Understanding Development

CHAPTER

CHAPTER OUTLINE

✦ How Do Theories Explain Child Development?
✦ What Are the Major Biology-Based Theories of Child Development?
✦ What Are the Major Psychoanalytic Theories of Child Development?
✦ What Are the Major Environment-Based Theories of Child Development?
✦ What Are the Major Cognition-Based Theories of Child Development?
✦ What Are the Major Contextual Theories of Child Development?
✦ How Is Child Development Studied?
People frequently wonder about the causes of their own and others’ behavior. As you learned in Chapter 1, questions about the origins of behavior have long fascinated developmental scientists. To what extent is our behavior due to biological factors or to the ways we are raised in our families? Can a poor family environment be overcome by positive experiences with friends and in school? To design studies about development, developmental scientists formulate theories about the causes of behavior.

**HOW DO THEORIES EXPLAIN CHILD DEVELOPMENT?**

Babies delivered by cocaine-addicted mothers are exposed to drugs before they are born. They are likely to be raised in disorganized homes with drug-abusing parents who probably will not have the ability to provide them with warmth, shelter, food, and nurturance. What is the best way to improve the lives of these children? Are these infants’ brains permanently damaged by drug exposure during critical periods of development? Should children born in this situation be taken away from their mothers? Should the children receive social support within their families to help them overcome the problems of being raised in a disadvantaged environment? Think about your response to the problem of how to improve crack babies’ lives. What would you do first? What priorities would you set for providing support for these children?

Theories of child development help developmental scientists decide what to focus on when they study or work with children. Each theory provides a framework for investigating development and suggests the factors that are the most central in the investigation. Recall from Chapter 1 the story of Victor, the Wild Boy of Aveyron. Faced with the challenge of explaining and treating the Wild Boy’s behavior, Itard relied on a theory for guidance. Itard believed that development is shaped by the environment and that Victor’s savage behavior was due to the savage environment he grew up in. Without a theory, Itard would have had no way to explain what caused Victor’s behavior, nor would he have been able to plan ways to help Victor become civilized. Theories are important because they provide the tools researchers need to organize and understand the complexities of development.

Theories are not just for researchers. In everyday life, people develop implicit theories to help them understand and explain other people’s behavior. For instance, people all over the United States have tried to understand why people like Timothy McVeigh (see Chapter 1) commit terrorist acts or why school children murder other children. These personal theories influence interactions with others and guide major decisions that people make in their everyday lives.

**SCIENTIFIC THEORIES**

The implicit theories that we use every day are simply smaller versions of the formal theories that scientists use. Some people believe that scientific theories are elaborate ideas developed with little relevance to the real world. But this belief is wrong— theories are the backbone of developmental research and are very much connected to the real world. A scientific theory is a structured set of ideas that attempts to organize and explain facts. In contrast, a fact is a statement, based on observation, with which many people would agree (Miller, 1993). Facts may be single observations or summaries of many observations. For instance, your height is a fact with which any physician would agree.

Theories organize and give meaning to facts by describing how they fit together. Theories also guide future research by suggesting which investigative leads scientists should pursue. As noted earlier, it is a fact that many unborn children are exposed to crack cocaine. Should scientists focus their research on the effects of the drug on the child or on the child’s later experiences in a drug-abusing family? Research based on biological theories might assess how biochemical changes associated with drugs influence development (Holzman & Paneth, 1994). Research based on environmental theories might focus on the stressful
conditions associated with living in drug-addicted families (Black et al., 1994). Both kinds of theories—biological and environmental—have proved important in understanding that early drug exposure does not necessarily cause permanent, irreversible damage. We now know that supportive family environments can buffer children from the devastating effects of early drug exposure (Leventhal et al., 1997).

Different theories provide different frames of reference for interpreting facts, and there is a tendency to interpret facts in ways that fit the theory. As you will soon learn, there are many theories of human development, each of which presents a unique perspective on development. Because human behavior is so complex, it is unlikely that any single theory will be able to explain all behavior (Miller, 1993).

EVALUATING THEORIES OF DEVELOPMENT

Developmental scientists consider whether a theory explains the available facts about the real world of child development. The more facts it explains, the better the theory is. A good theory also is understandable, predicts future events, provides practical guidance, and stimulates new knowledge. A good theory is empirically based, meaning that it is based on observation and experimentation. Thus, a good theory is testable—researchers are able to determine whether its propositions are correct. If a theory is untestable, its usefulness and accuracy cannot be determined (Thomas, 1996).

Theories of development can be distinguished from one another in terms of their perspective on the developmental issues discussed in Chapter 1 (such as nature versus nurture and continuity versus discontinuity). The major theories and approaches used to study child development are categorized in terms of these issues in Table 2.1 and in the following sections.

WHAT ARE THE MAJOR BIOLOGY-BASED THEORIES OF CHILD DEVELOPMENT?

Many theories focus on the biological factors that underlie development—including both evolutionary processes and physiological development, such as the functioning of

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>DESCRIPTION</th>
<th>THEORIES INCLUDED</th>
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<tbody>
<tr>
<td>Biology-based theories</td>
<td>Emphasis on inherited biological factors and processes</td>
<td>Evolutionary theories&lt;br&gt;Ethological theories&lt;br&gt;Attachment theory&lt;br&gt;Neurodevelopmental theories</td>
</tr>
<tr>
<td>Psychoanalytic theories</td>
<td>Emphasis on unconscious internal drives and interactions with others</td>
<td>Freud's psychosexual theory&lt;br&gt;Erikson's psychosocial theory</td>
</tr>
<tr>
<td>Environment-based theories</td>
<td>Emphasis on the role of the external world</td>
<td>Classical conditioning&lt;br&gt;Operant conditioning&lt;br&gt;Social learning theory</td>
</tr>
<tr>
<td>Cognition-based theories</td>
<td>Emphasis on the role of cognition and processing of information</td>
<td>Piaget's theory&lt;br&gt;Vygotsky's theory&lt;br&gt;Information processing theory</td>
</tr>
<tr>
<td>Contextual theories</td>
<td>Emphasis on the interaction between individuals and their environments</td>
<td>Ecological theory&lt;br&gt;Dynamic systems theory</td>
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</table>
Biology-based theories assume that powerful organic or inherited forces influence behavior.

**EVOLUTIONARY THEORIES**

As you learned in Chapter 1, Darwin’s theory of evolution is based on the idea that individuals who have characteristics that promote survival and reproduction are more likely to pass these characteristics on to future generations. For instance, early primates who had physical characteristics such as opposable thumbs and an upright stance had increased chances of surviving because they were better able to adapt to their environment and gather food than individuals without those characteristics. Likewise, the ability to communicate, reason, and cooperate increased their chances for survival. Thus, the capacities for social behavior and reasoning, along with physical characteristics, underwent natural selection (Darwin, 1877).

Today, evolutionary theories influence many areas of research on development, including studies of social behavior and mate selection (Buss, 1998). In these studies, researchers focus on the behaviors they believe promote the survival of the species. Likewise, evolutionary developmental theorists consider the aspects of child development that promote survival (Bjorklund & Pellegrini, 2000; Geary & Bjorklund, 2000). For instance, evolutionary developmental theorists speculate that the limited capacity of children’s memory is advantageous for language acquisition because it helps children focus on the most essential features of language. Computer simulations of language learning confirm this speculation (Ellman, 1991; Newport, 1994). Furthermore, evolutionary theorists explain children’s play activities, aggression, and lack of inhibition by focusing on the survival value each has (Bjorklund & Pellegrini, 2000).

**ETHOLOGICAL THEORY**

Ethological theory, derived from Darwin’s ideas about evolution, focuses on the causes and adaptive value of behavior, considering both the evolutionary history of the species and the social context. Ethologists have been influential in proposing that there are critical periods in development during which a specific type of learning occurs rapidly. For example, as you learned in Chapter 1, newborn ducklings have a critical period during which they learn to follow the first moving object they see. Because this object usually is their mother, this inherited tendency (called imprinting) increases their chances of survival.

Ethological research has focused on questions such as how adults become attached to infants, why infants prefer to look at human faces, and how facial expressions communicate emotions and intentions. For instance, developmental ethologists are concerned with why infants of many different species have similar facial features, such as a small nose, a large forehead, and big eyes (see Figure 2.1). Ethologists proposed that these features are visual cues that have evolved to elicit caregiving behavior from parents. Research has confirmed

*Figure 2.1 Infant and Adult Faces*

Notice how infants of many different species have similar facial features, such as a small nose, a large forehead, and big eyes. Ethologists believe that these features are cues that evolved to elicit caregiving behavior from parents. These facial features make infants appear lovable and attractive to caregivers.
this idea with respect to human infants (Zebrowitz, Kendall-Tackett, & Fafel, 1991); even adults who have a “baby face” are perceived by others as being more childlike in their behavior (Zebrowitz & Montepare, 1992).

**ATTACHMENT THEORY**

Based on ethological principles, John Bowlby (1907–1990) developed an influential theory about the importance of early relationships for the developing child. According to Bowlby’s attachment theory, all children become emotionally attached to their caregivers, regardless of the treatment they receive from them. Attachments form as infants give cues to which caregivers respond, increasing the likelihood of infant survival.

Research today focuses on the quality of the attachment that forms. Over the first few years of life, children develop inner working models about themselves and others, based on the kind of care they have received. For example, a child who receives sensitive and consistent caregiving comes to view himself or herself as worthy. Children’s inner working models become internalized views or expectations about relationships with others and provide a basic roadmap for subsequent interactions with people (Crittenden & Claussen, 2000).

Recent research on attachment theory supports the idea that inner working models are influential in later development. Infants who have strong emotional ties with their caregivers are more likely than other children to explore their environments readily, to maintain contact with their caregivers, to become independent, and to have good self-esteem (Thompson, 1998). Researchers also are exploring how these early attachments influence dating, marriage, friendships, and parenting later in life (Crowell & Treboux, 2001).

**NEURODEVELOPMENTAL APPROACHES**

Neurodevelopmental approaches to the study of development focus on the relationship of brain development to behavior and thinking. How the brain develops and how the different parts of the brain function provide a broad basis for understanding how biology and environment both contribute to development. Studies of brain development point to the importance of the early years of children’s lives (MacLean, 1985). For instance, early in development, the brain depends on environmental input to fine-tune itself so that it is maximally sensitive to its environment (Jacobs, 1997). That is, the kinds of experiences a child has help to determine the patterns of connections in the brain (Elbert, Heim, & Rockstroh,
Early experiences, then, have a crucial role in determining how the brain wires itself, which in turn influences how the individual later responds to stimuli.

**WHAT ARE THE MAJOR PSYCHOANALYTIC THEORIES OF CHILD DEVELOPMENT?**

Psychoanalytic theories of development have their origins in the belief that the most important causes of behavior are rooted in the unconscious drives and forces that develop within the mind of an individual. Although today psychoanalytic theories are not often used to guide research, they continue to influence the ways people think about human behavior. Freudian notions underlie much of the thinking about developmental issues.

**FREUD’S PSYCHOSEXUAL THEORY**

Sigmund Freud (1856–1939) was a physician whose training stressed biological determinism—the view that all human activity has biological or neurological causes. Freud also was influenced by Darwin’s theory of evolution and Newton’s law of physics (that energy cannot be created or destroyed). These influences led Freud to postulate that human behavior arises from the dynamic, internal energy that is the result of our evolutionary heritage (Green, 1989). Freud called this fixed pool of energy the libido—the source of action and sexual desire.

According to Freud, the human personality, or psyche, consists of three structures: the id, the ego, and the superego. The id represents the primitive and instinctual components of the psyche that are unconscious, irrational, and uncontrolled. The id is driven by the pleasure principle—it seeks immediate gratification and avoids pain and distress (Freud, 1923/1960). Because the demands of the id are irrational, they often do not match what the environment provides. For example, because infants cannot feed themselves when they become hungry, immediate gratification may not be available. Infants may seek gratification by crying, sucking, and maybe even hallucinating. However, the reality of the world eventually forces changes in the id. It transforms a portion of itself into a new personality structure—the ego.

The ego is the source of reason and operates according to the reality principle, which is based on the conditions and demands of the real world. The ego seeks to fulfill the demands of the id in ways that are acceptable to society. The ego does not, however, represent an internalized set of social rules. This aspect of the psyche develops out of the ego and becomes the superego.

The superego, which represents one’s conscience and morals and social conventions, demands strict adherence with cultural expectations. When its demands are disobeyed, the superego punishes the individual by producing guilt, shame, and fear.

An individual’s behavior depends on the dynamic interactions of these three structures. The ego continually negotiates settlements between the demands of the id and the constraints of the superego.

Freud’s theory of psychosexual development is a stage theory of development, based on how the libido is transformed into different structures and modes of expression (see Table 2.2). During each stage, the increased sensitivity of a particular area of the body makes it an erogenous zone where libidinal energy is invested and pleasure is experienced (Freud, 1920/1965). Different erogenous zones are activated over the course of development as the child’s genetic blueprint unfolds.

The ideas put forth by Freud on the importance of early development and the role that parents play in influencing children’s personalities have become ingrained in our culture. One of his most enduring contributions is his concept of the unconscious—the idea that there are influences on our behavior of which we generally are not aware. His notion that there are defense mechanisms—such as repression and projection—that protect...
individuals from anxiety and fear also has become widely accepted. His belief that early experiences and patterns of social interactions can produce mental illness led him to develop psychoanalysis—a form of therapy designed to help individuals recover their memories of the early interactions that have influenced their behavior.

Notwithstanding the contributions, there are serious problems with Freud’s theory. The most important criticism is that the theory is not based on solid scientific evidence. In fact, although Freud proposed a developmental theory, he never really studied children; he obtained his evidence from his patients’ recollections, during psychoanalysis, of their childhoods. Furthermore, many aspects of Freud’s theory are unmeasurable and therefore untestable—how does one measure libidinal energy or identify the source of the superego?

Inherent in Freud’s discussion of the libido and its source of gratification is the notion that infants and young children are sexual beings and derive erotic pleasure from their interactions. This notion was (and still is) very controversial. Freud developed his theory during a period in history when society was very restrictive in its views about sexuality. Other Freudian concepts reflect cultural biases, such as the implication that male sexuality has a superiority that makes it a source of envy and jealousy for females (Horney, 1967).

ERIKSON’S PSYCHOSOCIAL THEORY

Erik Erikson (1902–1994) was a German-born psychoanalyst who extended and refined Freud’s theory of development. Erikson accepted Freud’s theory of psychosexual development but believed that, for several reasons, it was incomplete:

✦ It gave too little recognition to social and cultural influences.
✦ It failed to recognize developmental changes beyond adolescence.
✦ It did not give enough emphasis to ego development.
✦ It focused primarily on the development of neurotic and maladaptive behavior and did not give enough consideration to healthy development.

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**TABLE 2.2**

Freud’s Theory of Psychosexual Development

<table>
<thead>
<tr>
<th>STAGE</th>
<th>AGES</th>
<th>PSYCHIC DEVELOPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral</td>
<td>Birth–1 year</td>
<td>Id is the only psychic structure operating.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pleasure principle operates unconsciously.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Erogenous zone is the mouth.</td>
</tr>
<tr>
<td>Anal</td>
<td>1–3 years</td>
<td>Ego develops as the result of conflicts with the social world.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reality principle operates.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Erogenous zone is the anus.</td>
</tr>
<tr>
<td>Phallic</td>
<td>3–6 years</td>
<td>Superego develops as the result of the conflict over the sexual desire for the opposite-sex parent and the rivalry of the same-sex parent.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Erogenous zone is the genital region.</td>
</tr>
<tr>
<td>Latency</td>
<td>6 years–puberty</td>
<td>Libido becomes dormant.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Focus is on the development of skills necessary for adult functioning.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>There is no particular erogenous zone.</td>
</tr>
<tr>
<td>Genital</td>
<td>Puberty–adulthood</td>
<td>Focus is on mature sexual functioning and reproduction.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Erogenous zone is the genital area.</td>
</tr>
</tbody>
</table>

Sigmund Freud developed a psychosexual theory of development based on the idea that internal forces and energy play an important role in development. What contributions has Freud’s theory made to today’s thinking about child development?
Erikson argued that, during development, individuals go through a series of eight psychosocial crises that reflect a struggle between two conflicting personality characteristics. These crises represent critical periods in personality development (Erikson, 1968). The sequence and type of crisis at each stage are fixed; individuals can do nothing to prevent a crisis from occurring or to change or speed up the sequence of crises. Erikson believed, however, that these crises manifest themselves differently from person to person. For example, although all infants experience the natural conflict between Trust and Mistrust during the first year of life, individual circumstances affect the outcome of the crisis. Imagine how differently trust is experienced by an infant who has warm clothing and adequate food and by an infant who is left alone for hours with only a bottle or who is constantly hungry and ignored by caregivers. Thus, the levels of attention given to infants may affect their development of basic trust (Wallerstein & Goldberger, 1998). What kind of trust did Victor, the Wild Boy, develop when he was abandoned at a young age? What kind of autonomy did he develop?

Erikson’s major contribution was the detailed definitions he provided of psychosocial stages and the crisis associated with each stage, shown in Table 2.3. In addition, Erikson recognized cultural differences (Erikson, 1963) and contributed significantly to the study of adolescence, especially the process by which adolescents form personal identities (Erikson, 1968). Unfortunately, though, apart from research on adolescent identity, there is little research on childhood and adult psychosocial crises. Moreover, many of Erikson’s theoretical propositions, like other psychoanalytic ideas, are difficult, if not impossible, to test (Green, 1989).

**WHAT ARE THE MAJOR ENVIRONMENT-BASED THEORIES OF CHILD DEVELOPMENT?**

Environment-based theories maintain that the environment in which people live and the experiences they have are major determinants of behavior. According to this view, people are relatively passive in responding to the environments they are exposed to during their lives. Behavioral changes occur only when the environment is changed. Environment-based studies focus on factors that determine how behavior changes in response to everyday events.

**CLASSICAL CONDITIONING**

Ivan Pavlov (1849–1936), a Russian physiologist, was the founder of modern learning theory. While studying dogs’ digestive systems, he made an important accidental discovery. When
food was placed on a dog’s tongue, the dog salivated as a reflex response to the food. Pavlov noticed that, after a while, dogs also salivated when they saw the food coming. For this to happen, the dogs must have learned to associate the sight of food with the taste of the food. Thus, they learned a conditioned response to a previously neutral stimulus. Many people have noticed a similar pattern of conditioning in their pets—cats often come running at the sound of a can opener because they have associated the sound of the can opener with food (Crain, 1992).

In Pavlov’s studies, the typical classical conditioning procedure was to present, over several trials, a conditioned stimulus—for example, a bright light—paired with an unconditioned stimulus, such as food. The food is an unconditioned stimulus because it automatically elicits a response, the unconditioned response of salivation. The light begins as a neutral stimulus, but with repeated pairings the dog learns to associate it with the food, thereby producing a conditioned response—salivating at the sight of the light (Keohoe & Macrae, 1998).

The principles of classical conditioning were first applied to humans by John Watson (1878–1958). Watson argued that infants naturally respond with fear to only two events: suddenly losing support (fear of falling) and sudden loud noises. How, then, do children develop fear of snakes or dogs or the dark? Freud would have argued that a child’s fear of snakes reflects his or her repressed, unconscious drives and instincts. For Watson, the answer was that children learn to be fearful through classical conditioning.

To test this idea, Watson and colleagues conditioned an 11-month-old boy named Albert to fear a white rat (Watson & Raynor, 1920). At first, Albert was not afraid of the rat. But then Albert was shown the rat while a loud noise was made. After four pairings, Albert was shown the rat by itself, and he whimpered and withdrew from it. A few days later, Albert was tested to see whether he had generalized his fear to other objects or animals. He had indeed become fearful of all kinds of furry animals and objects such as rabbits and fur coats (Crain, 1992). Classical conditioning can thus be used to explain children’s development of common fears such as that of going to visit the doctor (see Figure 2.2).

Watson also found a method to decondition fears. He used systematic desensitization to decondition the fears of a young child named Peter. Peter was afraid of many animals, furry things, and mechanical objects. When Peter was relaxed and eating in his highchair, Watson would bring in a caged animal and leave it visible in the distance. The animal was gradually brought closer, allowing Peter to associate the pleasant feelings of eating with the presence of the animal. Over repeated and gradual exposures, Peter eventually lost his fear of the animal.

**OPERANT CONDITIONING**

B. F. Skinner (1905–1990) was concerned with how the environment shapes people’s behaviors. Operant conditioning focuses on how the consequences of a behavior affect the likelihood that the behavior will be repeated. For instance, if an infant is praised when he or she takes a first step, the infant will be more motivated to take another step.

The principles of operant conditioning have been studied extensively and applied effectively to many kinds of human behavior. Behavior is more likely to occur if the consequences are positive or negative reinforcers. Seat belt alarms are an example of an effective negative reinforcer: Once the seat belt is hooked, the annoying buzzing stops, thereby increasing the chances that one will use seat belts in the future.

In contrast, punishment is the application of unpleasant consequences to decrease the likelihood that a behavior will be repeated. Some parents use scolding or spanking as punishment, in the hope that these consequences will reduce undesirable behaviors. Punishment also may take the form of extra work, revoking privileges, or disapproval. Studies show, however, that punishment often is effective for only a short time and may have unintended negative side effects (such as increasing anxiety and timidity). A more effective strategy for reducing unwanted behavior may be extinction, in which all positive consequences are withheld (Crain, 1992).

Have you ever wondered how animals in the movies or on television learn to do difficult routines on cue? The answer lies in the fact that animal trainers use the principles of

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**classical conditioning**
Pavlov’s theory of how responses to neutral stimuli become conditioned

**operant conditioning**
learning based on the principle that the consequences of a behavior affect the likelihood that the behavior will be repeated

**positive reinforcement**
presentation of stimuli that increase the likelihood that a behavior will recur

**negative reinforcement**
removal of a negative or aversive stimulus, which increases the likelihood that a behavior will recur

**punishment**
application of unpleasant consequences to decrease the likelihood that a behavior will be repeated

**extinction**
reducing unwanted behavior by withholding all positive consequences
Shaping— the process of rewarding behaviors that approximate the desired behavior.

At first, the pain of the vaccination the child receives naturally elicits crying, but the sight of the doctor does not. After the child associates the doctor with the vaccination, the sight of the doctor elicits fear and crying. Thus, the child is classically conditioned to fear the doctor. Using classical conditioning principles, how might you recondition and eliminate the child’s fear of the doctor?

Operant conditioning to train them. Complex strings of behaviors are learned through shaping—a process of rewarding behaviors that approximate the desired behavior. A small step toward a larger goal is rewarded a few times, and then the next step is rewarded. For example, getting children to put their toys away can be shaped by rewarding them first when they approach the toys, then when they pick them up, and then when they attempt to put them away (Green, 1989). Similarly, animals are rewarded for performing small tasks, which are eventually developed into a complex string of behaviors.
SOCIAL LEARNING THEORY

Four-year-old Todd watches as his friend Ian puts on high heels and a fancy dress. Several children begin to comment about Ian’s appearance, telling him he shouldn’t dress up in girls’ clothes. They tease him and won’t play with him for the rest of the day.

In this story, Ian may have learned a hard lesson; the consequences of dressing in girls’ clothing can be severe, and he may be unlikely to do it again in the future. But what does Todd learn from observing Ian? Does Todd need to experience the teasing to recognize that putting on “girls’ clothes” might lead to negative consequences? According to Albert Bandura (1925–present), much of children’s learning occurs by watching the consequences that others experience for their behaviors, through a process called vicarious reinforcement.

From his observation of Ian, Todd learns that boys shouldn’t dress up in girls’ clothes. Knowledge of response consequences guides children’s and adults’ future behavioral choices (Bandura, 1977).

Bandura’s social learning theory is based on his idea that individuals are greatly influenced by other people. In addition to being influenced by vicarious reinforcement, Bandura believes that children and adults imitate, or model, the behavior of other people. Through modeling, individuals learn new behaviors, the contexts appropriate for those behaviors, and their consequences. Consider how children often mimic the behaviors of superheroes from movies and television. How are they able to do this?

Four processes are involved in modeling the behavior of others:

✦ Attention. A child must pay attention to models to be able to imitate their behavior. The models most likely to capture attention are those with power, prestige, or charisma.
✦ Retention. To imitate another person’s behavior later on, a child must have a way to represent the behavior in her or his memory so that it can be retrieved when necessary.
✦ Motor reproduction. To successfully reproduce another’s behavior, a child must have the motor control or abilities to carry out the action. Imitation provides the pattern for a behavior but not the actual skill to accomplish it.
✦ Reinforcement and motivation. Successful imitation requires that the behavior have the desired consequences, causing the child to want to repeat it.

Social learning theory often has been used to explain the impact of television on children’s behavior. Popular television characters attract children’s attention, and children may learn to act inappropriately by observing the behaviors of these powerful models (American Medical Association, 1996). Based on the four processes described above, what might be effective strategies for reducing children’s modeling of inappropriate behavior? What might be effective strategies for increasing their modeling of positive behaviors?

WHAT ARE THE MAJOR COGNITION-BASED THEORIES OF CHILD DEVELOPMENT

Cognition-based theories emphasize the role of mental processes such as memory, decision making, and information processing in influencing development. Studies of cognitive development focus on how thinking and reasoning change over time and the effects of these changes on development. Cognition-based theories assume that an essential feature of development is that individuals strive for greater understanding of the world around them.

PIAGET’S COGNITIVE DEVELOPMENTAL THEORY

Jean Piaget (1896–1980) was a Swiss scientist who became interested in the question of how we come to know and understand the world around us. While administering intelligence tests to French school children, Piaget noticed a pattern in the reasons children gave for...
correct and incorrect answers on the tests. He speculated that children of different ages use different kinds of thought processes. Piaget also observed the development of his own children and became convinced that children’s thinking is very different from that of adolescents and adults (Crain, 1992; Miller, 1993). This idea became the central tenet of his theory.

**Piaget’s View of Intelligence**

Piaget defined intelligence as an active process in which people acquire information by interacting with objects, ideas, and other people. From these interactions, individuals develop better ways of adapting to life’s challenges. According to Piaget, cognitive development is a process of developing the intellectual means to adapt to the environment (Langer & Killen, 1998).

When children interact with people and objects in the world, changes occur in their conceptions of the world. Children’s abilities to interact with the environment are based on their **schemes**—cognitive guides, or blueprints, for processing information. A child gathers information about an object or person by applying a scheme and using it to sort and organize the information. The schemes that children use change over time. Infants use schemes, such as sucking and grasping, that are based on their senses. Young children use schemes that are based on the appearances of objects. As children grow older, they develop more complex and abstract schemes. For instance, a high school student may have a scheme for solving algebraic equations.

Changes occur rapidly when information is being processed about the world. For instance, an infant who first holds a rattle has to apply schemes to the rattle to try to solve the problem of what this object is. Children develop their problem-solving abilities through two continually occurring processes of adaptation: **assimilation**, or directly processing information that fits a scheme, and **accommodation**, or changing the scheme to fit the new information from the environment. For example, the infant holding a rattle for the first time may assimilate it into an existing scheme for smooth, round objects by sucking on it. He or she may then accommodate and develop a scheme for “rattle” after shaking it and realizing that some things make sounds when shaken. The interplay of assimilation and accommodation helps children adapt to their ever-changing environment (Piaget, 1952).

Piaget believed that intelligence undergoes dramatic changes over time. These changes are so clear-cut that Piaget referred to them as stages of cognitive development (see Table 2.4). Each stage is marked by specific types of thinking and problem solving that differ qualitatively from those of other stages. Furthermore, the stages are sequential and nonreversible—children do not return to earlier stages of thinking (Zigler & Gilman, 1998).

**Piaget’s Stages of Cognitive Development**

Piaget’s first stage, the **sensorimotor stage**, begins at birth and lasts until about 2 years of age. The sensorimotor child relates to objects and people through his or her senses and motor skills. Give an infant a small block, for example, and he or she will try to suck it. Infants use sensorimotor schemes to allow them to learn about the qualities of objects—their shapes, textures, and tastes.

A major accomplishment of the child’s first two years is coming to understand that objects continue to exist even when she or he cannot see them—the concept of **object permanence**. During the first two years of life, children also begin to show signs of purposeful behavior, and by the end of this time, they understand how to use symbols (such as language) to represent their thoughts.

The second stage in Piaget’s theory, the **preoperational stage**, lasts from about 2 to 7 years of age. Preoperational children think in symbols, which permit more flexibility and planning in their problem solving. Preoperational children are egocentric in their thinking—they believe that everyone sees the world as they do. A child who hides only her
### Table 2.4
Piaget’s Stages of Cognitive Development

<table>
<thead>
<tr>
<th>STAGE</th>
<th>APPROXIMATE AGES (IN YEARS)</th>
<th>MAJOR FEATURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensorimotor stage</td>
<td>0–2</td>
<td>Motoric knowledge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of understanding that objects continue to exist when not in view</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Present orientation</td>
</tr>
<tr>
<td>Preoperational stage</td>
<td>2–7</td>
<td>Symbolic representation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Planning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Thinking and problem solving guided by perception and appearances</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Egocentric thinking</td>
</tr>
<tr>
<td>Concrete operational stage</td>
<td>7–11</td>
<td>Logic used in problem solving</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logic applied only to concrete objects and events</td>
</tr>
<tr>
<td>Formal operational stage</td>
<td>11 and beyond</td>
<td>Logic applied to hypothetical and abstract problems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Concern with concepts like justice, equality, and fairness</td>
</tr>
</tbody>
</table>
The son to put this puzzle together?

father in this photograph is helping children. How do you think the facilitating learning in their actions and caregivers have in the important role that social interaction plays. Vygotsky proposed a theory about everyday experiences play a crucial role in children's development. Through their routine interactions, caregivers and teachers provide meaningful assistance to children in developing cognitive, social, and emotional skills (Stringer, 1998). For instance, caregivers often describe problem-solving strategies to children to help them guide their own behavior. As they grow older, children repeat these guidance messages to themselves, out loud at first. These messages later become the silent inner speech that is used to guide behavior (Vygotsky, 1934/1986).

Vygotsky proposed a theory about the important role that social interactions and caregivers have in facilitating learning in their children. How do you think the father in this photograph is helping the son to put this puzzle together?

Vygotsky’s Theory of Cognitive Development

Lev Vygotsky (1896–1934) was a Russian psychologist whose work with children with disabilities gave him an interest in issues of development (Rieber & Hall, 1998). He proposed a theory of development based on the idea that children use psychological tools such as language, numbering systems, and maps to develop higher levels of thinking. Language is particularly important to development because it allows children to develop new ideas and to regulate their behavior. Vygotsky argued that people use language to engage in internal dialogues that help them solve difficult tasks. For instance, you may say to yourself that when you finish reading this section you will take a break. Through the self-direction of your internal dialogue, you continue reading, thereby regulating your behavior and promoting the learning of the material. Vygotsky regarded this internal, or private, speech as a critical element in cognitive development and learning.

More than Piaget, Vygotsky emphasized the influence of social interaction on development. A 3-year-old boy, for example, may be unable to discuss a trip he took to the zoo, but, given a series of prompts by his mother, he can describe the animals he saw and the foods he ate during his trip. The mother acts as a skilled helper in using language to describe experiences. Similarly, a teacher may provide the information and support a student needs to carry out long division. The distance between what a child can do unaided and what a child can do through interaction with skilled helpers is called the zone of proximal development. It is within this zone that a person's potential for new learning is strongest.

The idea that children learn through social interactions with skilled helpers suggests that everyday experiences play a crucial role in children's development. Through their routine interactions, caregivers and teachers provide meaningful assistance to children in developing cognitive, social, and emotional skills (Stringer, 1998). For instance, caregivers often describe problem-solving strategies to children to help them guide their own behavior. As they grow older, children repeat these guidance messages to themselves, out loud at first. These messages later become the silent inner speech that is used to guide behavior (Vygotsky, 1934/1986).

**Concrete Operational Stage**

Piaget's third stage of cognitive development (7 to 11 years), in which children begin to use logic to solve problems.

**Formal Operational Stage**

Piaget's fourth stage of cognitive development (begins around the age of 11), in which individuals are capable of applying logical principles to hypothetical and abstract situations.

**Zone of Proximal Development**

Vygotsky’s term for the distance between what a child can do unaided and what a child can do through interaction with skilled helpers.
INFORMATION PROCESSING THEORY

Can you remember learning to walk? Do you remember the first word you spoke? Most people cannot remember experiences from their early childhood. Why do we remember so little from our lives before the age of 5? This question is one of many that intrigue information processing theorists.

Studies of cognitive development have stimulated efforts to understand how people take in, remember, and use information from their experiences (Keil, 1998). Information processing theory is based on a model in which people have limited capacities for learning but can flexibly apply strategies to find ways around those limitations (Munakata, 1998; Siegler, 1996, 1998).

The human information processing model, shown in Figure 2.3, has three parts. The **sensory register** allows people to very briefly retain visual, auditory, and other information taken in through the senses. **Short-term memory** holds information long enough for the person to evaluate and selectively act on inputs. The capacity of short-term memory is limited: Only a few bits of information can be remembered (Bjorklund, 1995). **Long-term memory**, however, has an unlimited capacity for storing information over long periods of time. In long-term memory, information becomes linked to earlier memories, associations, and visual representations, creating networks that aid in recall. Individuals consciously link or classify ideas and use memory aids (such as rehearsal) to retrieve information.

Information processing theory has been particularly useful for understanding why children and adults remember information differently. For instance, 4-year-old children are less likely than adults to use memory aids and thus are less likely to process information so that it is retained in long-term memory. The theory also is helpful in understanding other changes, such as increased attention to relevant features, that occur in information processing as we grow older.

![Figure 2.3: Information Processing System](image)

*This diagram depicts the three parts of the information processing system. Can you explain what these parts are and how they work together?*
WHAT ARE THE MAJOR CONTEXTUAL THEORIES OF CHILD DEVELOPMENT?

Contextual theories emphasize the interaction between the biological and environmental forces that influence behavior and development in particular contexts. Although these theories are diverse, each is based on the idea that, to truly understand child development, one must study children in their historical, social, and cultural contexts. Development occurs when a child acts within the environment to produce change.

BRONFENBRENNER’S ECOLOGICAL THEORY

What happens to children raised in neighborhoods with drive-by shootings, drug dealing, and poor access to health care? How do societal values influence children’s development? Urie Bronfenbrenner (1917–present) used a concept from earth science—ecology—to outline the interplay between the child and his or her immediate social and physical environment. As shown in Figure 2.4, the child’s experiences are viewed as subsystems within larger systems, or a set of nested structures (Bronfenbrenner, 1979).

Notice that the different spheres contain different types of influences. Bronfenbrenner believed that these different levels of influence interact to affect a person’s development and behavior. This model depicts the complexity of contextual theories of development.
The innermost circle in the ecological model in Figure 2.4 represents the child’s microsystem (immediate environment) and includes influences such as physical objects (toys and technology), the structure of the environment, and the roles of and relationships among family members (Bronfenbrenner & Morris, 1998). This immediate environment has important effects on development. In a classic series of studies of the microsystem, Caldwell and colleagues (Bradley & Caldwell, 1976; Elardo, Bradley, & Caldwell, 1975) found that the quality of 6-month-old infants’ physical and intellectual environments (such as the presence of appropriate play materials and opportunities for daily stimulation) related to their intellectual performance four years later. Similar results have been obtained in more recent studies (Brooks-Gunn, 1995).

The middle sphere of the ecological model is the mesosystem, which encompasses the connections among settings including the child and how these connections influence the child—for example, how a child’s relationships at school affect her or his relationships with extended family members. In one of the first studies of mesosystem influences, it was found that children whose parents were actively involved in their hospital care were less emotionally distressed (both while in the hospital and at home up to a year later) than were children whose parents were allowed only brief visits (Prugh et al., 1953). Introducing people from one of the children’s settings (the family) into another (the hospital) helped ease the transition between them.

The next circle, the exosystem, represents the linkages among settings, one of which does not include the child, and how these influence development. External settings include parents’ social worlds, such as their employment, church attendance, and friends, and the physical environment beyond the immediate setting, such as neighborhood conditions. Researchers studying the exosystem have found, for instance, that children who live in violent neighborhoods have difficulty sleeping, have impaired cognitive performance, and are often aggressive, depressed, and fearful (Gorman-Smith & Tolan, 1998; Horn & Trickett, 1998).

The outermost circle, the macrosystem, represents larger societal values, historical changes, and social policies (Bronfenbrenner, 1986).

Bronfenbrenner’s ecological model is based on his assumption that the environment plays a decisive role in development. But the child and his or her environment are not separate. The child interacts with the environment of which he or she is a part, and these interactions are the engine of development (Bronfenbrenner & Evans, 2000; Bronfenbrenner & Morris, 1998). Children meet their environment most directly in everyday situations (micro- or mesosystem interactions), but these are embedded in the larger physical, social, and cultural contexts (the exosystem), which also affect their development (Magnusson, 1995).

**DYNAMIC SYSTEMS THEORY**

One of the newest theories in the study of development is dynamic systems theory (Thelen & Smith, 1998). The basic ideas of dynamic systems come from research done outside of the social sciences, largely in physics and biology. Dynamic systems theorists assume that complex systems form from basic and simple conditions without requiring a master plan for development (Thelen & Smith, 1994, 1998). This is a new way of thinking about development. Rather than unfolding from a master plan coded by the genes, development is believed to involve self-organization, in which systems change as a result of their interactions. The individual parts of a system, called control parameters, interact in ways that eventually lead to advancement to a new level or a new form. Control parameters can include external as well as internal factors. In this way, dynamic systems theory emphasizes the strong interconnections between children and their environments.

Consider the development of walking as a dynamic system (see Figure 2.5). Walking is a motion of coordinated leg movements that is performed easily by most people. Walking also is highly variable and complex because it requires constant readjustments to allow for different surfaces and different speeds. How does a child develop these coordinated motions and learn to adjust them as needed? A child has acquired many components of walking before she or he actually walks—balance, coordination of the legs, stepping abilities, and leg strength. At
In this model, the different elements involved in walking are considered to be control parameters. The slowest-developing aspect is the rate-limiting component, which limits the speed at which the behavior is acquired. Once this aspect develops, the system evolves into a new form—walking.

some point, these separate pieces all come together and the child is able to propel herself or himself across the floor for a few steps, usually with great concentration and little grace.

The slowest, or last-developing, part of a system is called the rate-limiting component; when it develops, the system evolves into a new form (Thelen, 1989). For many chil-
dren, the last part of the “walking puzzle,” the rate-limiting component, is leg strength. When their legs develop adequate strength, balance improves, enabling them to shift their weight back and forth on one leg as they take a step. If assistance is provided to reduce the input of the rate-limiting (leg strength) component, such as by putting children into a walker, they can easily walk earlier than development normally would allow. Once children are walking unaided, practice at using all the parts of the system together leads to smoother and better performance. As you can see from this example, a new behavior—walking—emerges out of several different systems that eventually work together to produce this new ability. Later, with further adjustments and development of individual pieces of the motor system, brain, and body, the child will move to another new form—running.

Although the dynamic systems approach is based on ideas formed outside the developmental sciences, the theory fits very well with the idea that development involves transactional experiences, from which universal developmental domains are constructed (Horowitz, 2000).

**HOW IS CHILD DEVELOPMENT STUDIED?**

Theories guide researchers by helping them to identify interesting and important questions. Once a question has been identified, scientists set out to answer it using a well-defined approach, called the scientific method.

Consider 4-year-old Bridget. She is a typical preschooler. Her best friend is Ivanna, and she seldom plays with boys. Bridget, like many other children, prefers to play with children who are the same sex as she. Scientists have been trying to discover why children prefer same-sex playmates (Maccoby, 1998; Martin, 1994; Martin & Fabes, 2001), but how do they investigate a question like this? Finding an answer requires application of scientific reasoning and use of the scientific method.

**SCIENTIFIC REASONING AND THE SCIENTIFIC METHOD**

Scientific reasoning is similar to good everyday problem solving. When you need to solve a problem, you apply logical reasoning to minimize the number of possible explanations, with the ultimate goal of finding one probable explanation (Overton, 1998). Scientific reasoning is designed to produce results that are objective (they are measurable and observable by others), reliable (they can be replicated repeatedly), and valid (they accurately describe the phenomenon in question).

To solve the many mysteries of child development, researchers use the scientific method. The scientific method involves four steps:

1. **Formulating a hypothesis.** Through observation and study, a scientist develops an educated expectation, or hypothesis, about the phenomenon or behavior he or she is interested in.
2. **Designing a study.** The scientist strategically designs a study that tests the hypothesis. The study may involve many different methods, such as structured interviews, observations, or experiments in the laboratory.
3. **Collecting evidence.** The scientist uses the strategy that he or she has designed to collect information to test the accuracy of the hypothesis.
4. **Interpreting and reporting the evidence.** The scientist analyzes the data and interprets the patterns of the findings as they relate to the hypothesis.

Consider the hypothesis that children play with same-sex peers because they have common interests. If this hypothesis is accurate, we would expect children to play more often with same-sex peers during gender-typed activities. For instance, a girl would be more likely to play with other girls when playing with a kitchen set than when swinging, a non-gender-typed activity. To test this hypothesis, a scientist might design a study in which a team of observers watches certain children while they play and notes the sex of the children who play
THE PRACTICAL IMPACT: NURTURING CHILDREN

Assessing Your Personal Beliefs

For some people, one theory “resonates” more than another—it makes more sense to them and just feels right. Which of the theories resonates with you? On each continuum, mark where your beliefs about the basic issues of human development fall. Then compare your answers with those that match different theoretical perspectives, as shown in the table below.

Dominant Influence: To what extent do you think biological and internal factors account for development?

<table>
<thead>
<tr>
<th>Dominant Influence</th>
<th>Biological and Internal Influences</th>
<th>Environmental Influences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minor ___________________________ Major</td>
<td></td>
</tr>
<tr>
<td>To what extent do you think environmental factors account for development?</td>
<td>Environmental Influences</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minor ___________________________ Major</td>
<td></td>
</tr>
</tbody>
</table>

Importance of Early Experience: Do you think that the experiences of early childhood are especially important to development?

<table>
<thead>
<tr>
<th>Importance of Early Experience</th>
<th>Yes ___________________________ No</th>
</tr>
</thead>
</table>

Continuity/Discontinuity: Do you think development proceeds smoothly?

<table>
<thead>
<tr>
<th>Continuity/Discontinuity</th>
<th>Yes ___________________________ No</th>
</tr>
</thead>
</table>

Now compare your responses to those that follow, given by theorists from different perspectives.

Issues in Development from Each Theoretical Perspective

<table>
<thead>
<tr>
<th>Biology-Based Theories</th>
<th>EMPHASIS ON BIOLOGICAL FACTORS</th>
<th>EMPHASIS ON ENVIRONMENTAL FACTORS</th>
<th>EMPHASIS ON EARLY EXPERIENCE</th>
<th>EMPHASIS ON CONTINUITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evolutionary</td>
<td>Major</td>
<td>Minor</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Ethology</td>
<td>Major</td>
<td>Minor</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Attachment</td>
<td>Major</td>
<td>Major</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Neurodevelopmental</td>
<td>Major</td>
<td>Major</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Psychoanalytic Theories

<table>
<thead>
<tr>
<th>Psychoanalytic Theories</th>
<th>EMPHASIS ON BIOLOGICAL FACTORS</th>
<th>EMPHASIS ON ENVIRONMENTAL FACTORS</th>
<th>EMPHASIS ON EARLY EXPERIENCE</th>
<th>EMPHASIS ON CONTINUITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freud</td>
<td>Major</td>
<td>Minor</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Erikson</td>
<td>Major</td>
<td>Minor</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

Environment-Based Theories

<table>
<thead>
<tr>
<th>Environment-Based Theories</th>
<th>EMPHASIS ON BIOLOGICAL FACTORS</th>
<th>EMPHASIS ON ENVIRONMENTAL FACTORS</th>
<th>EMPHASIS ON EARLY EXPERIENCE</th>
<th>EMPHASIS ON CONTINUITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classical Conditioning</td>
<td>Minor</td>
<td>Major</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Operant Conditioning</td>
<td>Minor</td>
<td>Major</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Social Learning</td>
<td>Minor</td>
<td>Major</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Cognition-Based Theories

<table>
<thead>
<tr>
<th>Cognition-Based Theories</th>
<th>EMPHASIS ON BIOLOGICAL FACTORS</th>
<th>EMPHASIS ON ENVIRONMENTAL FACTORS</th>
<th>EMPHASIS ON EARLY EXPERIENCE</th>
<th>EMPHASIS ON CONTINUITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piaget</td>
<td>Major</td>
<td>Major</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Vygotsky</td>
<td>Major</td>
<td>Major</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Information Processing</td>
<td>Major</td>
<td>Some</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Contextual Theories

<table>
<thead>
<tr>
<th>Contextual Theories</th>
<th>EMPHASIS ON BIOLOGICAL FACTORS</th>
<th>EMPHASIS ON ENVIRONMENTAL FACTORS</th>
<th>EMPHASIS ON EARLY EXPERIENCE</th>
<th>EMPHASIS ON CONTINUITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecological</td>
<td>Minor</td>
<td>Major</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Dynamic Systems</td>
<td>Major</td>
<td>Major</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
with them and what they are doing at that time. After some amount of time, the scientist summarizes and analyzes the observations. The scientist then interprets the findings to determine whether the children were more likely to play with same-sex peers when they were involved in gender-typed activities than when they were involved in non-gender-typed activities. When Maccoby (1988) investigated this hypothesis, she did not find support for it. Instead, children played with same-sex playmates regardless of the type of activity. Thus, this same-sex preference appears to be due to factors other than shared interests. When a hypothesis is not confirmed, scientists often learn interesting new information, which may change theories and help them formulate different hypotheses to test.

**TOPICS IN DEVELOPMENTAL SCIENCE**

Think about some of the headlines that you have seen related to child development or some of the issues that you have discussed with your friends. Should children go to preschool? How do teen gangs form? Can babies learn before they are born? Developmental scientists are interested in these questions and many more. What determines the areas or topics they choose to study?

The topics that are studied by developmental scientists have changed over time, and the “hot” topics of developmental science also change over time (Horowitz, 2000). The scientific study of child development grew out of concerns about the welfare of children, and very practical questions were the initial focus of research efforts. Research trends then changed for many years, becoming more focused on topics related to children’s learning (Schewebel, Plumert, & Pick, 2000).

Just as topics have changed over time, so too have the ways they are evaluated by both the lay public and other scientists. Recently, there has been an increasing emphasis on topics that have practical and everyday importance in the lives of children (Lerner, Fisher, & Weinberg, 2000; McCall & Groark, 2000). The newsworthiness of the topic, the severity of the issue (e.g., HIV infection in babies), and the number of people whose lives are touched by the issue also are factors in how topics are evaluated (Fabes, Martin, Hanish, & Updegraff, 2000).

Traditionally, research topics have been described as falling into one of two camps—basic developmental research and applied developmental research. Basic developmental research is designed to answer broad, fundamental questions about development, such as the following:
What are the causes of developmental disabilities?
How is language acquired?
What emotions are infants born with?

Applied developmental research is designed to solve practical problems, such as
- how to treat children with developmental delays
- how to improve the language skills of children who suffer head injuries
- how to help parents cope with chronically ill infants

Both types of research are necessary for understanding child development. Basic research lays the foundation for the applied research that follows. Additionally, applied research often produces questions that can be answered only through basic research (Herrmann, 1998). Today, there is a movement toward integrating the basic and applied approaches. Basic researchers can consider the implications of their research for applied issues. Applied scientists can ground their research on applied problems in basic research findings. And, basic research can be conducted within the context of an applied problem. For instance, research on children’s high accident rates when driving ATVs led to the development of the idea that children’s understanding of their own abilities varies depending on their familiarity with the demands of a situation. Children are most at risk for making errors (and possibly injuring themselves) when they are learning a new skill or acting within a new environment (Schewebel et al., 2000). When research is done in this way, the complementary roles of applied and basic research become even more apparent.

**RESEARCH STRATEGIES**

For both basic and applied developmental research, scientists have developed methods, or research designs, to help them determine whether their hypotheses are correct. No single research design is perfect, and each research design has advantages and disadvantages. The following qualities vary according to the design of the study:
- Degree of control and structure
- Degree to which cause and effect can be determined
- Degree to which the findings of the study generalize to other people or settings
- Degree to which the findings directly apply to real-life events and processes

Table 2.5 outlines how these qualities apply to the six different types of research designs discussed in this chapter.

How do scientists select the methods they believe will be most useful in investigating a problem? First, the theory that guides their research may lead them to choose a particular method. Ethologists, for instance, choose methods that allow them to collect data in natural settings, because they are interested in observing the adaptive functions of behaviors as they

**TABLE 2.5**
Comparing Different Research Strategies

<table>
<thead>
<tr>
<th>METHOD</th>
<th>CONTROL AND STRUCTURE</th>
<th>DETERMINATION OF CAUSALITY</th>
<th>GENERALIZES WELL</th>
<th>DIRECT APPLICATION TO REAL LIFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case studies</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Clinical interviews</td>
<td>No</td>
<td>No</td>
<td>Possibly</td>
<td>Possibly</td>
</tr>
<tr>
<td>Survey studies</td>
<td>No</td>
<td>No</td>
<td>Possibly</td>
<td>No</td>
</tr>
<tr>
<td>Naturalistic studies</td>
<td>No</td>
<td>No</td>
<td>Possibly</td>
<td>Yes</td>
</tr>
<tr>
<td>Correlational studies</td>
<td>No</td>
<td>No</td>
<td>Possibly</td>
<td>Possibly</td>
</tr>
<tr>
<td>Experimental studies</td>
<td>Yes</td>
<td>Yes</td>
<td>Possibly</td>
<td>Possibly</td>
</tr>
</tbody>
</table>
occur in everyday situations. Learning theorists are more likely to choose controlled settings, such as laboratory experiments, where they can manipulate conditions to study the effects of reinforcement on specific behaviors.

Second, the research question may dictate the best methods, leading scientists to adopt different methods at different times. For example, when first investigating a question, a scientist might examine behaviors in a natural setting. After formulating a testable hypothesis, he or she may then move into a more controlled environment where cause and effect can be tested.

Case Studies
In a case study, the researcher collects information about aspects of a person's life, such as medical history, family background, school grades, friendships and relationships, intelligence and achievement, personality characteristics, or dreams and desires. The advantage of this design is that it allows an in-depth view of the person. The disadvantage is that the information may not generalize to other people because of unique features of the person (Yin, 1994).

One of the earliest case studies was Charles Darwin's detailed diary study of his infant son's behavior (Darwin, 1877). Other important case studies have been based on the lives of famous people such as Mahatma Gandhi (Erikson, 1969). Case studies may feature people who are unusual or who have a noteworthy condition, such as Victor (Chapter 1). More recently, a case study of a severely neglected and abused child named Genie provided insights into how development proceeds under extremely harsh conditions (Curtiss, 1977).

Clinical Interviews
In a clinical interview, the researcher asks detailed questions in interaction with the participant. The goal of the clinical interview is to identify how the individual thinks about some topic. In the following example of a clinical interview (Piaget, 1946/1969, p. 207), the researcher is exploring the child's understanding of age. This interview reveals a common misunderstanding that young children have about age: that it is directly related to size.

*Experimenter:* Are you the same age? (as his older sister)

*Filk (boy, age 5):* No, because we weren't born at the same time.

*Experimenter:* Who was born first?

*Filk:* She was.

*Experimenter:* Will you be the same age as her one day or will the two of you never be the same age?

*Filk:* Soon I will be bigger than her, because men are bigger than women. Then I shall be older.

The data obtained in a clinical interview may be biased by participants' telling the experimenter what they believe the experimenter wants to hear (Garbarino & Stott, 1992). Also, the method can be used only with language-proficient participants and thus is not useful with very young children or with children who have language problems. The advantage of this method is its flexibility. The clinical interview can be used to probe for new information or to gain insights into people's thoughts and feelings.

Survey Studies
A survey study is used to determine how a number of people respond to a set of structured questions. A survey may be conducted by phone, in person, or by mail. An advantage is that
Correlations provide evidence of the type of relationship between two variables. The top graph depicts a positive correlation—as students study more, their grades improve. The bottom graph depicts a negative correlation—as students study more, their anxiety about test performance decreases. Correlational research, however, cannot tell us the reasons for these relationships.

**naturalistic study** method in which researchers observe the behavior of people in their natural environments

**correlational study** method in which researchers compare participants on two variables to determine whether the variables relate to each other

**correlation coefficients** calculated measures of the relations between variables

Data for many people can be obtained easily, but a disadvantage is that people often respond inaccurately as they try to present themselves in the most positive way (Fowler, 1993).

If you have answered questions for a telephone poll, you have been involved in a survey study. Survey studies are popular for gathering data about demographics (age, income, marital status), beliefs and attitudes, leisure activities, political beliefs, and consumer choices. Several large-scale surveys have been done on adults. One is the General Social Survey, which covers topics such as attitudes, life satisfaction, health, religion, sex, and race. Another is the National Health Interview Survey, designed to obtain information about eating and health habits. The National Survey of Children is one of the few large-scale studies of a broad range of topics done on children (Cozby, Worden, & Kee, 1989). Every decade, the US Census Bureau conducts one of the largest surveys, encompassing almost the entire US population, and the results have important consequences for funding and political representation for cities and states.

**Naturalistic Studies**

In a **naturalistic study**, researchers observe the behavior of people in their natural environments—homes, schools, malls, or parks. Because researchers are watching people in their familiar everyday settings, the people tend to behave normally. A disadvantage of naturalistic studies is the difficulty of generalizing from one setting to another setting. In addition, the researcher has no control over the naturalistic setting, making it virtually impossible to determine cause and effect.

Thorne (1993) conducted a year-long naturalistic study in public school classrooms in California and Michigan. She observed children’s social behavior in the lunchrooms, hallways, and playgrounds. From these observations, she described how boys and girls interact. For instance, she concluded that both sexes tend to play in same-sex groups but that children cross gender lines for certain games such as “chase and kiss.” Thorne’s data did not enable her to draw cause-and-effect conclusions, though, because she could not systematically control for variables that might explain why children behaved as they did.

**Correlational Studies**

Are children who watch more television more aggressive? The important research hypothesis that they tend to be more aggressive has been difficult to test. Because so many children watch television, it is difficult to find children who do not watch television to serve as a comparison group. In such cases, researchers use correlational studies. A **correlational study** compares participants (children, in this case) on two variables to determine whether the variables relate to each other: Are children who watch more television more likely to be aggressive than children who watch less television?

To uncover patterns in variables, researchers use **correlation coefficients**—calculations of the relations between variables. Correlation coefficients range from +1.0 to –1.0. A positive score represents a positive relationship between variables (a high score on one variable is related to a high score on the other). Zero represents no relationship between variables, and a negative score represents an inverse relationship between variables (a high score on one variable is related to a low score on the other). Figure 2.6 illustrates positive and negative correlations.

Although correlational studies demonstrate how variables are related, they cannot reveal whether one of the variables causes the other one. In the example of television viewing and aggression, for instance, it is impossible to know whether television viewing causes children to be more aggressive. It may be that children who are aggressive are more inclined to watch television than are less aggressive children. Or, television viewing and aggression may each be related to a third variable that has not been considered, such as parental supervision. Perhaps when parents do not supervise their children closely, the children watch more television and are also more aggressive, even though the two are not directly linked (Cozby et al., 1989).

Sometimes correlational studies provide the only ethical way to study a topic. For example, the most scientifically sound way to study the effects of spanking on children would be to have one group of parents spank their children and another group not spank theirs.
Scientists who study child development follow strict guidelines for the ethical treatment of the participants in their studies. Before running a study, scientists submit a plan for the study to the institutional review board at their college or university. This board is responsible for granting approval for and overseeing studies that involve human participants. To obtain approval, scientists must comply with the American Psychological Association’s guidelines for research with human participants and the guidelines for children developed by the Society for Research in Child Development. Special care is taken with children because they are assumed to be more vulnerable to stress and less able to evaluate what participation in a research program may mean. The guidelines for research with children include the following:

- **Protection from harm.** Each child must be protected from potential physical and psychological harm. No treatment or experimental condition can cause harm.
- **Protection of well-being.** If, in the course of research, information that may seriously affect a child’s well-being comes to the researcher’s attention, the investigator has a responsibility to discuss the information with experts in the field so that the parents may arrange necessary assistance for their child.
- **Informed consent.** Each child and his or her parents have the right to know the procedures that will be used in the study and decide whether or not to be involved in the study. Informed consent also requires a description of the risks and benefits of the study.
- **Privacy.** Children involved in studies have the right to maintain their privacy. This is accomplished by allowing children to remain anonymous when they participate in studies, typically by assigning identification numbers rather than using names and by analyzing data at a group rather than an individual level.
- **Right to beneficial treatments.** Children have the right to receive any treatment that is found to be effective when used in a study. If a child is a member of a nontreated control group, she or he has the option of receiving the treatment as soon as the treatment is found to be successful.

**Thinking It Through:**

1. What special protections must be in place for children who participate in research, over and above those extended to adults?
2. What scientific risk is there in informing research participants about the specific nature of the study, the hypotheses, and the methods before the study begins?

**Experimental Studies**

How do scientists investigate whether television viewing causes aggression? To answer the question of causality, scientists must use an experimental study, in which people are brought into a laboratory where the situation is manipulated and the effects of the manipulation are noted. The causes of behavior are easier to determine with experimental methods than with correlational methods because the scientist controls the sequence of events and any extraneous variables that may influence the findings in unexpected ways.

Scientists gain control over extraneous variables in several ways. One way is by trying to hold constant all other factors that may influence behavior. For instance, in a study of television violence, a scientist might hold constant the characteristics of the experimenter, the ages of the participants, the lighting, and the time of day participants are tested.

Not all variables can be easily controlled, however, especially characteristics of people. Scientists want to ensure that the effects of uncontrollable variables are randomly distributed across the groups involved in the study. For instance, a child’s upbringing may influence his or her likelihood of being aggressive with other people, but it is impossible to identify and control all the variables related to a child’s upbringing in any one study. To minimize the effects of these variables, scientists use randomization. They select participants at random, called random sampling, and they randomly assign people to groups, called random assignment. In this way, the effects of upbringing and other uncontrolled variables will be approximately the same for all groups in the study.

Scientists design experimental studies by determining which variable they want to test the effects of. This is the independent variable, which is assumed to be the cause of the behavior and is manipulated by the scientist. If the independent variable is exposure to violent programming, one group of children watches a violent program and the other
watches a nonviolent program. The children who watch the violent program are considered to be in the experimental group, whereas the children watching the nonviolent program are in the control group. All other variables are kept the same for both groups. The researcher then assesses whether children who received the independent variable (exposure to violent programming) differ from those who did not. The behavior thought to be affected by the independent variable is the dependent variable—in this case, aggressive behavior following the television viewing. Thus, in experimental studies, the “cause” is the independent variable and the “effect” is the dependent variable (Cozby et al., 1989).

Although the experimental method allows scientists to determine cause and effect, it has disadvantages. The major disadvantage is that laboratory situations often are not realistic. People may respond quite differently in a laboratory setting than in real life. Findings from experimental studies may be very relevant for real life, but care must be taken in interpreting them if the experimental manipulation is not realistic.

MEASURING CHANGE OVER TIME

Many of the most interesting questions in child development involve change over time. Is an outgoing and affectionate toddler likely to grow up to be a teenager who has many friends? Do active children become active adults? To answer these questions, scientists use methods that assess change over time.

One method for assessing change is the cross-sectional study. As Figure 2.7 illustrates, in cross-sectional studies, individuals of different ages are tested at the same point in time, and the results from each age group are compared. For instance, a researcher interested in developmental changes in memory capacity might test children who are 4, 8, 12, and 16 years old. Children at each age would be shown a group of objects and later asked what they remembered about the objects. By averaging the memory scores for children at each age, researchers could get an idea how memory capacity changes.

**FIGURE 2.7**

Cross-Sectional Design

![Cross-Sectional Design Diagram]

The cross-sectional design involves testing groups of people of different ages at the same point in time. What are the strengths and weaknesses of this design?
The Social Impact: Debating the Issue

Do Gifted Children Become Well-Adjusted Adults?

Remember the case of William James Sidis, the child prodigy discussed in Chapter 17. Many people believe that gifted children are like William—odd and socially awkward. But is this perception true? One attempt to examine this issue was launched in 1920, when Lewis Terman (1877–1956) began a longitudinal study of gifted children. He was interested in discovering the origins and outcomes of being a genius. He was particularly interested in testing the popular belief that geniuses grow up to be maladjusted. This study is one of the classic longitudinal studies (Terman, 1925). Over 1000 highly intelligent (IQ scores of 140 and above, or 40 points over the average) children from California were followed from school age through the rest of their lives. Terman was involved in the study until the children were in their 40s and 50s (Terman & Oden, 1959), and then new researchers took over the study to continue following Terman’s “Termites,” as the participants called themselves.

Terman’s participants were successful at all stages of their lives. As children, they did well in school, had satisfactory peer relationships, and showed early and intense interests in science and literature. Many more of the gifted participants finished college and obtained graduate degrees than did members of comparison groups with normal-range IQ scores. With respect to social adjustment and maturity, the gifted participants were similar to comparison groups of non-gifted people. Almost all of them married, and many had children. In their 40s, the gifted participants were at the peak of their careers. The Termites included many distinguished scientists, doctors, lawyers, and inventors. One participant learned fifteen languages, and two others were awarded over a hundred patents. Generally, the participants seemed contented with their lives. The gifted participants did not grow up to be criminals or alcoholics; in fact, their rates of criminal behavior and alcoholism were much lower than those for the general population. Even in their 70s, many of the participants had active and intellectually stimulating lives (Shurkin, 1992).

Thinking It Through:

1. Why is it important to test common-sense beliefs? In what ways does Terman’s study dispel the myth that geniuses are eccentric?
2. If you were designing a study of the psychological adjustment of gifted children, what kinds of measures would you consider including in your study? Why is it difficult to measure adjustment?
3. Why are longitudinal studies difficult to conduct? What factors make them expensive? How do you keep participants interested in being in the study?

Cross-sectional studies are limited in their ability to identify age-related changes. In these studies, the children in each age group make up a cohort, or unique birth group. The scientist may be unaware of important systematic ways in which cohorts differ. For instance, suppose a comparison of computer skills in 10-year-olds and 60-year-olds reveals that more of the 10-year-olds are highly skilled. The scientist might be tempted to conclude that as people grow older they lose computer skills. However, these two cohorts have experienced different historical times, which affected the amount of their exposure to computers in the first place.

Another method for assessing change over time is the longitudinal study (see Figure 2.8), in which the same group of individuals is tested at different points in time. When the results at the different points in time are compared, developmental changes become apparent. Problems of longitudinal studies include a tendency for some individuals to drop out and for test scores to improve because of repeated testing. Longitudinal studies also are limited in their ability to identify age-related changes. Any changes that occur may be due to the particular cohort studied rather than to age changes. These studies also are expensive and time-consuming (Willett, Singer, & Martin, 1998).

To minimize problems with cross-sectional and longitudinal designs, scientists may use a combination of the two strategies, called a cohort-sequential research design. In this design, illustrated in Figure 2.9 on page 53, a cross-sectional study is expanded so that data are collected from the same cohorts at different points in time. New participants can be added at each time point to prevent the problems of repeated testing and attrition.

Measuring Children’s Behavior

Developmental scientists have devised many ways to measure variables of interest, such as aggression, memory, intelligence, and stress. Four broad categories of measures are used. Physiological measures record responses of the body, such as heart rate, hormone production, and galvanic skin response (sweating), which are used to assess arousal and anxiety. Activity
Behavioral measures involve the direct assessment of behavior through observation. To investigate whether children have preferences for certain toys, observers watch them play to see if they choose one type of toy over another. To assess whether mothers and fathers respond to their children differently, observers watch and record how parents play with their children.

Self-reports are a third type of measure. Rather than observing children as they play with dolls or cars, a scientist might ask them which toy they prefer. Self-reports include questionnaires in which people respond to questions about their behavior, attitudes, beliefs, values, and habits. Self-report measures are the easiest type of information to gather, but people may not be accurate in reporting or may not remember the information they are asked to report on.

Projective measures indirectly assess individuals' psychological states. The typical strategy is to show a participant an ambiguous scene, such as a picture of a boy standing by a fireplace looking sad. The participant is then asked to make up a story about the boy. Or a child may be asked to draw a person or a family. From these stories and drawings, researchers infer the person's thinking and feelings. This method yields only subjective data, however, which might vary in interpretation from researcher to researcher.

Consider, too, the special challenges involved in testing hypotheses relevant to infants and young children. Many of the techniques used with older children and adults, such as questionnaires and projective measures, are impossible to use with young children. Infants and young children do not have the verbal skills necessary to answer questions. Whereas older children can provide some insight into their own thinking and experience, this kind of insight is very difficult for younger children to provide, even when they have some verbal skills. Testing infants, in particular, is difficult because they are often crying, asleep, or drowsy, making them unresponsive to any kind of testing. Adhering to ethical guidelines also is problematic when testing young children and infants, because it is difficult to assess a nonverbal child's refusal to participate.
As you can see, developmental scientists face many challenges as they choose a research question, a theoretical basis, a set of methods, and the types of measures. But studying how behavior develops and changes over time can be rewarding and meaningful work.

The cohort-sequential research design minimizes the problems of both cross-sectional and longitudinal designs. The same children are tested at several points in time, but new participants are added at each time point to prevent the problems of repeated testing and attrition.

As you can see, developmental scientists face many challenges as they choose a research question, a theoretical basis, a set of methods, and the types of measures. But studying how behavior develops and changes over time can be rewarding and meaningful work.

**TRY IT OUT**

**Activities Relating to Child Development**

1. Where do you stand in the nature versus nurture debate? What evidence, experiences, and observations can you cite to support your position? How do your ideas on the respective roles of biology and environment in development compare with those of your classmates?
2. Think about your own behavior. Can you think of examples of behaviors that you learned through operant conditioning? Through social learning? Describe how you might have acquired these behaviors.
3. Consider the development of a child born to a drug-addicted mother. Think about the kinds of microsystem, exosystem, and macrosystem influences that could potentially play a role in the child’s development. Now consider how interventions could be used at each of these levels to improve the developmental outcome for the child.
4. Design an individual or collaborative research project using one of the research strategies described in this chapter. Begin by posing a question that you wish to answer about child development. Try to formulate a hypothesis. Now, what methods will you use to test this hypothesis? Who will your participants be and how many will there be? What information will you need, where and how will you get it, and in what form will you record it? What ethical issues will you need to consider? What might be the outcomes of applications of your findings?
How do theories explain child development?
- Scientific theories are structured sets of ideas that help explain the complexities of child development, organize existing evidence, and provide guidance for future research.
- Developmental theories attempt to explain how behavior changes over time.
- Theories are judged by their usefulness, testability, ability to provide practical guidance, and ability to stimulate new research.

What are the major biology-based theories of child development?
- Evolutionary theory focuses on the idea that development of the individual is the result of the inheritance of characteristics that promote survival of the species.
- Ethological theory focuses on the evolutionary causes and adaptive value of behavior. Ethologists propose that there are critical and sensitive periods in development.
- Attachment theorists argue that early emotional ties with caregivers provide a child with an inner working model on which future relationships are based, and that attachment behaviors increase an infant’s likelihood of survival.
- Neurodevelopmental theory focuses on how the brain develops and how experience influences this development.

What are the major psychoanalytic theories of child development?
- Psychoanalytic theories stress the role of unconscious internal drives as the major influences on development.
- Freud’s psychosexual theory emphasized the development of sexual energy (the libido) and how the libido becomes focused on different erogenous zones over five stages (oral, anal, phallic, latency, genital) of development.
- Erikson’s psychosocial theory is based on crises that individuals undergo at different stages of development. How individuals resolve these crises influences their development.

What are the major environment-based theories of child development?
- Classical conditioning was discovered by Pavlov, who found that pairing a neutral stimulus with an unconditioned stimulus eventually elicits a conditioned response to the neutral, or conditioned, stimulus.
- Watson applied classical conditioning to the study of children’s emotions and found that emotions such as fear often result from the pairing of a once-neutral stimulus with an unconditioned stimulus that naturally elicits fear.
- Skinner focused on learning that occurs because of the consequences that follow a response (operant conditioning). Behaviors that lead to positive consequences are more likely to be repeated than those that lead to aversive consequences.
- Social learning theory emphasizes the roles of observation and imitation. Individuals develop new patterns of behavior by observing others and then modeling their behaviors.

What are the major cognition-based theories of child development?
- Piaget’s theory of cognitive development maintains that children’s thinking is qualitatively different from that of adolescents or adults. Cognitive development involves adapting to one’s environment, using the processes of assimilation and accommodation.
- Vygotsky’s theory of cognitive development emphasizes the importance of psychological tools, such as language, in development. Vygotsky also places great emphasis on the role of the social context and how social interactions support development in a learner’s zone of proximal development.
- Information processing theory focuses on both environmental input and the processing of information in the brain. The individual has limited but flexible capacities for processing information from the environment. These capacities change over time.

What are the major contextual theories of child development?
- Bronfenbrenner’s ecological theory features the interplay of the individual and his or her social and physical environment. The interactions between the child and the environment are the engine of development.
- Dynamic systems theory is a theoretical approach to understanding development that focuses on self-organization. Separate components of behavior develop at different times and then come together to produce new forms of action and behavior.

How is child development studied?
- The goals of scientific research are to produce findings that are objective, reliable, and valid. The scientific method involves four steps: formulating a hypothesis, designing a study, collecting evidence, and interpreting and reporting the evidence.
- Basic research is designed to investigate broad core developmental issues, whereas applied research is designed to solve practical problems.
- Many research strategies are available for testing hypotheses, and each has advantages and disadvantages. Case studies involve collecting information from individuals. Survey studies are used to determine how a number of people respond to structured questions. Naturalistic studies involve observing behavior in natural settings. Correlational studies assess the relationships between variables. Experimental studies investigate cause and effect.
- Change over time is measured through the use of developmental designs. In cross-sectional studies, individuals of different ages are tested at the same time. In longitudinal studies, the same group of individuals is followed and tested over time. In cohort-sequential studies, multiple groups of individuals are followed and tested over time.
- Different measures are used to study children’s development. Physiological measures assess activity in the body, such as heart rate and electrical activity in the brain. Behavioral measures require direct observation of people’s behavior. Self-reports involve asking people to answer questions about their behavior.
Projective measures use people’s responses to ambiguous scenes or pictures to measure their psychological states indirectly. Special challenges are involved in testing non-verbal infants and toddlers.

**KEY TERMS and CONCEPTS**

- accommodation (36)
- assimilation (36)
- attachment theory (29)
- case study (47)
- classical conditioning (33)
- clinical interview (47)
- cohort (51)
- cohort-sequential research design (51)
- concrete operational stage (38)
- control group (50)
- control parameters (41)
- correlational study (48)
- correlation coefficients (48)
- cross-sectional study (50)
- dependent variable (50)
- dynamic systems theory (41)
- ecological model (41)
- ego (30)
- empirically based (27)
- ethological theory (28)
- evolutionary theories (28)
- exosystem (41)
- experimental group (50)
- experimental study (49)
- extinction (33)
- fact (26)
- formal operational stage (38)
- id (30)
- independent variable (49)
- information processing theory (39)
- libido (30)
- long-term memory (39)
- longitudinal study (51)
- macrosystem (41)
- mesosystem (41)
- microsystem (41)
- naturalistic study (48)
- negative reinforcement (33)
- neodevelopmental approaches (29)
- operant conditioning (33)
- positive reinforcement (33)
- preoperational stage (36)
- psychoanalytic theories (30)
- psychosexual development (30)
- psychosocial crises (32)
- punishment (33)
- random assignment (49)
- random sampling (49)
- rate-limiting component (42)
- schemes (36)
- sensorimotor stage (36)
- sensory register (39)
- shaping (34)
- short-term memory (39)
- social learning theory (35)
- superego (30)
- survey study (47)
- theory (26)
- vicarious reinforcement (35)
- zone of proximal development (38)
## BENCHMARKS in Child Development

<table>
<thead>
<tr>
<th>DEVELOPMENTAL STAGE</th>
<th>APPROXIMATE AGES</th>
<th>PROMINENT CHARACTERISTICS OF STAGE</th>
</tr>
</thead>
</table>
| Prenatal                  | Conception to birth | Unfolding of genetic code  
Formation of basic organs and structures                                                               |
| Neonatal                  | 0–2 months       | Transition to extra-uterine life  
Adaptation to external environment  
Establishment of basic emotions and social interactions                                                  |
| Infancy/toddlerhood       | 2–36 months      | Transition to symbolic thought and language  
Development of locomotion  
Development of attachment relationships                                                                  |
| Early childhood           | 3–6 years        | Development of autonomous learning and regulated actions  
Focus on parent-child discipline  
Development of peer relationships                                                                       |
| Late childhood            | 7–10 years       | Transition to school  
Development of logical thinking  
Development of self-comparisons                                                                       |
| Early adolescence         | 11–14 years      | Achievement of puberty, growth spurt, and focus on physical appearance  
Development of risk-taking behaviors  
Interest in intimate relationships                                                                     |
| Late adolescence          | 15–19 years      | Development of formal logic  
Achievement of physical maturation  
Preparation for adulthood                                                                           |

### NATIONAL HOTLINES FOR CHILD DEVELOPMENT

- National Association of Counsel for Children: 888-828-6222
- National Information Center for Children and Youth with Disabilities: 800-695-0285
- National Library of Medicine: 888-346-3656
- Stand for Children: 800-663-4032
Impact Report on Child Development

This graph shows the population of the United States as a function of age, from birth to 19 years. Notice how the population increases from birth to age 10 and then begins to drop off. What factors contribute to the increased population rates in early life and the decreased population rates later in childhood and adolescence? What impact might these data have for social policy?


<table>
<thead>
<tr>
<th>AGE (IN YEARS)</th>
<th>POPULATION (IN MILLIONS)</th>
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SOURCE: US Census Bureau, 2001

Recommended Websites


Children Now: A nonpartisan, independent voice for children, working to translate the nation’s commitment to children and families into action. Its Website has a large amount of up-to-date information on child development, social policy, and research. http://www.childrennow.org/

Jean Piaget Society: Devoted to honoring Jean Piaget and his major theoretical and empirical contributions to the understanding of the origins and evolution of knowledge. Its Website provides an open forum for the presentation and discussion of scholarly work on issues related to human knowledge and its development, as well as lists of relevant books and other publications. http://www.piaget.org/

National Council on Family Relations (NCFR): The leading non-profit organization for family researchers, educators, policy makers, and practicing professionals. On the Website, its members share knowledge and information about families. http://www.ncfr.com/


US Census Bureau: This Website contains a huge amount of information about the United States—its population, families, economy, and society. http://www.census.gov/
Child development entails the biological, psychological and emotional changes that occur in human beings between birth and the conclusion of adolescence, as the individual progresses from dependency to increasing autonomy. It is a continuous process with a predictable sequence, yet having a unique course for every child. It does not progress at the same rate and each stage is affected by the preceding developmental experiences. Because these developmental changes may be strongly influenced by genetic factors, it is important to explore some of the best-know child development theories.

Psychologists and development researchers have proposed a number of different theories to describe and explain the process and stages that children go through as they develop. Some tend to focus on the developmental milestones or specific achievements that children reach by a certain age. Others focus on specific aspects of child development such as personality, cognition, and moral growth. The following are just some of the major ways of thinking about the stages of child development.

Contents
- Child Development Theories: A Brief History
- Psychoanalytic Child Development Theories
- Behavioral Child Development
- Most children experience positive growth and development
- Positive psychology- understanding when and how children develop in positive ways
- Resilient children- children who rise above adversity and develop in positive ways
- Theories of Child Development
- Theory: an organized set of ideas about how things work
- Cognitive Developmental Theories
- How children adjust their own understanding as they explore and learn about the world
- A response to simplistic views of behaviorism
- Focus is on how children think and how their thinking impacts their actions
- Best Known Theorists
  1. Jean Piaget
  2. Lev Vygotsky

Jean Piaget (1896-1980)
- Cognitive Developmentalism
  - Children actively adjust their understanding about the world as they learn.