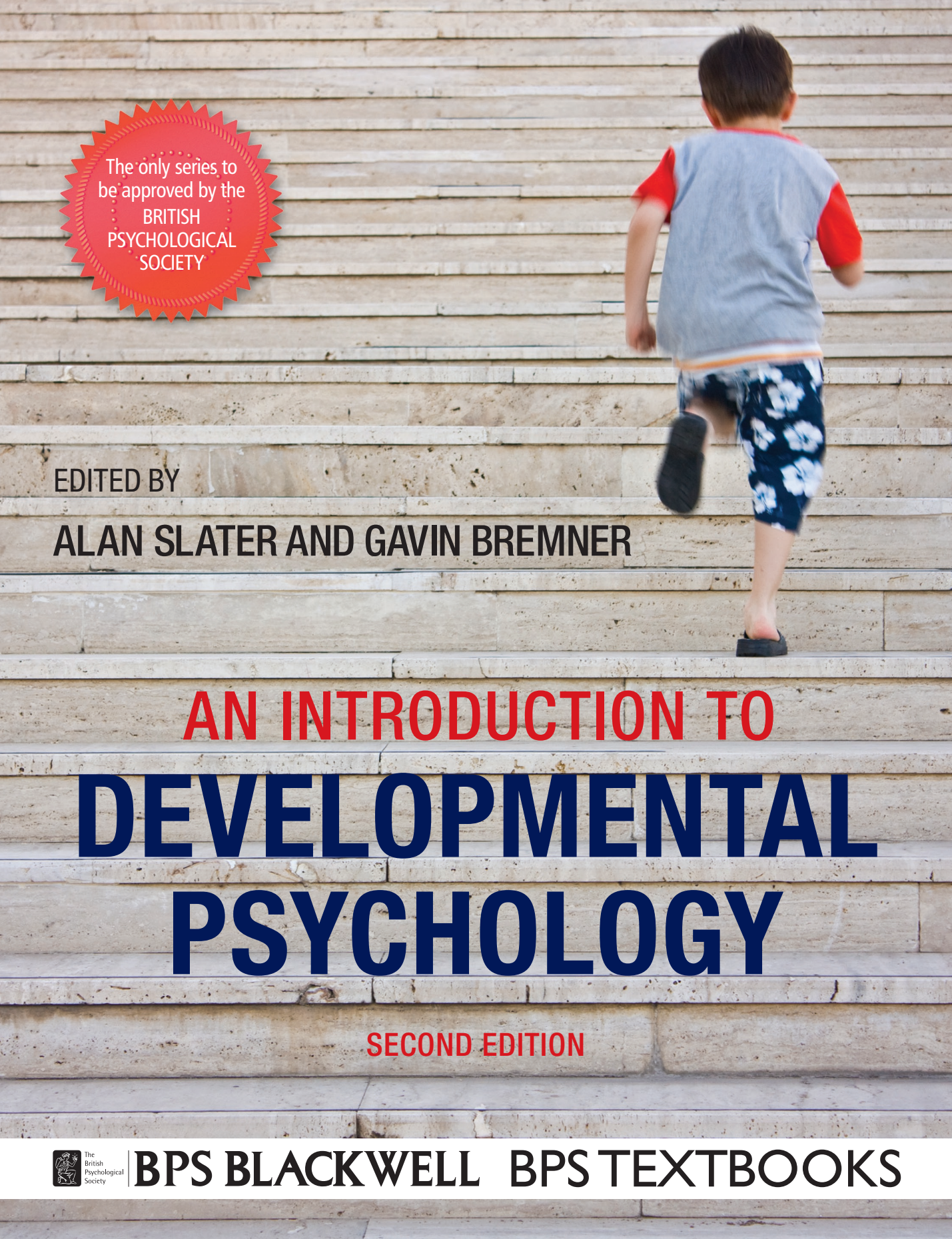

EDITED BY

ALAN SLATER AND GAVIN BREMNER

AN INTRODUCTION TO DEVELOPMENTAL PSYCHOLOGY

SECOND EDITION

The British Psychological Society | BPS BLACKWELL BPS TEXTBOOKS

An Introduction to Developmental Psychology

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Brief Contents

2 Theories and Issues in Child Development

Scott P. Johnson, Alan Slater & Ian Hocking

KEY TERMS

accommodation • animism • assimilation • behaviour genetics • behaviourism • bottom-up structures • castration complex • centration • cephalocaudal trend • chromosomes • classical conditioning • cognitive adaptations • concrete operations stage • connectionism • conservation tasks • constructivism • constructivist theory • continuity versus discontinuity • critical period • dynamic systems theory • ego • egocentric • Electra complex • ethological approaches • formal operations stage • functional invariants • gender constancy • gender development • hardware • hierarchy of needs • humanistic theory • id • imprinting • information processing • introspectionism • law of effect • maturation • mechanistic world view • microgenetic studies • monotropy • motor milestones • nature–nurture issue • object unity • observational learning • oedipus complex • operant conditioning • organismic world view • perception of causality • precocial species • preoperational stage • primary drives • proximodistal trend • psychoanalysis • psychoanalytic theory • psychosexual stages • psychosocial stages • reaction formation • reductionism • schemas • self-actualization • sensitive period • sensorimotor stage • social cognitive theory • social learning theory • stability versus change • strange situation • strategies • superego • theory of development • top-down structures • zone of proximal development

CHAPTER OUTLINE

OVERVIEW

This chapter sets the theoretical background for the material in the chapters to follow. The coverage of theoretical approaches is broad, and will give the reader a good introduction to the diversity of explanations of children's development.

First, different theories of motor development are outlined, and the authors point to the advantages of dynamic systems theory according to which motor development is a product of the interplay between brain structure, the structure and dynamics of the body, and the structure of the environment.

Next, the chapter considers theories of cognitive development. Piaget's stage theory is central here, and receives a thorough treatment. His theory is contrasted with the information processing account. Whereas Piaget's theory treats early deficits in thought as due to lack of logical ability, information processing accounts identify processing deficits as the problem, in particular, limitations in memory.

A large number of theoretical approaches stress the social environment in some way or other. Vygotsky's theory treats higher cognitive structures as coming from the social world, becoming internalised as a result of interactions with knowledgeable others. Behaviourist theories are all based on the principle that the social world, and in particular the parents, shape the behaviour of the individual, and the best example of application of these accounts to child development is Albert Bandura's social learning theory.

Other theories have their origins in evolutionary theory, and the best example in developmental psychology is attachment theory, originally formulated by John Bowlby, according to which formation of a secure emotional attachment between infant and caregiver is a vital prerequisite for emotional stability. Attachment theory is closely related to psychoanalytic approaches, the prime example being Freud's theory of psychosexual development, according to which emotional problems in adulthood can be traced to problems the child encountered in one of the psychosexual stages. Humanistic theories bear certain similarities to psychoanalytic theory. For instance, Maslow's account proposes a hierarchy of needs that humans must achieve to reach a satisfactory adult state.

The authors summarise the sections on theories by pointing out, through examples, the fact that different theories are not necessarily mutually exclusive. Often, one theory explains some aspects of behaviour, while another theory fills in more of the story.

The chapter ends by summarising some key issues that will reappear in the pages that follow, namely the nature–nurture issue, stability versus change, and continuity versus discontinuity in development. Different theories very clearly say different things with respect to these distinctions, and the challenge for developmental psychology is to weigh these different accounts against each other.

THEORIES IN CHILD DEVELOPMENT

Es gibt nichts Praktischeres als eine gute Theorie.

Emmanuel Kant (1724–1804)

or …

There is nothing so practical as a good theory.

Kurt Lewin (1944, p. 195)

INTRODUCTION

Human development is rich, varied, and enormously complex. We should not expect, therefore, that any single theory of development will do justice to this complexity, and indeed no theory attempts to do this. Each theory attempts to account for only a limited range of development and it is often the case that within each area of development there are competing theoretical views, each attempting to account for the same aspects of development. We will see some of this complexity and conflict in our account of different theoretical views, and in Chapter 1 we have seen that different ways of studying children lead to different developmental functions, and these are linked with different theoretical views.

Before beginning our account of theories of development it is helpful to say what we mean by a theory, as this is a term that has many definitions. For our purposes a **theory of development** is a scheme or system of ideas that is based on evidence and attempts to explain, describe and predict behaviour and development. From this account it is clear that a theory attempts to bring order to what might otherwise be a chaotic mass of information – for this reason we can see why 'there is nothing so practical as a good theory'!

theory of development a scheme or system of ideas that is based on evidence and attempts to explain, describe, and predict behaviour and development.

In every area of development there are at least two kinds of theory which we can call the minor and the major. What we are calling *minor* theories are those which deal only with very specific, narrow areas of development. So, for example, there are theories about the way in which eye movements develop, about the origins of pointing, and so on. *Major* theories are those which attempt to explain large areas of development, and it is these that are the focus of this chapter.

To make our account of theories more orderly and understandable, we have divided them into six broad groups:

- Motor development
- Cognitive development
- Social-cognitive development
- Evolution and ethology
- Psychoanalytic theories
- Humanistic theory

MOTOR DEVELOPMENT

One of the most obvious signs of development in infancy is the baby achieving the various **motor milestones**. Parents are very proud of these acquisitions and they are a focus of parental conversations about their infants – 'Billy can sit now', 'Helen has just started to crawl', 'Jimmy can walk without help', 'Rachel loves to climb up

motor milestones the basic motor skills acquired in infancy and early childhood, such as sitting unaided, standing, crawling, walking.

stairs'. The development of motor skills has very important implications for other aspects of development. The ability to *act* on the world affects all other aspects of development, and each new accomplishment brings with it an increasing degree of independence. For example, when infants begin to crawl they become independently mobile and one of the major transitions in early development begins. These changes affect emotional and social development, communication, appreciation of heights, and an understanding of distance and space (Campos *et al.*, 2000).

Table 2.1 charts the sequence of development of various motor milestones during infancy. At birth the infant has a number of well-developed motor skills, which include sucking, looking, grasping, breathing, crying – skills that are vital for survival. However, the general impression of the newborn is one of uncoordinated inability and general weakness. Movements of the limbs appear jerky and uncoordinated, and it takes a few weeks before infants can lift their head from a prone position. The muscles are clearly unable to support the baby's weight in order to allow such basic activities as sitting, rolling over, or standing. By the end of infancy, around 18 months, all this has changed (Figure 2.1). The toddler can walk, run, climb, communicate in speech and gesture, and use the two hands in complex coordinated actions.

The questions that a theory of motor development needs to explain include the following: Do the early motor activities prepare the way for the more complex voluntary activities that follow, and if so, how do they do it? How do new motor patterns (such as pointing, running, speaking, tool use) develop since they appear to be qualitatively different from earlier patterns? As we shall see, the answers to these questions are complex.

If you look at Table 2.1 two things will become apparent. First is that the different motor milestones emerge in a regular sequence – sitting with support, sitting unaided, crawling, standing, walking, and climbing appear almost always in this order. The second is that there is a considerable age range in which individual infants achieve each skill – for example, some infants crawl at 5 months while others are as late as 11 months. These two aspects of motor development give separate support to the two major theories of motor development that we will discuss here – *maturational theories* and *dynamic systems theory*.

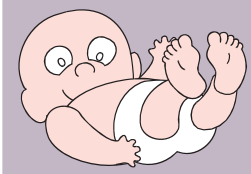
Maturational theories

One of the first psychologists to investigate human motor development was Arnold Gesell, who studied hundreds of hours of films of motor activity in longitudinal studies of children from birth to 9 years (e.g., Gesell & Ames, 1940). He concluded that motor development proceeded from the global to the specific in two directions. One direction is called the **cephalocaudal trend** and is from head to foot along the length of the body – that is, control of the head is first, then the arms and trunk, and finally control of the legs. The other direction of development is what is called the **proximodistal trend**, which is that motor control is from the centre of the body outwards to more peripheral segments – that is, the head, trunk, and

cephalocaudal trend motor development that proceeds in infancy from head to foot along the length of the body.

proximodistal trend the development of motor control in infancy which is from the centre of the body outwards to more peripheral segments.

Table 1 *The development of motor skills in infancy*

Age	*Gross Motor Skills*	*Fine Motor Skills*
1–3 months 	Stepping reflex, lifts head, sits with support.	Grasps object if placed in hands, sucks, control of eye movements, the first smile.
2–4 months	When prone lifts head and uses arms for support.	Grasps cube when placed near hand.
5–8 months	Sits without support.	Reaches for and grasps object, using one hand.
5–10 months	Stands with support, and pulls self to stand.	Points at object of interest, grasps with thumb and finger ('pincer grip').
5–11 months	Crawls.	Grasps spoon, gradually learns to direct food to mouth!
10–14 months 	Stands alone, and walks alone.	Puts objects into small containers, builds 'tower' of cubes. Produces first meaningful word.
13–18 months	Walks backwards and sideways, runs, climbs, walks up stairs.	Holds crayon with fingers, scribbles energetically.
18–30 months 	Runs easily, jumps, skips, rides and steers tricycle, walks on tiptoe.	Vocabulary and articulation increases rapidly, picks up small objects (e.g. candy/sweets).

pelvic girdle are brought under control before the elbow, wrist, knee, and ankle joints, which in turn lead to finer control over hands and fingers.

These two invariant sequences of development, together with the regular sequence with which the motor milestones are achieved, led Gesell to the view that *maturation* alone shapes motor development – development is controlled by a maturational timetable linked particularly to the central nervous system and also to muscular development. Each animal species has its own sequence, and experience has little, if any, effect on motor development.

One of the first researchers to question Gesell's hypothesis was Myrtle McGraw (1945). She tested pairs of twins where one member of each pair received enriched motor training (in reaching, climbing stairs, and other motor skills) and found that in the trained twin motor development was considerably accelerated when compared with the 'untrained' twin.

FIGURE 2.1 *The 18-month-old can walk, run, climb and has the fine motor skills to feed themselves*

In addition to McGraw's findings there are other considerations which suggest that a purely maturational account of motor development can be largely dismissed. Here are just two such considerations. First, the fact that motor skills develop in a regular sequence does not prove a genetic cause. Consider advanced skills such as learning to play a sport, typing, driving, and playing the piano. In these instances we can see an invariant sequence of development, as we progress from simple actions to more complex integrated skilful behaviour, but nobody would suggest that these skills are genetically determined! Second, a maturational theory does not account for the considerable individual differences in the acquisition of various motor skills.

dynamic systems theory a theoretical approach applied to many areas of development which views the individual as interacting dynamically in a complex system in which all parts interact.

Clearly, a different theoretical account of motor development is needed, and here we describe one of the most recent of these, known as the **dynamic systems theory** of motor development.

Dynamic systems theory

What has become apparent is that infants (and children) develop skills in different ways. As an example, there are some infants who simply do not like to crawl and these will often stand and walk before they crawl, indicating that the motor milestones referred to earlier are not set in stone. Those infants who do crawl will acquire it in their own individual ways – some will shuffle on their bellies before crawling on hands and knees, others will skip the belly-crawling stage, and still other infants will

microgenetic studies studies of development that observe individual children in great detail from the time they first attempt a new skill, such as walking or crawling, until it is performed effortlessly.

forgo the crawling stage entirely, and after several months of sitting and shuffling may stand and then walk (Adolph & Joh, 2007). In addition to these observations there are what are called **microgenetic studies** of motor development in which experimenters observe individual infants or children from the time they first attempt a new skill, such as walking or crawling, until it is performed effortlessly (e.g., Gill, Adolph & Vereijken, 2009). From these studies it becomes clear that infants' acquisition of a new motor skill is much the same as that of adults learning a new motor skill – the beginnings are usually fumbling and poor, there is trial and error learning and great concentration, all gradually leading to the accomplished skilful activity, which then is usually used in the development of yet new motor skills.

According to the dynamic systems theory all new motor development is the result of a dynamic and continual interaction of three major factors: (1) nervous system development; (2) the capabilities and biomechanics of the body; (3) environmental constraints and support (Thelen & Spencer, 1998). We can illustrate this dynamic interplay by considering three separate studies on infant kicking, reaching and sitting, and walking.

Infant kicking

Esther Thelen (1999) tested 24 three-month-olds on a foot-kicking task in which each infant was placed in a crib in a supine (lying on their back) position and a soft elastic ankle cuff was attached to one leg, and the cuff, in turn, was attached by a cord to an overhead brightly coloured mobile. By kicking the leg the babies could make the mobile dance around and they quickly learned to make this exciting event happen. In this condition the *other* leg – the one that was not connected to the mobile movements – either moved independently or alternately with the attached leg (Figure 2.2).

Then Thelen changed the arrangement by yoking the legs together. She did this by putting ankle cuffs on both legs, and joining the two together with a strip of Velcro. What happened then was that the infants initially tried to kick the legs separately – because moving the legs alternately is the more natural action – but gradually learned to kick both together to get the mobile to move.

This study shows that the infants were able to change their pattern of interlimb coordination to solve a novel, experimentally imposed task.

Infant reaching

Thelen and Spencer (1998) followed the same four infants from 3 weeks to 1 year (a longitudinal study) in order to explore the development of successful reaching. Their aim was to look at the interrelationship between different motor systems. What they found was that infants acquired stable control over the head several weeks before the onset of reaching, then there was a reorganisation of muscle patterns so that the infants could stabilise the head and shoulder. These developments gave the infants a stable base from which to reach, and successful reaching followed. This is an indication that infants need a stable posture before they can attain the goal of reaching successfully, and is a clear demonstration that new motor skills are learned through a process of modifying and developing their already existing abilities.

FIGURE 2.2 *The ankle ribbon attached to the baby's foot causes the mobile to jiggle about when she kicks her legs*
This is an example of operant conditioning, the infant learns the contingency between kicking and reward

Source: Carolyn Rovee-Collier, reprinted with permission.

Infant walking

Newborn infants are extremely top heavy, with big heads and weak legs. Over the coming years their body weight is gradually redistributed and their centre of mass gradually moves downwards until it finishes slightly above the navel. Adolph and Avolio (2000, p. 1148) put it rather nicely – 'It is as if infants' bodies are growing to fit their comparatively large heads'! This means that as infants and children grow they need constantly to adjust and adapt their motor activities to accommodate the naturally occurring changes to their body dimensions. There can be few clearer demonstrations that the motor system is dynamic and constantly changing than this simple fact.

Adolph and Avolio give a nice demonstration of the way in which infants can make adjustments over a very short period of time. They tested 14-month-olds by having them wear saddlebags slung over each shoulder. The saddle bags increased the infants' chest circumference by the same amount in each of two conditions: *feather-weight* – filled with pillow-stuffing, weighing the negligible amount of 120 g – and *lead-weight* – the not so negligible amount of between 2.2 and 3.0 kg, which increased their body weight by 25 per cent and raised their centre of mass (raising the centre of mass leads to increased instability, and is similar to a backpacker carrying a heavy pack). They found that the lead-weight infants were more cautious, and made prolonged exploratory movements – swaying, touching and leaning – before attempting to walk down a slope. That is, these infants were testing their new-found body dimensions and weight, and adjusted their judgements of what they could and could

not do. These findings again demonstrate that infants do not have a fixed and rigid understanding of their own abilities, and have the dynamic flexibility to adjust their abilities as they approach each novel motor problem.

Overview

Despite the apparent appeal of maturational theories of motor development, research over the last 20 years has demonstrated that motor skills are learned, both during infancy and throughout life. The apparently invariant ordering of the motor milestones is partly dictated by logical necessity – you can't run before you can walk! – and is not necessarily invariant (you *can* walk before you can crawl!) From a consideration of the studies described above it becomes clear that motor development cannot be accounted for by any maturational theory. These and other findings contribute to the 'emerging view of infants as active participants in their own motor-skill acquisition, in which developmental change is empowered through infants' everyday problem-solving activities' (Thelen, 1999, p. 103).

The emphasis on children as active participants in their own development is an essential characteristic of the theoretical views offered by 'The Giant of Developmental Psychology', Jean Piaget, whose claim was that children's ability to act on the world underlies their cognitive development, and we now turn our attention to his views.

COGNITIVE DEVELOPMENT

Piaget's theory of development

> Everyone knows that Piaget was the most important figure the field has ever known …[he] transformed the field of developmental psychology.
>
> *(Flavell, 1996, p. 200)*

> Once psychologists looked at development through Piaget's eyes, they never saw children in quite the same way.
>
> *(Miller, 1993, p. 81)*

> A towering figure internationally.
>
> *(Bliss, 2010, p. 446)*

Piaget's contribution to our understanding of children's development has been quite extraordinary, and his influence is reflected in this book – in particular Chapters 5 (infancy), 9 (early and middle childhood), 16 (adolescence), and 19 (education), and in these chapters alternatives to Piaget's account of development are also given. In order to see why he had such an impact we will first describe the state of developmental psychology before Piaget, and then describe some of the fundamental aspects of human development that he described which changed our view of development. We follow this with a brief account of the *stages of development* that he described, and finally give an overview of his enormous contribution to developmental psychology.

Developmental psychology before Piaget

Before Piaget revolutionised our understanding of children's development psychology was dominated by the influence of the two diametrically opposed theoretical views of *behaviourism* and **psychoanalysis**. Both of these views are discussed later, and for the moment we will restrict our comments to note that, despite the fact the they are strikingly opposed, they share one essential feature, which is that the child is seen as the passive recipient of their upbringing – development results from such things as the severity of toilet training, and of rewards and punishments. Neither approach gives much credit to the child in shaping their own course of development. With Piaget, all this changed . . .

psychoanalysis the theoretical view, first developed by Sigmund Freud, that much of our behaviour is determined by unconscious factors.

Fundamental aspects of human development, according to Piaget

Children are active agents in shaping their own development, they are not simply blank slates who passively and unthinkingly respond to whatever the environment offers them. That is, children's behaviour and development is motivated largely *intrinsically* (internally) rather than *extrinsically*.

For Piaget, children learn to adapt to their environments and as a result of their **cognitive adaptations** they become better able to understand their world. Adaptation is something that all living organisms have evolved to do and as children adapt they gradually construct more advanced understandings of their worlds.

cognitive adaptations children's developing cognitive awareness of the world. As a result of cognitive adaptations they become better able to understand their world.

These more advanced understandings of the world reflect themselves in the appearance, during development, of new stages of development. Piaget's theory is therefore the best example of the **organismic world view** that we discussed in Chapter 1, which portrays children as inherently active, continually interacting with the environment, in such a way as to shape their own development.

organismic world view the idea that people are inherently active and continually interacting with the environment, and therefore helping to shape their own development. Piaget's theory is an example of this world view.

Since children are active in developing or constructing their worlds Piaget's theory is often referred to as a *constructivist theory*. In the next sections we will first discuss the ways in which children adapt to their environments, and next give an account of the stages of development that Piaget put forward.

Adaptation: Assimilation and accommodation

In order to adapt to the world two important processes are necessary. **Assimilation** is what happens when we treat new objects, people and events as if they were familiar – that is, we *assimilate* the new to our already-existing schemes of thought. Examples would be: we meet a new policeman (or doctor, professor . . .) and treat them as we habitually treat policemen, doctors or professors. Assimilation occurs from the earliest days – the infant is offered a new toy and puts it in their

assimilation the process through which children incorporate new experiences into their preexisting *schemas* – that is, they *assimilate* the new to their already-existing schemes of thought. An important process in Piaget's theory.

accommodation the cognitive process through which children adapt to new experiences by modifying their preexisting *schemas*. An important process in Piaget's theory.

schemas mental structures in the child's thinking that provide representations and plans for enacting behaviours.

functional invariants processes that do not change during development, such as accommodation and assimilation in Piaget's theory.

sensorimotor stage in Piaget's theory, the first stage of *cognitive development*, whereby thought is based primarily on action and internalized thinking is largely absent. This stage is characteristic of infants from birth to about 2 years old.

preoperational stage a stage of development described by Piaget in which children under the age of approximately 7 years are unable to see enough aspects of problems in order to solve them.

concrete operations stage the third Piagetian stage of development in which reasoning is said to become more logical, systematic, and rational in its application to concrete objects.

formal operations stage the fourth Piagetian stage in which the individual acquires the capacity for abstract scientific thought. This includes the ability to theorise about impossible events and items.

mouth to use the familiar activity of sucking; the child meets a new teacher and treats them in the same way they treat teachers.

Accommodation is where individuals have to modify or change their **schemas**, or ways of thinking, in order to adjust to a new situation. For example: infants might be presented with a toy that is larger than those they have previously handled, and so will have to adjust their fingers and grasp to hold it; when children meet a new teacher who is different from their previous teachers they have to adjust their way of thinking to understand the new person. It is worth stressing that assimilation and accommodation always occur together during infancy and the examples given above are both cases of assimilation and accommodation occurring together.

Throughout life the processes of assimilation and accommodation are always active as we constantly strive to adapt to the world we encounter. These processes, therefore, are what can be called **functional invariants** in that they don't change during development. What do change are the cognitive structures (often called schemes) that allow the child to comprehend the world at progressively higher levels of understanding. According to Piaget's view there are different levels of cognitive understanding that take the child from the activity-based sensorimotor functioning in infancy to the abstract levels of thought found in adolescence.

The four stages of cognitive development

Children move through four broad stages of development, each of which is characterised by qualitatively different ways of thinking (Piaget, 1962). These stages are the **sensorimotor stage** of infancy, the **preoperational stage** of early childhood, the **concrete operations stage** of middle childhood, and the **formal operations stage** of adolescence and beyond. We will give a brief account of each of these stages, together with the approximate ages at which they are found – note that these ages are only approximate and individual children's development will often be slower or quicker.

Sensorimotor stage (birth to 2 years)

This is one of the most impressive and dramatic areas of development. The child changes from the helpless newborn to the thinking and knowing toddler, that is, to the cognitive individual with a 'mind'. These changes take place as a result of the infant's actions on the objects and people in its environments, and this stage is the development of *thought in action*. As a result, infants learn to solve problems, such as pulling a cloth to obtain an out-of-reach toy, and they learn that objects continue to exist even though they cannot be seen or heard. As the stage draws to a close the infant, now a toddler whose language is developing rapidly, is able to reason through thought as well as through sensorimotor activities.

Preoperational stage (2 to 7 years)

Preschool children can solve a number of practical, concrete problems by the intelligent use of means-end problem solving, the use of tools, requesting objects, asking for things to happen, and other means. They can communicate well and represent information and ideas by means of symbols – in drawing, symbolic play, gesture, drawing, and particularly speech.

These abilities continue to develop considerably during the preoperational stage, but there are some striking limitations to children's thinking during this period. Children tend to be **egocentric** (find it difficult to see things from another's point of view). They display **animism** in their thinking (they tend to attribute life and lifelike qualities to inanimate objects, particularly those that move and are active, such as the wind and the clouds, and sometimes trees and other objects. Here is Piaget asking a child about the sun, which follows you around as you move: *Piaget* – 'Is it alive?' *Child* – 'Of course, otherwise it wouldn't follow us, it couldn't shine' (Piaget, 1960, p. 215). Their thinking tends to be illogical, and at times seems quite magical – it is at this stage that children believe in Santa Claus! What underlies children's thinking during the preoperational stage is the lack of a logical framework for thought, and this appears during the concrete operations stage.

egocentric an egocentric child is one who finds it difficult to see things from another person's point of view. Not to be confused with egotistical.

animism a characteristic of children's thinking in Piaget's *preoperational stage* in which they tend to attribute life and life-like qualities to inanimate objects, particularly those that move and are active.

Concrete operations stage (7 to 11 years)

One major characteristic of preoperational thought is called **centration** – the focusing or centring of attention on one aspect of a situation to the exclusion of others. This is clearly demonstrated in Piaget's **conservation tasks**. A typical conservation problem is the conservation of number. In this problem the child is shown two rows of candies/sweets, such as M & Ms© or Smarties© in one-to-one correspondence and with each having six candies. The child is simply asked 'Look what I do' and is not questioned about the number in each row. Then, while the child watches, one M & M or Smartie is added to one row so that it has seven. Next, the other row is stretched out so that it *looks* as though it has more, but in reality it has less.

Then the child is asked 'Which row would you like?' Preoperational children will usually ask for the longer row – they focus on the increase in length and ignore the addition of one candy/sweet to the other row. However, the child at the concrete operations level knows that one has been added to the shorter row, and since nothing has been subtracted by the action of stretching out the other row, knows that the shorter row contains more – and will therefore ask for the shorter row. If you have access to a 4- and a 7-year-old and are allowed to give them candies/sweets then this is an interesting experiment to do with both of them – the younger child will want the longer row, and the older child the shorter, and neither understands the reasoning of the other!

In addition to mastering conservation, the concrete operational child becomes better at a number of tasks that share the same underlying logic, and these are discussed in detail in Chapter 9.

centration the focusing or centering of attention on one aspect of a situation to the exclusion of others.

conservation tasks tasks that examine children's ability to understand that physical attributes of objects, such as their mass and weight, do not vary when the object changes shape.

The formal operations stage (from about 11 years)

The concrete operations child becomes able to solve many problems involving the physical world, but the major limitation in their thinking is to do with the realm of possibilities. When children enter the final stage of cognitive development – the *formal operations stage* – this limitation is removed. The adolescent now becomes able to reason in the way that scientists do – to manipulate variables to find out what causes things to happen – and is also introduced to the realm of possibilities and hypothetical thought. Adolescents (and adults) spend many hours discussing abstract matters – Does God exist? – Why do we need politics? – Should abortion be allowed? – What is the meaning of life? A more detailed account of adolescent thinking is given in chapter 16.

Overview

In Piaget's theory we have a comprehensive and detailed account of cognitive development from birth to adulthood. Cognitive development proceeds through a series of stages, each more complex than the last, and each building on the achievements of the previous one. In many respects, aspects of Piaget's theory seem obvious – of course children are active in shaping their own development. But it was many years before his theories began to make an impact on American and British psychology. This was primarily due to three factors. First, American and British psychology was dominated by the theoretical school of thought known as behaviourism, which offered the **mechanistic world view** that the child is inherently passive until stimulated by the environment and so the opposing view offered by Piaget took time to be accepted. Second, Piaget only ever wrote in French, which made his work less accessible to English-speaking psychologists. And, third, while Piaget was a brilliant thinker, his writings are often extraordinarily complex and difficult to understand!

mechanistic world view the idea that a person can be represented as being like a machine (such as a computer), which is inherently passive until stimulated by the environment.

Piaget's full impact awaited the arrival of one man who could summarise, synthesise and present his theoretical views in a way that was comprehensible and available to the English-speaking world. This was John H. Flavell whose *The Developmental Psychology of Jean Piaget* appeared in 1963 (and in the foreword to this book Piaget wrote 'I am not an easy author; hence it must have required an immense effort at comprehension and intellectual empathy to have produced the clear and straightforward presentation that is found here'). More recently, Flavell (1996) wrote an assessment of Piaget's contribution, entitled 'Piaget's legacy' and quotes an anonymous reviewer of his article – 'The impact of Piaget on developmental psychology is . . . too monumental to embrace and at the same time too omnipresent to detect', to which Flavell simply adds the words 'I agree'.

INFORMATION PROCESSING APPROACHES

Information processing approaches view the human mind as a complex system through which information flows. Information processing accounts of human cognition include current views of memory formation, with terms such as *encoding,*

storage, retrieval, **strategies**, *metamemory*, and this account is given in Chapter 13. A brief account of information processing explanations of cognitive changes in adolescence is given in Chapter 16.

information processing the view that *cognitive processes* are explained in terms of inputs and outputs and that the human mind is a system through which information flows.

Information processing theories are rooted in three 20th-century innovations. The first is the rapid and continuing advances in computer technology. The second is the view, revolutionary at the time, that an organism's behaviour cannot be understood without knowing the structure of the perceiver's environment—for example, the structure of light reflected from objects (Gibson, 1979). The third is **constructivism**, a theory about how perception 'fills in' information that cannot be seen or heard directly, such as inferring the parts of an object that are hidden from view via processes of inference. Piaget's theory is also regarded as a 'constructivist' view, because the child is proposed to *construct* their knowledge from existing perceptual and cognitive skills. Gibson's theory is also a constructive view, but primarily concerned with how we construct our perceptual, rather than cognitive, world. Gibson's theory and constructivism were opposed to a theoretical viewpoint that was dominant at mid-century, *behaviourism*, whose principal tenet was that our knowledge of an organism is limited exclusively to what we can observe, and a position that avoided discussions of what goes on *inside* the mind. Investigations of both perception and cognition and their development, therefore, were severely constrained and, ultimately, unsatisfying – hence the need for new theoretical approaches.

strategies knowledge built up to solve particular problems.

constructivism Piaget's theoretical view that infants are not born with knowledge about the world, but instead gradually construct knowledge and the ability to represent reality mentally.

Information processing theories, therefore, focus on the information available in the external environment, and the means by which the child receives and interprets this information. This way of thinking can provide clarity with respect to understanding many aspects of cognitive development. The task of the developing child is to use their perceptual systems – vision, hearing, touch, and so forth – to explore the world and obtain information about its properties. The information must be attended to, encoded, stored, retrieved, and acted upon to build knowledge of objects and their characteristics.

In contrast to Piaget's theory, information processing theories are not the product of one person's work, but instead represent a number of scientists working with a common set of assumptions. In the following sections we provide some recent examples.

bottom-up a cognitive development process beginning with the 'input' or uptake of information by the child, and building complex systems of knowledge from simpler origins.

Cognitive development in infancy

According to the information processing approach, cognitive development proceeds in **bottom-up** fashion beginning with the "input," or uptake of information by the child, and building complex systems of knowledge from simpler origins. (This is opposed to **top-down** fashion in which the state of the system is specified or presumed, and then working to discover its components and their development, a view more consistent with nativist theory.) For young infants, sensory and perceptual skills are relatively immature, and this may impose limits on knowledge acquisition. An important part of a

top-down a cognitive development process in which the state of the system is specified or presumed, and then working to discover its components and their development, a view more consistent with nativist theory.

research agenda, therefore, is investigations of how infants assemble the building blocks of knowledge.

A prominent example of this approach comes from the work of Les Cohen and colleagues, who asked how infants come to perceive *causality*, as when one object bumps into another and causes it to move. Two parameters are especially important to perceive causality: temporal and physical proximity. When a billiard ball strikes another and makes it move, for instance, the second ball moves immediately upon contact. When an event is arranged so that the second ball moves after a brief delay (violating temporal proximity) or before being contacted by the first ball (violating physical proximity), 6-month-old infants did not seem to perceive the event as causal (Leslie, 1984). (This was learned by reversing the events and observing infants for evidence that they saw a reversal of the causal relation). Cohen and Amsel (1998) repeated this experiment and tested younger infants, and discovered that 4-month-olds perceived the 'components' of each event – that is, the motions of the individual objects – but not their causal relation. In information processing terms, the younger infants processed the *lower-order* units involved in the event but not the *higher-order* relations, and this suggests that development of causal perception between 4 and 6 months consists in noticing the higher-order, complex relations among objects and their motions.

perception of causality when one object collides with another and causes it to move.

object unity when two parts of an object are visible but its centre is hidden by another object – do infants perceive the visible parts to be connected?

A second example of the information processing approach comes from the work of Scott Johnson and colleagues, who asked how infants perceive **object unity**, as when two parts of an object are visible but its centre is hidden by another object – do infants perceive the visible parts to be connected? As in the case of causal perception, younger infants perceive the components but not the wholes – in this case, they perceive the parts of a partly hidden object but do not see it as a single unit (Johnson, 2004). Amso and Johnson (2006) found that unity perception depends on the extent to which infants actually look at the object parts, as opposed to other parts of the scene (this was ascertained by measuring infants' eye movements with an eye tracker device). Development of object perception, in particular object unity, therefore, consists again in detecting the higher-order relations among lower-order components.

Cognitive development in childhood

In childhood, the task of building knowledge often comes down to determining which of the many 'strategies' are available to solve particular problems. This idea has been investigated rigorously by Robert Siegler and colleagues in the area of mathematics instruction. A typical approach to this question involves examination of arithmetic strategies (learning to add by memorisation, counting on the fingers, and so forth) repeatedly in individual children as the school year progresses, and recording speed, accuracy, and strategy use. A number of strategic changes have been noted: incorporation of new strategies, identification of efficient strategies, more efficient execution of each strategy, and more adaptive choices among strategies (Siegler & Shipley, 1995). There are stable individual differences in strategy choice, but children typically use multiple strategies at all points of assessment. Children hone their choices with

experience and thus come to solve problems more quickly and accurately. A more detailed account of Siegler's view of development is given in Chapter 9.

Connectionism and brain development

connectionism a modern theoretical approach that developed from *information processing* accounts in which computers are programmed to simulate the action of the brain and nerve cells (*neurons*).

Information processing theory also takes advantage of two new advances in cognitive science: the use of **connectionist models** and methods for recording brain activity in infants and children. Each is discussed in turn.

Connectionist models are computer programs designed to emulate (model) some aspect of human cognition, including cognitive development. The word 'connectionist' refers to the structure of the model, which consists of a number of processing units that are connected and that influence one another by a flow of activations. This is analogous to the brain, which likewise consists of processing units (neurons) that are connected and activate one another (across synapses). Connectionist models take in information, appropriately coded in a way that the computer can process, and provide a response, coded in a way that a human can understand. In between input and output are units, typically numbered in the dozens to the thousands, which process the information. The model learns by changing the activation strengths and connections among units. It is provided with multiple opportunities to process the information, and often some sort of feedback on how it is doing between trials, as impetus to improve performance. Because there is no knowledge built into a model, it is effectively a 'blank slate', and as such represents a model for learning in the human child. Initially the model has to guess at how it is to respond, but given enough training and feedback, it is capable of learning remarkably sophisticated kinds of information.

Connectionist models have been used to examine many aspects of perceptual and cognitive development. There is no single model of cognitive development *per se*, but instead modellers will choose a particular problem to emulate, design a model and a learning regimen, and probe the time course and nature of learning as it occurs. Two examples, relevant to infant development studies discussed previously, merit mention. In the first, Cohen *et al.* (2002) described a model of infant cognitive development that learned to discriminate the temporal and physical parameters that lead infants to perceive causality, and appeared to represent 'truly' causal events (to humans) uniquely, as more than the 'sum of the parts' (as do humans). In the second, Schlesinger *et al.* (2007) devised a model of infants' gaze patterns based on the idea of different brain systems that respond to specific visual features in an input image: luminance, motion, colour, and orientation. The model computed 'salience' based on competition among features, known to occur in real brains (Gottlieb *et al.*, 1998), and it directed its attention toward regions in the input of highest salience. The question was how infants learn to direct their attention to a partly hidden object, as part of the more general question of perception of object unity. The model learned to 'find' the object quickly and suggests that gaze control and salience, and the development of neural structures that support them, are a vital component of object perception in infancy. Other models of cognitive development incorporate a role for social interaction, physical

growth, genes and gene expression, and the development of circuits and networks in the brain, and as such epitomise both a major theoretical advancement and a more realistic representation of human development (Westermann *et al.*, 2007).

Summary

The theories and research we have described are motivated by multiple notions of information: the information available in the stimulus, the uptake of that information, the processing of the information by the individual, and the individual's response. Understanding of information at these different levels is a central task of information processing theory, and multiple methods are used in pursuit of this goal: empirical studies of infants and children (including close observations of behaviours at a 'microgenetic' scale), connectionist models, and recordings of brain activity.

Comparing information-processing approaches with Piaget's approach

Piaget's theory and information-processing approaches have quite a lot in common. Both attempt to specify children's abilities and limitations as development proceeds, and both try to explain how new levels of understanding develop from earlier, less advanced ones. More importantly, Piaget's theory and information processing theories share a focus on 'active' participation by the child in their own development. On both views, children learn by doing, by trying new strategies (and discarding many) and discovering the consequences, and learn by directing their attention appropriately.

However, they differ in several important ways. Information processing approaches place great importance on the role of processing limitations (another computing analogy) in limiting children's thinking and reasoning at any point in time, and also emphasise the development of stategies and procedures for helping to overcome these limitations – clear accounts of these with respect to memory development are given in Chapters 13 and 16. Piaget's theory does not discuss processing limitations, but rather discusses developmental changes in terms of the child gradually constructing logical frameworks for thought, such as *concrete operations* and *formal operations.*

Another important difference is that information processing accounts see development as unfolding in a continuous fashion, rather than in qualitatively different stages as Piaget suggested. To see how this difference might work consider the child who moves from Piaget's *preoperational stage* to the *concrete operations stage.* When presented with a conservation of number task the preoperational child centres attention on one aspect of the changed array – the increase in length – and ignores the other, equally important, aspect, which is that, in the example given above, a candy/sweet has been added to the smaller row. When the child is able to overcome this limitation they move to the qualitatively different level of thinking that characterises the stage of concrete operations. An information processing account, on the other hand, would simply say that the child's processing capacity has increased so that they are now able to hold two things in mind simultaneously, so that what underlies the apparently *qualitative* change in thinking is actually a *quantitative* change in processing capacity.

SOCIAL-COGNITIVE DEVELOPMENT

Whereas Piaget tended to focus on the individual child attempting to make sense of the world (given some basic tools) other researchers have been interested in the interaction between the child and their community – the social environment.

Vygotsky

Born in the same year as Piaget, the Russian psychologist Lev Semenovich Vygotsky (1896–1934) was one of the first to recognise the importance of knowledgeable adults in the child's environment. For him, the development of intellectual abilities is influenced by a *didactic* relationship (one based on instructive dialogue) with more advanced individuals. One fascinating facet of his work is the claim that higher mental abilities are first encountered and used competently in social interactions, only later being internalised and possessed as individual thought processes. For instance, language is used socially to quite a level of competence before it is internalised, reorganising thought in the process.

Thus, a major theme in Vygotsky's theories is that social interaction plays a fundamental role in cognitive development. He argued that there is a gap between what the child knows and what they can be taught. At a given stage of development the child has a certain level of understanding, a temporary maximum. A little beyond this point lies the **zone of proximal development (ZPD)**. This zone can be seen as representing problems and ideas that are just a little too difficult for the child to understand on their own. It can, however, be explored and understood with the help of an adult. Thus the adult can guide the child because they have a firmer grasp of the more complex thinking involved.

zone of proximal development (ZPD) the difference between what children can do on their own, and what they can do under adult guidance or in collaboration with more able *peers*.

Vygotsky died young (from tuberculosis) but he left an impressive amount of work (over 100 published articles and books) which continues to have an impact on developmental psychology. A comparison of Vygotsky's views with those of Piaget is given in Chapter 9, and his contribution to education is discussed in detail in Chapter 19.

introspectionism an approach to psychology common in the nineteenth century in which observers were asked to reflect on their thoughts, feelings, and perceptions.

Behaviourism and social learning theory

Early behaviourism

Towards the end of the nineteenth century, psychology experienced a swing away from the subjective perspective of **introspectionism** (the analysis of self-reported perceptions) towards a more objective method. This scientific approach to psychology had its roots in the work of Vygotsky's countryman, Ivan Petrovich Pavlov (1849–1936). Pavlov developed a grand theory of learning called **classical conditioning**. According to this theory, certain behaviours can be elicited

classical conditioning a method of learning first investigated by the Russian physiologist Ivan Pavlov in the early part of the 20th century. In this form of conditioning, certain behaviours can be elicited by a neutral (normally unstimulating) stimulus because of its learned association with a more powerful stimulus.

by a neutral (normally unstimulating) stimulus simply because of its learned association with a more powerful stimulus. For example, when food was presented to dogs at the same time as a bell, the bell would eventually cause a salivation response when presented on its own. The dogs learned an *association* between the two. This principle of conditioning is applicable to much human behaviour – you might find yourself salivating when the dinner bell sounds!

law of effect law or rule devised by the American psychologist Edward Lee Thorndike which states that the likelihood of an action being repeated is increased if it leads to reward, and decreased if it leads to punishment.

Many psychologists seized upon his ideas. Because of its fundamental nature, Pavlov's work had the potential to explain all forms of human behaviour and its development. It was combined with other theoretical notions such as Thorndike's **law of effect** (The likelihood of an action being repeated is increased if it leads to reward, and decreased if it leads to punishment) and *behaviourism* was born. With this, the pendulum swing towards objectivity was complete. In its most radical form – as espoused by early behaviourist John Watson (1878–1958) – behaviourism denies the role of the mind as an object of study and reduces all behaviour to chains of stimuli (from the environment) and the resulting response (the behaviour). Some took this very seriously indeed, and ascribed the mind's 'inner voice' to a sub-vocal tremor of the larynx. One behaviourist administered himself a muscle-relaxing nerve toxin in order to find out, but, despite his condition, his mind remained active along with his scientific zeal.

The early behaviourists' view of child development is quite simple. The infant is born with little more than the machinery of conditioning and infancy and childhood consists of constant warping and moulding under pressure of the environment. The child is passive and receptive and can be shaped in any direction. This view was clearly expressed by Watson (1970, p. 94):

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

reductionism the claim that complex behaviours and skills such as language and problem-solving are formed from simpler core processes, such as neural activity and conditioning, and can ultimately be understood in these simpler terms.

Any behaviours – even the most elaborate, like language – are towers built upon the foundations of very simple, repeated connections between a stimulus and its response. This has been termed a **reductionist** perspective because it reduces ostensibly complex phenomena to simpler core processes.

operant conditioning a form of conditioning investigated by B.F. Skinner. The training, or shaping, of an animal or human by rewarding them for producing the desired behaviour (or a close approximation to it) and/or either ignoring or punishing undesirable behaviours in order to stop them.

B.F. Skinner's behaviourism

Any discussion of behaviourism would not be complete without the inclusion of Burrhus Frederic Skinner (1904–90). He had an effect on his area of psychology perhaps greater than any other individual (and during his lifetime was regularly in the list of the most famous 10 Americans). Whilst the early behaviourists emphasised the passive nature of the child, Skinner envisioned a more active role. **Operant conditioning** differs from *classical conditioning* because children

operate (emit behaviours) on their environments. It is still the case that the child's development is dominated by their environment, but Skinner's viewpoint allowed for more flexible and generative patterns of behaviour. According to Skinner's view it is possible to shape the animal's or child's behaviour by manipulating the reinforcement received.

We can see the role of reinforcement in this brief account of infant behaviour (Skinner, 1961, p. 418):

> One reinforcer to which babies often respond is the flashing on and off of a table lamp. Whenever the baby lifts its hand, flash the light. In a short time a well-defined response will be generated. (Human babies are just as 'smart' as dogs or pigeons in this respect.) Incidentally, the baby will enjoy the experience.

It is certainly the case that our behaviour is guided by reward and punishment, and behaviourism continues to be used in the control of behaviour. Skinner gave an account of how parents may unwittingly promote undesirable behaviours, such as aggression, crying or shouting in their children. If, for example, the mother only gives the child attention when it is misbehaving, then her positive reinforcement of attention is likely to promote the very behaviour she does not want! The remedy is this (Skinner, 1961, p. 419):

> The remedy in such a case is simply for the mother to make sure that she responds with attention and affection to most if not all the responses of the child which are . . . acceptable . . . and that she never reinforces the annoying forms of behavior.

Social learning theory

social learning theory associated with Albert Bandura. The application of *behaviourism* to social and cognitive learning that emphasises the importance of *observational learning*, that is, learning by observation and then copying (imitating) the observed acts.

Whereas behaviourism had important but rather vague things to say about the child's acquisition of behaviour patterns, the work of Albert Bandura (1925–) examined particular behaviours in more detail. His behaviourism was less mechanistic than that of Skinner. He did not focus only on observable behaviour, but posited processing that occurred within the mind – a construct specifically denied by his behaviourist colleagues. His approach was initially named *sociobehaviourism*, then **social learning theory**.

During the 1960s Bandura carried out a series of experiments on childhood aggression. In one, some children were divided into two groups. The first ('control') group saw an adult playing with toys, one of which was an inflatable 'Bobo' doll. The second ('experimental') group saw the same adult, this time playing aggressively with the toys, hitting the doll with a hammer. When allowed to play individually, Bandura observed that children from the experimental group behaved in a more aggressive way towards their own Bobo doll.

observational learning situation in which people (especially children) learn by observing others and then copying (imitating) the observed acts.

So, without obvious reinforcement, a particular aggressive behaviour had been learned. Bandura termed this **observational learning** or 'vicarious conditioning'. In some sense, the child had *mentally* assumed the role of the observed person and taken note of any reinforcement. Bandura concluded that children imitate the actions of

others, based on perceived reinforcement. He followed up the Bobo-doll experiment with investigations into cartoon and film violence. The findings were clear: children imitated the aggressive behaviour.

Bandura's approach kept the essential components of behaviourism – that we learn by reinforcement and punishment of behaviour, in accord with the *Law of Effect* – and added the important dimension of learning by observation. Adults and others in the child's life provide models, and in humans learning by imitation is extremely common in all areas of social and cognitive development. Over the last 40 years social learning theory has become increasingly cognitive in its account of human learning and by the mid-1980s Bandura had developed the **social cognitive theory** of human functioning. This theory is a development of Social Learning Theory and emphasises humans' ability to exercise control over the nature and quality of their lives, and to be 'self-reflective about one's capabilities, quality of functioning, and the meaning and purpose of one's life pursuits' (Bandura, 2001, p. 1). Although not designed as a theory of child development social cognitive theory is currently being used to introduce social change in successful attempts to ameliorate global problems such as population explosions (Bandura, 2009).

social cognitive theory a theory that emphasises social factors in cognitive development.

ETHOLOGY AND EVOLUTION

Evolution

The theoretical basis of any evolutionary theory of development is, of course, evolution itself. The present form of the theory is largely identical to that developed by its founder, Charles Robert Darwin (Darwin was born on 12 February 1809 – the same day as Abraham Lincoln – and died on 19 April 1882). Perhaps the most important unit in evolution is the *gene*, which is the basic genetic material out of which **chromosomes** are formed. The term gene is also used in a vague way when talking about any heritable characteristic of an organism: eye colour, intelligence, or an inherited behaviour. When a set of genes leads to an overall advantage for an organism, the organism tends to produce more copies of itself. Those genes, therefore, will become more frequent in the *gene pool*. When a set of genes leads to an overall disadvantage, those genes will become less frequent. This means that as evolution proceeds any gene still in the gene pool will tend to be advantageous. The difficult concept to master is to remember this should apply to behaviours as well as physical characteristics.

chromosomes strands of DNA (deoxyribonucleic acid) and protein that contain the genes and provide the genetic blueprint for the animal or plant.

Evolutionary theories of child development that emphasise the genetic basis of many behaviours, and point to the adaptive and survival value of these behaviours, are known as **ethological approaches**.

ethological approaches approaches which emphasise the evolutionary origins of many behaviours that are important for survival, such as *imprinting*.

The ethological approach

The origins of ethology can be traced back to Darwin, and its modern foundations were laid by two European zoologists, Konrad Lorenz (1903–89) and Niko Tinbergen (1907–88), who pioneered the genetic analysis of development: they both shared the 1973 Nobel prize in Physiology or Medicine). They reasoned that certain behaviours in the young of many species would be genetic in origin because they (i) promote survival and (ii) are found in many species, including humans. One such behaviour is **imprinting**, which refers to the tendency of the newborn or newly hatched of **precocial species** of animals (which includes ducks, geese, sheep, horses) to follow the first moving objects they see. This behaviour involves the formation of an attachment between the infant and the mother (Figure 2.3). Clearly, imprinting is *adaptive* (adds to survival value) because it leads to a physical proximity between parent and offspring. As a consequence, the parent is always at hand to feed, give warmth, protect from predators and generally attend to the offspring.

Lorenz is famous for his experiments with young geese (goslings). He demonstrated that if the first moving object they saw after hatching was him then the unwitting goslings would imprint on him and follow him around (and even, as adults, attempt to mate with him!).

imprinting a period soon after birth or hatching in which the young of *precocial species* of animals (which includes ducks, geese, sheep, horses) follow the first moving objects they see.

precocial species those species of animals where the young are able to locomote almost immediately after birth or hatching. These include ducks, geese, sheep, and horses. The young will often *imprint* on and follow their mother, an instinctive response which has clear survival value for the young.

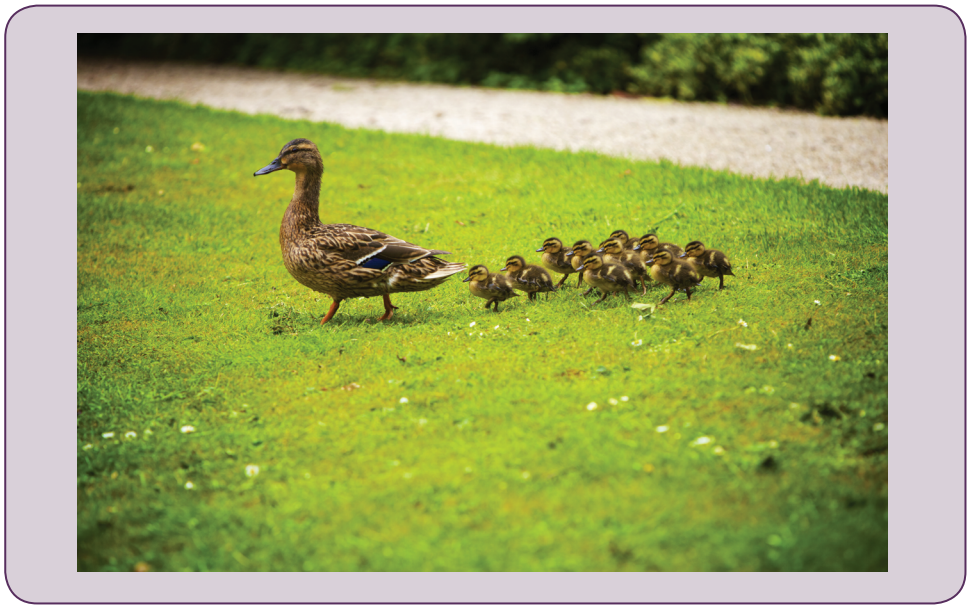


FIGURE 2.3 *Newly hatched chicks will follow their mother and siblings*

Source: © Jan de Wild/Shutterstock.

There are two implications of ethology's conception of behaviours. The first is that, for the most part, they require an external stimulus or target. For example, imprinting needs a target 'parent' – if this target does not exist, imprinting will either not take place, or will take place with an inappropriate target (cf. Lorenz's goslings). The second implication is one of time. Originally, ethologists envisioned a **critical period**, this being the length of time for the behaviour to grow to maturity in the presence of the right conditions (e.g. language developing in a rich linguistic environment). When this critical period expires, the behaviour cannot develop. These days, the evidence points towards a *sensitive* rather than critical period; behaviours may take root beyond this sensitive time period, but their development may be difficult and ultimately retarded.

critical period a limited period, usually early in an animal's life, in which the young have to be exposed to a particular skill or experience in order for it to be learned.

EMOTIONAL DEVELOPMENT

Attachment theory – John Bowlby and Mary Ainsworth

> Mother love in infancy and childhood is as important for mental health as are vitamins and proteins for physical health.
>
> *(Bowlby, 1952)*

The British physician and psychoanalyst John Bowlby was inspired by observations of imprinting, and was one of the first to offer an ethological and evolutionary interpretation of human development. The concluding comment to his 1952 book (given above) is one of the most widely quoted within developmental psychology. His contribution to our understanding of attachment formation in infancy and childhood continues to have an immense impact, and here we will give a very brief account of his views, and that of his American colleague Mary Ainsworth.

Prior to Bowlby the prevailing belief, stemming from Behaviourism is that the attachment of infants to their caregivers was a **secondary drive**, that is, because the mother (or **primary caregiver**) satisfies the baby's **primary drives** (these include hunger, thirst and the need for warmth) she acquires secondary reinforcing properties. However, Bowlby pointed out that the need for attachment was itself a primary drive (as the quote given above indicates, which is the conclusion to his 1952 report to the World Health Organization).

primary drives basic needs which include hunger, thirst, and the need for warmth. Bowlby and others have argued that an infant's need for attachment is also a primary drive.

Several lines of evidence have since supported this conclusion. In the 1950s and 1960s Harry Harlow and his colleagues (e.g. Harlow & Zimmerman, 1959) separated baby monkeys from their real mothers and offered them two surrogate (substitute) 'mothers'. One of these was made of wire, but had a nipple attached which provided food (and hence satisfied the primary drives of hunger and thirst). The other was made of soft cloth and provided no nutrition. What they found is that the baby monkeys fed from the 'wire mother', but cuddled up to the 'soft cloth mother', and ran

to 'her' when frightened by loud sounds. It therefore seemed reasonable to conclude that the 'soft cloth mother' provided what we can call *contact comfort*, and satisfied a basic or primary need.

Bowlby argued that there is an innate, instinctual drive in humans to form attachments that is as strong as any other primary drive or need. He put forward the principle of **monotropy**, which is the claim that the infant has a need to form an attachment with one significant person (usually the mother). This claim was later found to be overstated, because Rudolph Schaffer and Peggy Emerson (1964) found that infants often formed multiple attachments, and that in some cases their strongest attachment was to people such as the father, a grandparent, or peers, who did not fulfil basic caregiving activities, but who did engage in satisfying interactions ('quality time') with them (see Figure 2.4).

monotropy the view that the infant has a basic need to form an attachment with one significant person, usually the mother. A central claim in Bowlby's early theory of attachment formation.

Bowlby believed that the attachment system between infant and caregiver became organised and consolidated in the second half of the infant's first year from birth, and became particularly apparent when the infant began to crawl. At this time, infants tend to use the mother as a 'safe base' from which to begin their explorations of the world, and it then becomes possible to measure how infants react to their mother's departure and to her return. For these measures we are indebted to Mary Ainsworth, who trained with Bowlby, and who invented what is commonly called the **strange situation**. In this situation a baby (usually around a year old) and their mother enter an experimental room in which there are several toys. The mother sits on a chair and after a short while a stranger enters, at which point the mother leaves, only to return a few minutes later. An observer then notes the infant's response to several events – when the stranger enters, when the mother leaves and when she returns.

strange situation measure, devised by Ainsworth, of the level of attachment a child has with their parent.

FIGURE 2.4 *Infants will usually form multiple attachments*

Using the strange situation Ainsworth discovered that there are several attachment 'styles' that differ in degree of security. A detailed account of these attachment styles and of Bowlby's and Ainsworth's contribution in developing what is called *attachment theory* is given in detail in Chapter 6. For the moment we can conclude that their importance has been in demonstrating the importance of early secure attachments and showing that these attachments are as basic and important as any other human drive or motivation.

PSYCHOANALYTIC THEORIES

psychoanalytic theory most prominently associated with Sigmund Freud. Freud suggested that there are three main personality structures: the *ego*, the *id* and the superego.

id in Freud's theory, a primitive collection of urges with which an individual begins life. The id is responsible for an individual's 'primitive' instincts, such as eating and reproducing.

ego in Freud's theory, the ego can be thought of as the rational thought that evolved to control the urges of the ***id*** in order that they meet the demands of reality and maintain social approval and esteem.

superego in Freud's theory, a collection of ideals, an individual's morality. This is what we refer to as our conscience and it is often in conflict with our *id*.

psychosexual stages Freud argued that there were five stages of human development: oral (0–1 year), anal (1–3 years), phallic (3–5 years), latency (5 years–adolescence), and genital (adolescence onwards).

Sigmund Freud – The founder of psychoanalysis

For generations almost every branch of human knowledge will be enriched and illuminated by the imagination of Freud.

(Jane Harrison, 1850–1928)

His place is not, as he claimed, with Copernicus and Darwin, but with Hans Christian Anderson and the Brother Grimm, tellers of fairy tales.

(Hans Eysenck, 1916–97)

As will be apparent from the above, not everyone agrees that Freud's contribution to knowledge has been entirely positive! Freud claimed that much of our behaviour is determined by unconscious forces of which we are not directly aware. In presenting his **psychoanalytic theory** he suggested that there are three main structures to personality: the **id**, the **ego**, and the **superego**. The *id* is present in the newborn infant and consists of impulses, emotions and desires. It demands instant gratification of all its wishes and needs. As this is impractical the *ego* develops to act as a practical interface or mediator between reality and the desires of the id. The final structure to develop is the *superego*, which is the sense of duty and responsibility – in many ways the conscience.

The ego and the superego develop as the individual progresses through the five **psychosexual stages** – oral, anal, phallic, latency and genital – and these are described next.

The five psychosexual stages

Oral stage (approximately birth to 1 year)

The infant's greatest satisfaction is derived from stimulation of the lips, tongue, and mouth. Sucking is the chief source of pleasure for the young infant.

Anal stage (approximately 1 to 3 years)

During this stage toilet or potty training takes place and the child gains the greatest psychosexual pleasure from exercising control over the anus and by retaining and eliminating faeces.

Phallic stage (approximately 3 to 6 years)

This is the time when children obtain their greatest pleasure from stimulating the genitals. At this time boys experience the **Oedipus complex**. This expression derives from the Greek myth in which Oedipus became infatuated with his mother. In the Freudian account the young boy develops sexual feelings towards his mother but realises that his father is a major competitor for her (sexual) affections! He then fears castration at the hands of his father (the **castration complex**) and in order to resolve this complex he adopts the ideals of his father and the superego (the conscience) develops. If we return to Greek mythology, the noblewoman Electra remained obsessively bound, or fixated to the memory of her father Agamemnon. In the Freudian account, for little girls the **Electra complex** is when they develop feelings towards their father and fear retribution at the hands of their mother. They resolve this by empathising with their mother, adopting the ideals she offers, and so the girl's superego develops.

Oedipus complex an important stage of development in Freud's *psychoanalytic theory*. This expression derives from the Greek myth in which Oedipus became infatuated with his mother. In the Freudian account, the young boy develops sexual feelings toward his mother but realizes that his father is an important stage of development in Freud's *psychoanalytic theory*. This expression derives from the Greek myth in which Oedipus became infatuated with his mother.

castration complex in Freud's *psychoanalitic theory* where the young boy fears castration at the hands of his father.

Electra complex in Freud's *psycholanalytic theory* this is where little girls develop feelings towards their father and fear retribution at the hands of their mother.

Latency and genital stages (approximately 6 years to adolescence)

From around 6 years the torments of infancy and early childhood subside and the child's sexual awakening goes into a resting period (*Latency*, from around 6 years to puberty and adolescence). Then, at adolescence, sexual feelings become more apparent and urgent and the genital stage appears. In the latter 'true' sexual feelings emerge and the adolescent strives to cope with awakening desires.

Problems with Freudian theory

One of the main claims of Freudian theory is that much of what motivates us is determined unconsciously. By their very nature unconscious processes cannot be measured and so it is often claimed that belief in Freudian ideas is precisely that – beliefs rather than evidence-based claims. It is certainly the case that Freud's views are almost impossible to test. To illustrate this consider the Freudian notion of **reaction formation**. If you are harshly toilet trained as a child then the Freudian prediction would be that you become 'anally retentive', that is, you become excessively neat and tidy. However, if in some way you recognise this in yourself (maybe even unconsciously) then you can react against it (i.e. *reaction formation* occurs) and you actively become very untidy! What this means is that you can react against your upbringing and reverse the effects, which means in turn that it

reaction formation a term used in *psychoanalytic theory*. The individual may react, often unconsciously, to negative aspects of their personality.

is impossible to predict the child's development despite the fact that the first 6 years from birth are supposedly critical in determining later personality formation.

Psychoanalysis, then and now: An overview

Freudian theory has been of immense importance in pointing out two possibilities. One is that early childhood can be immensely important in affecting and determining later development (a position also adopted by people such as Bowlby, whose views are given above), and the other is that we can be driven by unconscious needs and desires of which we are not aware. Thus, if we did not go through one of the childhood psychosexual stages very well, this could reflect itself in later adult disorders such as neurotic symptoms, but we would not be aware of the causes of the problem. The only way to come to terms with this would be intensive sessions of psychoanalysis (see Figure 2.5) in which the analyst tries to discover what it is that went wrong in your childhood that is causing your current problems.

The theory is largely unsupported by scientific evidence. Thus, there is little evidence that the Oedipus and Electra complexes occur. Additionally, if events occurring in early childhood can have different outcomes (as a result of reaction formation) then it is impossible to make clear predictions about the effects of early experiences. Nevertheless, there are many who believe that psychoanalytic theories are important in understanding human development, and there have been many theoreticians who have offered variations and alternatives to Freud's proposals. We briefly consider two of these next, Anna Freud and Eric Erikson (psychoanalytic accounts of the development of self and of adolescence are given in Chapters 8 and 17).

FIGURE 2.5 *The psychoanalyst tries to discover what it is that went wrong in your childhood that is causing your current problems*

Source: © Blaj Gabriel/Shutterstock.

Modern psychoanalysts – Anna Freud and Eric Erikson

Anna Freud (1895–1982) was the youngest of Sigmund Freud's children. She grew up with an interest in psychoanalysis, and is often referred to as 'the founder of child psychoanalysis'. She felt that adolescence and puberty presented a series of challenges. During this period of ego struggle, through meeting these challenges the ego matures and becomes better able to defend itself. For Eric Erikson (1902–94), like Anna Freud, personality formation was not largely complete by age 6 or 7 as Sigmund Freud suggested. Rather, stages of psychological conflict and adjustment occur throughout the lifespan. Whereas Freud felt that the child's personality was determined largely by parents and by unconscious forces, Erikson gave much greater emphasis to the role of the broader social world which includes relatives, friends, society and culture. For this reason Erikson's stages are called **psychosocial** rather than *psychosexual*. The work of Anna Freud and Erikson as it applies to adolescent development is discussed in more detail in Chapter 17.

psychosocial stages stages of development put forward by Erik Erikson. The child goes from the stage of 'basic trust' in early infancy to the final stage in adult life of maturity with a sense of integrity and self-worth.

HUMANISTIC THEORY – ABRAHAM MASLOW

Humanistic theories focus on the individual's own subjective experiences, motives, and desires. In general, they differ from psychoanalytic views in putting much less emphasis on the role of the unconscious in determining behaviour. Humanists argue that we are not driven by unconscious needs, neither are we driven by external environmental pulls such as reinforcement and rewards. Rather, humans have free will and are motivated to fulfil their potential. The inner need or desire to fulfil one's potential is known as **self-actualisation**. The drive for self-actualisation is not restricted to childhood but is applicable across the life span, and a leading proponent of the humanistic view was Abraham Maslow (1908–70).

humanistic theory theory which emphasizes that humans have free will and are motivated to fulfil their potential.

self-actualisation fulfillment of needs beyond those deemed necessary for survival.

Abraham Maslow's hierarchy of needs

Maslow suggested that there is a **hierarchy of needs** or motives that determine our behaviour. The hierarchy is given below (Figure 2.6) and extends from the basic needs for survival through the search for self-actualisation. To see how Maslow's hierarchy might work, imagine the following scenario (based on Dworetsky, 1995, p. 43. You are a young man or woman who arrives as an emigrant/immigrant to a foreign country, broke and homeless. Your first aim would be

hierarchy of needs stages of needs or desires in Abraham Maslow's *humanistic theory* which go from the basic physiological needs for food and water to the ultimate desire for *self-actualisation* or the desire to fulfill one's potential.

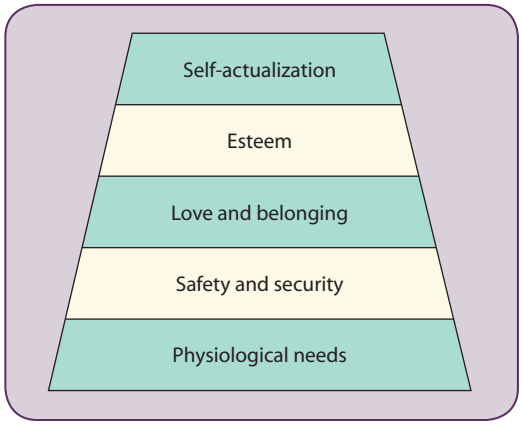


FIGURE 2.6 *Maslow's hierarchy of needs*

to ensure that your basic physiological needs for food, water and warm were satisfied. Next would be finding a place where you feel safe and secure. You are then able to begin to search for ways of satisfying your psychological needs, to develop relationships with people so you feel that you belong. Your sense of self-esteem develops as you feel needed by others, and your final goal would be to attain self-actualisation – this is equivalent to achieving your full potential, perhaps in education, sport, music, rearing children, and many other types of activity and attainment.

Maslow's theory was not intended as a theory of children's development – the hierarchy of needs is applicable at all ages from early childhood on, and children achieve goals and fulfil their potential as do adults. It is worth noting that, sadly, today there are over 200 million child slaves in the world today – children who work in the fields, in domestic slavery, in bars, restaurants, on building sites, in sweatshops perhaps making expensive [or cheap] clothes and shoes for Western consumption, and in many countries the prettiest children are raised in brothels. For countries in the developing world child slave labour makes good sense – children are a renewable resource, they don't form unions, they are cheap and trainable. These children enter a lifetime sentence of hard labour and ill health for the 'crime' of poverty – their needs lower in Maslow's hierarchy are met but self-actualisation is a myth not an attainable possibility.

PUTTING IT ALL TOGETHER – DIFFERENT THEORIES FOR DIFFERENT NEEDS

In this chapter we have given a sample of the many different theories that have been developed to explain human development. As is abundantly obvious, child development is enormously complex, and we should not expect any theory, however 'grand' to attempt to account for more than one or two selected areas of development. Thus, there are theories that focus specifically on motor, perceptual, cognitive, emotional, social, or personality development.

However, it is important to remember that in the child themselves all aspects of development are interrelated. For example, each new motor acquisition in infancy opens up new ways of exploring the world, which in turn affects infants' awareness of the world and their cognitive and social development. New cognitive achievements affect the child's social development since they allow the child to interact with others

at an increasing more sophisticated level of understanding. Cognitive and social developments give increased opportunities for children to develop their potentials, and hence allow for the possibility of self-actualisation.

The essential point is that theories typically focus on specific areas of development, but development itself is multi-faceted and all aspects of change are integrally linked. To illustrate this interrelatedness of different aspects of development we will focus on one area of development where different theoretical views make their own different contributions, the topic of **gender development**.

gender development the developing understanding that a child is either a girl or a boy and that there are gender-appropriate behaviours associated with this difference.

Gender development

Gender development concerns the important question of how it is that children grow up knowing that they are either a boy or a girl. Psychologists from several different theoretical traditions have offered accounts of how this happens, and here we give very brief accounts of cognitive, behaviourist/social learning, psychoanalytic and biological explanations.

A cognitive account

A cognitive view of gender development was offered nearly 40 years ago by the American psychologist Lawrence Kohlberg (1966, see also Chapter 14 for his theory of the development of moral reasoning). According to Kohlberg's account of gender development the child gradually comes to realise that she/he is a girl or a boy and that this is unchangeable – once a girl (or boy) always a girl (or boy), a realisation that is known as **gender constancy**. Most children come to this realisation some time after 3 years, and almost all know it by age 7 (Tobin *et al.*, 2010; Wehren & De Lisi, 1983). Kohlberg's theory suggests that once children understand which gender they are they will develop appropriate gender-role behaviours. That is, knowing you are a girl or a boy helps the child to organise their behaviour to be gender-appropriate.

gender constancy the awareness, in early childhood, that one is either a boy or a girl, and that this is unchangeable – once a girl (boy), always a girl (boy).

A social learning account

Social learning accounts of gender development are based on the work of Albert Bandura, whose views we discussed earlier, and these in turn are developed from behaviourist theories of learning. In this account the child is reinforced for what the parents and others perceive as being gender-appropriate behaviour (girls play with dolls, boys don't cry). Additionally, children imitate significant others and learn to observe same-gender models to see how to behave. In this way, through observation, imitation and reinforcement children's gender roles are shaped.

A psychoanalytic view

In the Freudian version of psychoanalytic theory a girl's identification with her mother, and a boy's with his father, develop from the resolution of the Electra and Oedipus complexes, as described above. As a result of this identification girls

and boys form female and male identities (respectively!) and take on their same-gender parent's views and behaviour as their own.

Biological determinants

The accounts described so far all emphasise the role of *nurture* in promoting gender development. But remember that the physical aspects of gender are biologically determined by the type of chromosomes we inherit at conception (see Chapter 4). Here we will describe a case history (which is described in more detail in chapter 8) to highlight the role of *nature* (genetic and biological) in gender determination.

Bruce Reimer was one of two identical twins born on 22 August 1965. The twins developed urinary problems and at 8 months Bruce (and his twin brother Brian) were taken to a clinic for circumcision. What happened to Bruce was that he 'had his penis accidentally burned to ablation during phimosis repair by cautery' (Diamond & Sigmundson, 1999, p. 58). What this medical terminology means is that the incompetent physician destroyed Bruce's penis.

At the time one of the most influential views on gender development was expressed by the psychologist John Money (e.g. Money & Ehrhardt, 1972), and was that individuals are psychosexually and gender neutral at birth, and that experience (*nurture*) is the sole determinant of their development. A decision was therefore made to carry out gender-reassignment surgery (to create a vagina and female genital appearance), and to rear Bruce as Brenda. This case is described in earlier textbooks on child development as clear evidence that nurture determined gender roles, and Money's theoretical views achieved widespread acceptance, even to the point that some were arguing that if a genetic male had a small penis (in extreme instances this is referred to as a *micropenis*) then 'Often it is wiser to rear a genetic male as a female' (Donahoe & Hendren, 1976, p. 396).

But it all went drastically wrong. Even soon after the operation 'Brenda' began rejecting girl things, like refusing to wear dresses. Somewhere between the ages of 9 and 11 Brenda 'figured that I was a guy'. At school 'she' persisted in standing up to urinate in the girls' bathroom. She made several suicide attempts and finally learned the truth. At this time Brenda refused to carry on as a female and insisted on gender reassignment (which included a mastectomy and phallus reconstruction) to his biologically determined gender, and called himself David. He later married an older woman and adopted her children. This case is one that gives strong support for the view that prenatal and early-infantile hormones have a strong influence on gender development and other gender dimorphism characteristics.

Overview

These different accounts of gender development all have their appeal. It is clear that social influences and children's cognitive awareness influence their gender-related behaviour. But it is also clear that biological (genetic/hormonal) influences are important. Many, perhaps most, *transsexuals* (those who elect for gender reassignment, often through surgical procedures) will say that they have felt that they were a girl in a boy's body (or vice versa) for as long as they can remember, even though they may never been reinforced for gender-inappropriate behaviour. What is clear is that we have different theoretical views and there are multiple causes of gender

development in children. Perhaps biological factors provide the basic differences, and cognitive and social factors add the fine detail to create behavioural differences.

ISSUES IN CHILD DEVELOPMENT

There are many issues, controversies and debates in the study of child development, and we will see the most important of these in the pages of this book. Many of these topics are specific to a particular area or areas of development, but there are others that affect almost all aspects of growth and here we briefly describe three of these – the **nature–nurture issue**, **stability versus change**, **continuity versus discontinuity**.

nature–nurture ongoing debate on whether development is the result of an individual's genes (nature) or the kinds of experiences they have throughout their life (*nurture*).

stability versus change the question of whether individuals are stable in the sense of maintaining their rank order across age, e.g. does the bright 2-year-old become a bright 10-year-old?

continuity versus discontinuity whether development is *continuous*, and therefore an accumulation of 'more of the same', or *discontinuous* and marked by qualitative changes. Piaget's theory is an example of a *discontinuous* theory of development.

behaviour genetics the study of how genetic factors influence behaviour and, more generally, differences between individuals.

The nature–nurture issue

We are all of us a product of the *interaction* of the two broad factors of *nature* – inheritence or genetic factors – and *nurture* – environmental influences. For example, it is argued that humans are genetically predisposed to acquire language, but which language we acquire is determined by the language(s) we hear and learn. It is important to note that without both factors no development could occur! Nevertheless, people differ in their abilities, temperaments, personalities and a host of other characteristics, and psychologists and **behaviour geneticists** have attempted to estimate the relative contributions of nature and nurture to these individual variations between people. Are certain behavioural characteristics such as gender development (as discussed in the previous section), intelligence, and personality more influenced by heredity or by the environment? A detailed account of these attempts, and of the nature–nurture issue in general, is given in Chapter 3.

Stability versus change

It is often claimed that 'the child is father to the man' (or 'the child is mother to the woman'), meaning that early experiences influence current and later development. This view suggests that certain aspects of children's development display stability, in the sense that they are consistent and predictable across time. It turns out that development is characterised by both stability and change – for example, personality characteristics such as shyness, and the tendency to be aggressive tend to be stable, while others such as *approach* (the tendency to extreme friendliness and lack of caution with strangers) and *sluggishness* (reacting passively to changing circumstances) are unstable (as discussed in Chapter 15).

Continuity versus discontinuity

In Chapter 1 we described two 'World Views' which are called *organismic* and *mechanistic*. Organismic theories, such as Piaget's, emphasise that some of the most interesting changes in human development – such as those that accompany major changes in thinking, puberty, and other life transitions such as first going to school, going to college, getting married, etc. – are characterised by discontinuity, by qualitatively different ways of thinking and behaving. Mechanistic theories, as exemplified by behaviourist views, emphasise continuity – that development is reflected by a more continuous growth function, rather than occurring in qualitatively different stages. What complicates things is that, as we have seen, it is often possible to think of the same aspect of development (such as intelligence) as being both continuous and discontinuous. Sternberg and Okagaki (1989, p. 158) state the case as follows:

> as it stands, the continuity–discontinuity debate is largely misconceived and . . . we should …be thinking in terms of ways in which development is simultaneously continuous and discontinuous with respect to different dimensions of analysis.

SUMMARY AND CONCLUSIONS

Although these three issues will appear regularly in the chapters of this book it is important to keep in mind that human development requires both nature and nurture, it displays aspects of stability and also change, and it is both continuous and discontinuous.

In the rest of this book you will find many examples of theories and theoretical approaches – mostly the ones that we have described in this chapter, but also a few new ones. Always remember that a theory has specific applications – that is, attempts to account for a limited area of development – and we should not ask too much of any one. It would be a mistake to criticise Piaget, Freud, and Bowlby for paying too little attention, respectively, to social development, the role of conscious awareness, and cognitive development, because this was not their aim! All of these theoreticians, the others described here, and yet others whose work will appear in later chapters, have helped to mould our understanding of children's development and make it the exciting, dynamic topic of enquiry that it is today.

DISCUSSION POINTS

1. Considering the evidence presented here, list as many aspects of motor development (a) that may not depend on experience, (b) that probably do depend on experience.
2. Discuss ways in which Piaget's account of development differs from (a) maturational accounts, and (b) accounts that portray development as moulded by the environment.

3. Think of differences between Piaget's theory and information processing theories of development.
4. Skinner's theory of learning through reinforcement seems quite plausible in many ways. Think about what makes the account plausible, and also about the aspects of development that it does not explain.
5. In what ways has Albert Bandura's Social Learning Theory and Social Cognitive theory advanced our understanding of factors influencing development?
6. Is the psychoanalytic approach to development a theory or just a compelling story?
7. How plausible is it that Maslow was able to establish a hierarchy of needs simply from interviews about sexuality?
8. The view presented here is that different theoretical approaches to development can exist side by side, complementing each other. Consider whether there are limits to this view. For instance, are there some approaches that are so opposed that they cannot coexist?

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