin to doubt their own abilities to control the world and themselves.

Erikson believed that if the infant leaves this stage with less autonomy than shame or doubt, they will find it more difficult to achieve autonomy later in life. In contrast, the infant who moves through this stage with a much greater sense of autonomy than feelings of shame and doubt is better prepared to be autonomous in later stages of development.

Stage 3: Initiative versus guilt (3–5 years)

The third stage involves a conflict between initiative at one extreme and guilt at the other. Having established a sense of trust and autonomy in infancy, children develop an increasing sense of their own power and now want to try new things and use their power. According to Erikson, **initiative** involves being able to plan, think for oneself and carry out various kinds of activities with purpose.

Children from three to five years of age (the preschool years) are very active and increasingly have more control over their bodies. They can run, jump, wrestle, climb and ride a tricycle. Their mental capabilities are also developing. They have good language skills, they are inquisitive, they participate in imaginative play, and they are beginning to understand that other people have different thoughts and feelings from them. They also start to realise they can make things happen.

Children at this age no longer merely react. They plan and think for themselves, act with purpose, explore and follow their curiosity. They can therefore initiate and carry out various activities on their own, often just for the sake of being active. They no longer just respond to or imitate the actions of other children (Erikson, 1963).

Children at this age also become increasingly aware that there are limits beyond which they must not go when showing initiative and using their powers. For example, they become aware of rules about what is (and what is not) permitted, what will (and what will not) be tolerated, and even questions they should not ask. Thus, along with initiative comes the potential for feeling **guilt** — about

going too far, about overstepping boundaries, about asking too many inappropriate questions, about becoming the 'wrong kind of person' (Morris, 1990).

For example, consider the case of five-year-old Sumi who feels so angry at her little brother that she wants to hit him. Sumi also realises that hitting her brother is wrong and that this action would upset her parents. She knows she has the ability to hit her little brother, but realises she cannot always do what she wants. She also realises that she will feel guilty if she fails to control her behaviour. In the autonomy stage (stage 2), children can be made to feel ashamed by other people; whereas in this third stage they learn to make themselves feel ashamed.

According to Erikson, whether or not a child leaves this stage with a stronger sense of initiative than guilt depends largely on the way in which caregivers respond to the child's self-initiated activities. Children who are given a lot of freedom and the opportunity to initiate play activities simply for the sake of doing them will have their sense of initiative strengthened.

Initiative is also strengthened when caregivers answer their children's questions (intellectual initiative) and do not discourage or make fun of their fantasies. However, if children are made to feel that their play is silly and stupid, that their questions are annoying or a nuisance, and that fantasy is a waste of time, then they may develop a sense of guilt over self-initiated activities, feelings that may continue through later stages (Elkind, 1971).



FIGURE 5.58 Initiative involves being able to think for yourself and acting with a purpose.

Stage 4: Industry versus inferiority (5–12 years)

Stage 4 involves a conflict between industry at one extreme and inferiority at the other. During this period, which corresponds with the primary school years, children have a desire to learn how things are made, how they work and what they do. According to Erikson, children will develop a strong sense of industry, unless they are restricted by feelings of inferiority or inadequacy.

During stage 4, children gain mastery over their bodies. It is also a period during which they become capable of logical reasoning, and of playing and learning by rules. For example, it is not until this stage that children are really able to 'take turns' at games that require them to obey rules, such as when playing tag or card games.

Although play continues to be important, as it is in all other stages, this is the period when the child must learn to work and become productive. According to Erikson, children must learn the technology or 'tools' which are important for being an industrious, productive worker in their society. In New Guinea, the Arapesh boy learns to make bows and arrows and traps, and the Arapesh girl learns to plant, weed and harvest. In Western, industrialised societies such as Australia, the basic tools required to become a productive, industrious worker later in life involve literacy (reading and writing) and numeracy (using numbers). These tools are mainly learned in school.

At school, the child also learns to be a worker and to earn recognition by producing things of quality, both by themselves and with others. Importantly, school also exposes the child to many

peers with whom they cooperate and compete, and against whom they measure their abilities and accomplishments. To the five-year-old child, entering school is like entering a new world which is different from home. In many respects, school is a social world with its own goals, rules, achievements and failures.

When children are encouraged in their efforts to get the most out of things they already have, to do practical things (whether it be to cook, assemble a jigsaw puzzle, or construct a cubby house), are allowed to finish their products and are praised and rewarded for their results, then their sense of **industry** is enhanced. But parents who see their children's efforts as 'mischief' and 'making a mess' promote the development of a child's sense of inferiority. When children feel less adequate than their peers in achievements, skills and abilities, they develop a sense of **inferiority**.

The child's school experience also affects their industry–inferiority balance. For example, a child who has difficulties with schoolwork can have a particularly unhappy school experience, even when their sense of industry is encouraged and rewarded at home. This child may be 'too bright' to be in special classes, but 'too slow' to compete with children of average ability. Consequently, the child regularly experiences failure in academic efforts and this reinforces their sense of inferiority. However, children who have their sense of industry 'squashed' at home can have it revitalised at school through a sensitive and encouraging teacher.

Therefore, whether the child develops a sense of industry or inferiority does not depend solely on the caregiving efforts of the parents (as it does in earlier stages), but on other significant adults in the child's life as well (Elkind, 1971).



FIGURE 5.59 In stage 4, children learn the basic 'tools' that will enable them to become productive, industrious workers later in their lives.

Stage 5: Identity versus identity confusion (12–18 years)

Stage 5 involves resolving the conflict between identity at one extreme and identity confusion at the other. During this period, which corresponds with adolescence, the psychosocial crisis is about developing a sense of identity. Failure to resolve this crisis produces 'identity confusion'. Erikson used the term **identity** to refer to the overall image individuals have of themselves. He believed that identity is something all people seek and that the search for identity is a lifelong search. However, it first comes into focus during adolescence.

During adolescence, the individual matures cognitively as well as emotionally and physically. In addition to the new feelings, sensations and desires that are experienced as a result of bodily changes, the adolescent develops a variety of new ways of looking at and thinking about the world. Among other things, adolescents can think about how other people think and contemplate what others think of them. They can also form clear ideas about ideal families, religions, cultures and societies which they can then compare with their own experiences of family, religion, cultures and societies.

Erikson believed that the task of this fifth stage is for adolescents to use their cognitive abilities to bring together all the things they have learned about themselves in the various roles they have undertaken in life; for example, as a son or daughter, brother or sister, student, sportsperson, friend, leader, follower, musician, employee and so on. The different images of the self learned through these different roles need to be combined into a complete image of the whole person that makes sense and that shows continuity with the past while preparing for the future. The adolescents who succeed at this

task develop a psychosocial identity, a sense of who they are, where they have been and where they want to go in life.

If the person has reached adolescence with a healthy sense of trust, autonomy, initiative and industry, then their chances of developing a meaningful sense of

identity are much better. The opposite is true for the person who enters adolescence with considerable mistrust, shame, doubt, guilt and inferiority. According to Erikson, preparation for a successful adolescence and forming an integrated psychosocial identity must, therefore, begin in infancy.

When young people do not attain a sense of personal identity, they show a certain amount of **role confusion** — a sense of not knowing who they are, where they belong, to whom they belong or where they are headed in life. According to Erikson, such confusion is often seen in 'delinquent young people'. Some young people seek a 'negative identity' opposite to the one that their parents and

relatives would prefer them to have; for example, an identity as a 'delinquent', 'metal head' or a 'petrol head'.

Role confusion may also be evident when a young person takes an excessively long time to reach adulthood. However, a certain amount of identity confusion is normal and, according to Erikson, helps explain the inconsistency, or changeable nature, of much adolescent behaviour, as well as adolescents' self-consciousness about their appearance.

Failure to establish a clear sense of personal identity during adolescence does not mean that a person is a failure or will never establish a strong sense of who they are. People who attain a sense of identity in adolescence will still come across challenges to that identity as they move through life (Elkind, 1971; Grotevant, 1992; Harter, 1990).



FIGURE 5.60 Role confusion can cause some young people to adopt a 'negative identity', which is opposite to their parents' preferences.

Stage 6: Intimacy versus isolation (18–25 years)

The sixth stage of psychosocial development involves a conflict between intimacy at one extreme and isolation at the other. Failure to resolve this conflict results in avoiding interpersonal relationships and experiencing a sense of isolation. Erikson used the term **intimacy** to refer to the ability to share with and care about another person without fear of losing oneself in the process.

Isolation refers to the sense of being alone without anyone to share one's life with or care for.

During later adolescence and the early years of adulthood, it becomes possible for the first time to engage in a truly intimate relationship with another person outside the family; to love another person for their real qualities and not just for the satisfaction that can be obtained from the relationship.

According to Erikson, this kind of relationship cannot occur earlier in life because a person cannot establish true intimacy without first developing a strong sense of personal identity and independence and being secure in their place in the world. People who do not fully understand who they are find it difficult to deal with the complete and open sharing that is required in an intimate relationship.

Erikson's description of intimacy versus isolation may provide some insight into people who avoid commitment to another person in a relationship. Furthermore, a person without a strong sense of identity tends to frequently seek praise, flattery and adoration from others, and this interferes with the shared commitment and honest communication that are essential for an intimate relationship to develop and last. People who lack a sense of identity tend to isolate themselves, or form superficial or shallow relationships with others (Grotevant, 1992; Morris, 1990).

According to Erikson, intimacy does not necessarily involve sex and it includes the relationship between friends. For example, soldiers who have served together under the most dangerous circumstances often develop a sense of commitment to one another that illustrates intimacy in its broadest sense. If a sense of intimacy is not established with friends or a partner, the result, in Erikson's view, is a sense of isolation (Elkind, 1971).

As with other psychosocial crises, the development of intimacy does not occur only during the stages of late adolescence and young adulthood. Nor do individuals stop seeking intimacy after the early adulthood stage. Intimacy, like identity, continually changes over time and is influenced by experiences later in life.



FIGURE 5.61 Intimacy involves sharing and caring with someone else without fear of losing oneself in the process.

Stage 7: Generativity versus stagnation (25–65 years)

Stage 7 corresponds with adulthood and involves a psychosocial crisis of generativity at one extreme and stagnation at the other. **Generativity** refers to a person's concern with others beyond their immediate family, with future generations and the nature of the society and world in which those generations will live. Basically, people who achieve generativity build their lives around doing things that help others, will leave a lasting mark on future generations and will make the world a better place in which to live.

Erikson believed that people go through this psychosocial crisis towards the middle of the seventh stage when they look ahead to the latter half of their lives and feel a need to participate in the continuation of life. According to Erikson, if this need is not met, people develop a sense of stagnation. **Stagnation** refers to boredom, inactivity, too much concern with personal needs and comforts and a lack of personal growth.

According to Erikson, having children is an important part of generativity for many people. He did not believe, however, that everyone needs to become a parent in order to be generative. Nor did he believe that parenthood guarantees that someone will be generative.

Generativity is sometimes achieved by becoming involved in activities which promote the development of younger people; for example, as a sport coach, member of a school council or involvement with some other youth organisation.

Generativity can also be achieved by actively participating in groups concerned with social or environmental problems, such as youth unemployment and climate change. Similarly, work with community agencies, volunteer work for welfare groups and service on committees dealing with social or environmental problems provides opportunities for generativity. In all these examples, the act of helping is in itself satisfying and recognition or reward is not sought.

Many adults also achieve a sense of generativity through their paid work. Working creatively, skilfully or productively in a job that has a lasting influence on the lives of other people can help develop a strong sense of generativity and a lasting feeling of pleasure and satisfaction. This could apply to jobs in fields such as teaching, nursing, legal aid, social work, scientific research and engineering. Some people in middle adulthood change careers in an effort to find a job that provides a greater sense of generativity and lasting satisfaction (Morris, 1990).



FIGURE 5.62 Generativity can be achieved by becoming involved in activities which promote the development of younger people.

According to Erikson, becoming generative is not always easy. It depends on the successful resolution of the crises in each of the previous six stages. Furthermore, the attainment of generativity can be difficult in a youth-oriented society that seems eager for older people to step aside and let younger, more 'technologically savvy' workers take over. Thus, older workers can lose opportunities for generativity by not being able to pass on the wisdom and skills they have developed over the years (Dacey & Travers, 1991).

As in Erikson's other psychosocial stages, it is the balance of the positive and negative aspects of the crisis which is important. For example, some stagnation can provide a break that leads to greater generative activity in the future. However, too much stagnation can result in an obsession with oneself, severe depression or despair in the next stage.

Stage 8: Integrity versus despair (65+ years)

The eighth and final stage occurs when most of a person's life's work is nearing completion and there is time for reflection. The last psychosocial crisis to be faced is integrity versus despair.

According to Erikson, the sense of integrity arises from the individual's ability to look back on their life with satisfaction. **Integrity** refers to a sense of satisfaction with one's achievements in life and a belief that all that happened in the course of one's life has been useful, valuable and meaningful. The major part of life has been lived and the crisis of integrity involves an examination of that life and a judgment of whether that life, with all its ups and downs, gains and losses, good decisions and mistakes, pleasures and pains, was worthwhile.

At the other extreme is the individual who looks back on life with a sense of despair. **Despair** involves bitter feelings of hopelessness, involving lost opportunities, mistakes that were made and the sense that life has been meaningless and empty. In the latter years of life, the individual may realise with despair that time seems to have run out and it is too late to do all the things they want to do.

While a person must achieve a greater sense of integrity than despair for the successful resolution of the final crisis, Erikson believed that some despair is inevitable. For example, he suggested that even if someone felt completely fulfilled with their life, the fact that other people have suffered throughout their lives may make them feel some despair.



FIGURE 5.63 Integrity develops from looking back at achievements in life with satisfaction.

LEARNING ACTIVITY 5.23

Summarising Erikson's theory

Complete the following table to summarise Erikson's psychosocial theory of personality development by including a name and description of each psychosocial crisis.

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Stage	Age	Developmental period	Psychosocial crisis	Description of crisis
1	Birth to 12–18 months	Early infancy		
2	18 months–3 years	Late infancy		
3	3–5 years	Early childhood		
4	5–12 years	Middle and late childhood		
5	12–18 years	Adolescence		
6	18–25 years	Young adulthood		
7	25–65 years	Adulthood		
8	65+ years	Late adulthood		

LEARNING ACTIVITY 5.24

Identifying Erikson's psychosocial stages of development

Identify the psychosocial crisis most likely to be unresolved in each of the following examples. Explain the person's feelings and behaviour in terms of Erikson's theory.

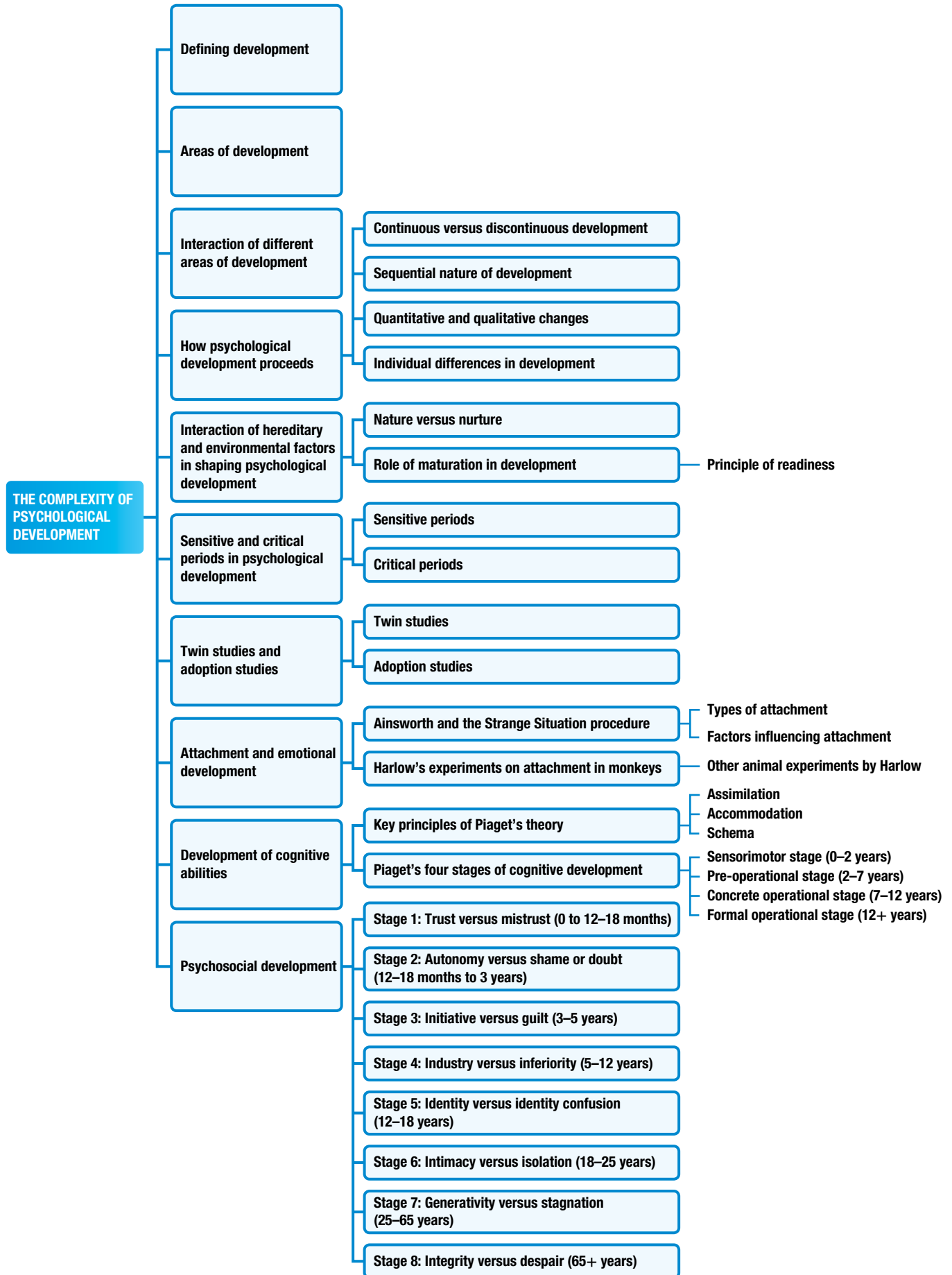
- 1 A new employee is reluctant to do a task on their own for fear of making a mistake.
- 2 A 28-year-old woman constantly gives others compliments seeking to get compliments in return.
- 3 A 38-year-old has had three broken engagements in the past 10 years.
- 4 A solicitor decides to take up politics and runs for a state government seat in parliament because she is passionate about 'making a difference' to the environment.
- 5 An adolescent boy is reluctant to develop friendships with females after his girlfriend was unfaithful.
- 6 An adult wishes they could relive their working life so they could do it better.
- 7 A 10-year-old continually misbehaves in class to avoid doing schoolwork.
- 8 An adolescent girl always waits to be asked to join in social activities.

LEARNING ACTIVITY 5.25

Reflection

What insight has Erikson's theory enabled about your own personality development?

CHAPTER SUMMARY



CHAPTER 5 TEST

SECTION A — Multiple-choice questions

Choose the response that is **correct** or that **best answers** the question.

A correct answer scores 1, an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No marks will be given if more than one answer is completed for any question.

Question 1

Which of the following can be considered to be a developmental change?

- A. being in a good mood after getting back a maths test result
- B. trying bungee jumping for the first time
- C. having a good night's sleep after not having slept well for three nights
- D. regularly speaking in public without getting anxious after having learnt a strategy to manage anxiety

Question 2

Maturation means that

- A. physical development and psychological development occur independently of one another.
- B. the brain and nervous system need to be sufficiently developed before someone can think, feel or behave in a particular way.
- C. psychological development does not occur in a sequential way.
- D. if someone practises any skill they will become competent at that skill.

Question 3

A person's genetic make-up is determined

- A. at conception.
- B. at birth.
- C. during childhood.
- D. when they reproduce.

Question 4

In psychology, nature refers to

- A. the natural tendency to control one's own development.
- B. the influence of genetic inheritance on development.
- C. the influence of an individual's experiences throughout infancy.
- D. the influence of an individual's experiences throughout their lifetime.

Question 5

Which of the following statements about the effects of heredity and environment on psychological development is most correct?

- A. Heredity is more important than the environment in shaping psychological development.
- B. The environment is more important than heredity in shaping psychological development.
- C. Environmental influences are stronger than the influence of heredity in psychological development.
- D. Genes provide the plan for how development will proceed and environmental influences determine how that plan unfolds in determining psychological development.

Question 6

The correct sequence of the stages of cognitive development described in Piaget's theory is

- A. sensorimotor, concrete operational, pre-operational, formal operational.
- B. sensorimotor, formal operational, concrete operational, pre-operational.
- C. sensorimotor, pre-operational, concrete operational, formal operational.
- D. pre-operational, sensorimotor, formal operational, concrete operational.

Question 7

According to Ainsworth's attachment theory, infants form the strongest attachment to

- A. people most closely involved with them.
- B. people they like.
- C. people who spend the most time with them.
- D. only one person.

Question 8

Infants who form a secure attachment are likely to

- A. treat their caregiver as a stranger.
- B. feel safe and able to depend on their caregiver.
- C. feel safe in the presence of all people.
- D. show some distress but gradually increase exploration when the caregiver departs.

Question 9

An infant who demonstrates an insecure resistant attachment pattern of behaviour

- A. avoids forming an attachment.
- B. will not seek to be close to their caregiver.
- C. seeks to be close to the caregiver then wriggles to be freed from them.
- D. will not be distressed when separated from their caregiver.

Question 10

Trinh believes that the clouds 'look sad today'. Piaget refers to this way of thinking about objects as

- A. animism.
- B. centricism.
- C. classification.
- D. transformation.

Question 11

According to Piaget, logical and abstract thinking are not consistently apparent until an individual has reached the ____ stage.

- A. sensorimotor
- B. pre-operational
- C. formal operational
- D. concrete operational

Question 12

In developing his theory of personality development, Erikson primarily relied on evidence from

- A. case studies.
- B. experiments.
- C. cross-sectional studies.
- D. observational studies.

Question 13

Bree and Emma's father bought them a strawberry Big M each while out shopping. He decides to pour the milk out of each carton into different glasses and his daughters watch him do this. Emma's glass is much wider than Bree's glass and she complains that Bree has been given more milk than she has.

It is likely that Emma has yet to develop an understanding of

- A. classification.
- B. conservation of mass.
- C. conservation of volume.
- D. conservation of length.

Question 14

How many stages are there in Erikson's theory of personality development?

- A. 5
- B. 6
- C. 7
- D. 8

Question 15

Erikson proposed that the order in which people go through his stages is

- A. varied.
- B. fixed.
- C. age-related.
- D. sex-related.

SECTION B — Short-answer questions

Answer **all** questions in the spaces provided. Write using black or blue pen.

Question 1 (1 mark)

According to Harlow's research, _____ is a vital factor influencing attachment in rhesus monkeys.

Question 2 (2 marks)

Explain the meaning of attachment in relation to psychological development.

Question 3 (4 marks)

Describe two factors that influence the development of attachment and how each relationship factor can influence that type and quality of an attachment.

Question 4 (2 marks)

Compare and contrast sensitive and critical periods in development with reference to two key differences.

Question 5 (3 marks)

Explain why the results of adoption studies may be compared with those of twin studies to understand how nature and nurture can influence psychological development.

Question 6 (3 marks)

Distinguish between Piaget's processes of assimilation and accommodation with reference to an example.

Question 7 (3 marks)

(a) What is abstract thinking? 1 mark

(b) Give an example of abstract thinking. 1 mark

(c) In which stage of Piaget's theory is it accomplished? 1 mark

Question 8 (3 marks)

A child is unable to classify correctly. Explain this inability with reference to centration.

Question 9 (3 marks)

(a) Explain what a psychosocial crisis is with reference to one of the crises identified by Erikson. Ensure you correctly name the crisis. 2 marks

(b) How do psychosocial crises shape personality development? 1 mark

Question 10 (2 marks)

Describe two common criticisms of Piaget's theory.

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The answers to the multiple-choice questions are in the answer section at the back of this book and in eBookPLUS.

The answers to the short-answer questions are in eBookPLUS.