

YOU KNOW YOU HAVE MASTERED THE MAIN TOPICS IN THIS CHAPTER IF YOU ARE ABLE TO . . .

- ∞ Introduce the research methods and major issues in developmental psychology, including the nature versus nurture controversy.
- ∞ Describe the stages of prenatal development and potential hazards.
- ∞ Discuss the theories of Piaget and Vygotsky with regards to cognitive development.
- ∞ Describe the physical and cognitive development in infancy and childhood including language development.
- ∞ Explain the concept of personality including the idea of temperament, attachment theory, and Erikson's psychosocial model.
- ∞ Identify the major stages of development in adolescence and adulthood.
- ∞ Discuss three theories of aging and Kübler-Ross's stages of dying.
- ∞ Understand how ADHD affects adults.

RAPID REVIEW

Human development is the scientific study of the changes that occur in people as they age from conception to death. Since age cannot be directly manipulated by a researcher, developmental psychologists have had to develop alternative methods to investigate the effects of aging on psychological processes. Three common methods used are **longitudinal**, **cross-sectional**, and **cross-sequential** studies. Longitudinal studies have the advantage of following the same subject across time but are limited due to the amount of time and money required to complete the study and the problem of attrition. Cross-sectional studies are cheaper, faster, and easier to conduct since they gather information from different age groups at one particular period of time; however, results from these studies may be confounded due to individual and history differences. Cross-sequential studies are a combination of longitudinal and cross-sectional techniques and often represent an ideal compromise. One of the biggest debates among developmental psychologists is the question of **nature** versus **nurture**. Nature refers to the influence of everything you inherited genetically from your biological parents and nurture refers to the influence your environment has had on your development. More recently, the question of interest has switched from nature *versus* nurture to the interaction of nature *and* nurture. Behavioral genetics is the field of science that studies the interactions of nature, or genes, and nurture, or the environment.

Genetics is the science of heredity and involves the study of DNA, genes, and chromosomes. **DNA (deoxyribonucleic acid)** is the smallest unit of the three and are strands of molecules linked together like a twisted ladder. The links are made up of amines and their names are abbreviated with the letters A, T, G, and C. The next largest unit are the **genes**, which are sections of the ladder containing instructions on how to make a specific protein. One way to think of genes is as individual recipes for proteins. The biggest unit is the **chromosomes**, which are long strands of DNA twisted together and wound up in coils. The chromosomes are found in the nucleus of all the cells of your body except red blood cells. Humans have a total of 46 chromosomes, 23 from the mother's egg and 23 from the father's sperm. Each chromosome from the mother matches a chromosome from the father to form 23 pairs. Both chromosomes in the pair have the same genes (for example, each chromosome contains a gene for hair color). Even though they contain the same gene, the instructions on that gene might be slightly different; for example, one of the genes has the instructions for blonde hair while the other gene contains the instructions for brown hair. The first 22 pairs of chromosomes are called autosomes, and the last pair (the 23rd) contains the instructions for determining sex and are called the sex chromosomes. **Dominant genes** are the genes that are more likely to influence the trait. **Recessive genes** are not as strong and will only get their instructions carried out if the other chromosome in the pair also contains a recessive gene. In reality, almost all traits are determined by multiple gene pairs. This is called **polygenic inheritance**. Some diseases result from problems with recessive genes and are only expressed when both parents have

the recessive gene, while some disorders result from the fact that there are the wrong number of chromosomes in the fertilizing egg or sperm.

Many people believe that **conception** represents the beginning of life. **Fertilization** occurs when the sperm penetrates the egg (or **ovum**). The result is a single cell with 46 chromosomes (23 from the sperm and 23 from the egg). This cell is called a **zygote**. **Monozygotic (or identical) twins** result from the zygote splitting into two separate masses early in the division process. **Dizygotic (or fraternal) twins** result from two eggs being fertilized by two separate sperm. Siamese twins are more properly referred to as **conjoined twins** and result from an incomplete separation of the zygotic mass. Britty and Abby Hensel are an example of conjoined twins. The **germinal period** of pregnancy is the first two weeks after fertilization during which the zygote migrates down to the uterus and attaches to the uterine wall. The placenta and umbilical cord both begin to develop during this period. The **embryonic period** lasts from about Week 2 to Week 8 after which the **embryo** is about one inch long with primitive eyes, nose, lips, teeth, arms and legs. **Critical periods** are times in development during which an environmental influence can impact the development of the fetus. Different organs and structures have different critical periods. The environmental influences that can impact the development of the fetus are called **teratogens**. The **fetal period** lasts from the eighth week after conception to the end of the pregnancy. Tremendous growth of the **fetus** occurs during this time. A baby born before the 38th week of pregnancy is considered preterm and is at risk for survival, especially if he or she weighs less than five and a half pounds. Most miscarriages, also called spontaneous abortions, occur in the first three months of a pregnancy.

Infants have a large number of capabilities even immediately after birth. Most infants are able to perform five innate reflexes. Touch is the most well developed sense followed by smell and taste. Vision is the least functional of the senses. The rods are developed at birth but cones must develop over a six-month time period. At birth, an infant's vision is most clear seven to ten inches from their face. Also, infants appear to show a preference for the human voice and human faces. Due to a recent trend of many parents choosing not to give immunization shots to their children, there is a growing concern over the possibility of widespread epidemics. Most immunizations are made from the dead virus and cannot cause an infection in the recipient. No link has been found between autism and immunization.

The brain triples in weight during the first two years of life with the increase being caused by the expansion of existing cells not the growth of new ones. **Jean Piaget** believed that the primary factor in the development of a child's cognitive abilities was the child's interactions with objects in the environment. Piaget believed that children form mental concepts or **schemes** as they experience new situations and events. He proposed four stages of **cognitive development** from infancy to adolescence. The **sensorimotor stage**, lasting from infancy to age 2, involves the use of the senses and muscles to learn about the environment and includes the development of **object permanence** and symbolic thought. The **preoperational stage** lasts from age 2 to 7 and involve language and concept development through the process of asking questions. Children in this stage display the ability of symbolic thought through make-believe play and also display characteristics of **egocentrism**, **centration**, and **irreversibility**. The **concrete operational** stage lasts from age 7 to 12 and includes the development of concepts such as **conservation** and reversible thinking. However, children in this stage are still unable to deal with abstract concepts such as freedom or love. The **formal operational stage** is the final stage of cognitive development, according to Piaget, and lasts from the age of 12 on. During this stage abstract, hypothetical thinking develops. Research suggests that about one-half of the adults in the U.S. reach this stage of cognitive development. Piaget's concepts have been successfully applied in schools but have also been criticized for their emphasis on distinct stages of development, overemphasis on egocentrism, and failure to mention the role of the family or social environment in the child's development.

Lev Vygotsky was a Russian psychologist who felt the primary factor in development was the social environment. He proposed a concept called **scaffolding** in which a more highly skilled person give the learner help and then stops as the learner develops on his own. Vygotsky believed that each child has a **zone of proximal development** or ZPD, which is the difference between what a child can do alone and what he or she can do with the help of a teacher. Vygotsky's principles have been applied in the classroom through the use of cooperative learning and reciprocal teaching.

Psychologists interested in information-processing theory have investigated the memory capabilities of the developing infant and have found that infants demonstrate memory from birth, 4- to 5-year-olds appear to be able to store about three items in their short-term memory and have both episodic and procedural memories in long-term memory. Language development appears to be an important step in cognitive development and facilitates the development of symbolic thinking. The stages of language development experienced by all speakers includes cooing around 2 months of age, babbling at 6 months of age, one-word speech or holophrases around 1 year of age, telegraphic speech at around a year and a half, and then whole sentences.

Temperament refers to the behavioral and emotional characteristics observed in infancy. Several researchers have suggested the existence of three types of temperaments, easy, difficult, and slow to warm up. **Attachment** is the emotional bond between an infant and caregiver. Mary Ainsworth and others studied attachment using the Strange Situation and observed four attachment styles, secure, avoidant, ambivalent, and disorganized/disoriented. Harry Harlow studied the nature of attachment behaviors by observing Rhesus monkeys interact with two different “surrogate” mothers. He found that **contact comfort** was an important factor in attachment.

Erik Erikson, who originally trained as a Freudian psychoanalyst, proposed an eight-stage theory of development that occurred over the entire life span. Each stage involved an emotional crises in the individual’s social interactions. The first four stages occurred during infancy and childhood and consisted of the crises of **trust versus mistrust**, **autonomy versus shame and doubt**, **initiation versus guilt**, and **industry versus inferiority**. Most children begin to understand **gender** differences around the age of 2 and begin to develop their own **gender identity**.

Adolescence is the period of time from around age 14 to the early 20s and is most clearly identified by the physical changes that occur in **puberty**. Mentally, many adolescents are moving into Piaget’s formal operational stage of development, which includes the ability to think in the abstract and to consider hypothetical situations. At the same time, adolescents still demonstrate a considerable amount of egocentric thinking as can be seen in the thought processes of the **personal fable**, in which the adolescent feels they are different from all others, and the **imaginary audience**, where the adolescent is convinced that everyone is looking at him or her.

Lawrence Kohlberg proposed a theory about the development of moral thinking and divided the development into three levels, **pre-conventional**, during which the individual conforms to social norms; **conventional**, during which time the consequences determine morality; and **post-conventional**, during which a person’s individual moral principles determine right and wrong. The social crisis proposed by Erikson for the period of adolescence is that of **identity versus role confusion**.

Adulthood can be roughly identified as the time period from the early 20s until death. Middle age is often associated with an increase in health problems and includes the events of **menopause** for women and **andropause** for men. Cognitive abilities do not decline overall but the speed of processing does appear to slow down and people tend to have a harder time retrieving specific information from their memory. Erikson proposed three psycho-social developmental stages for adulthood. The stages are **intimacy versus isolation**, **generativity versus stagnation**, and **ego integrity versus despair**. Parenting is a significant part of many people’s adulthood. Diana Baumrind proposed three basic parenting styles, **authoritarian**, **permissive**, and **authoritative**. Permissive parents can either be **permissive neglectful** or **permissive indulgent**.

There are a number of theories as to why our bodies physically age. The cellular clock theory suggests that cells are limited in the number of times they can reproduce. The wear-and-tear theory proposes that aging is a result of outside stressors such as physical exertion and bodily damage. The free radical theory states that as people get older, more and more free radicals accumulate in their bodies. Socially, the **activity theory** suggests that elderly people adjust more positively to aging when they remain active in some way.

Elizabeth Kübler-Ross proposed a well-known theory of the dying process. Based on her work with dying patients, Kübler-Ross felt that people experienced a series of five different emotions including denial, anger, bargaining, depression, and acceptance. Others see dying as more of a process rather than a series of stages.