CHAPTER 7

Physical and Cognitive Development in Early Childhood

OBJECTIVE

7.1 Identify patterns of body growth in early childhood.

7.2 Contrast advances in gross and fine motor development and their implications for young children's development.

7.3 Distinguish two processes of brain development and the role of plasticity in development.

7.4 Contrast Piaget's and Vygotsky's perspectives on young children's thinking.

7.5 Discuss changes that occur in attention, episodic memory, and autobiographic memory during early childhood.

7.6 Summarize young children's awareness and understanding of the mind.

7.7 Describe young children's developing capacities for language.

7.8 Contrast social learning and cognitive-developmental perspectives on moral development in early childhood.

7.9 Identify and explain two approaches to early childhood education, including their associated outcomes.

7.10 Analyze effects of poverty on development and resources to help families in need.

CHAPTER CONTENTS

George's parents watched with pride as their 4-year-old son kicked the soccer ball to the other children. George has grown from a bowlegged, round-tummied, and top-heavy toddler, into a strong, well-coordinated young child. His body slimmed, grew taller, and reshaped into proportions similar to that of an adult. As a toddler, he often stumbled and fell, but George can now run, skip, and throw a ball. He has also gained better control over his fingers; he can draw recognizable pictures of objects, animals, and people. As his vocabulary and language skills have grown, George has become more adept at communicating his ideas and needs.


2=2
+5=7
3+1=4
4+6=10
5+3=8

How do these developments take place? In this chapter, we examine the many changes that children undergo in physical and motor development as well as how their thinking and language skills change.

GROWTH AND MOTOR DEVELOPMENT IN EARLY CHILDHOOD

George's abilities to run, skip, and manipulate his fingers to create objects with Play-Doh illustrate the many ways that children learn to control their bodies. George is also growing bigger and stronger day by day, though the speed of growth is not as dramatic as when he was younger. His pediatrician assures his parents that this is normal and counsels them about healthy dietary choices now that George has become a picky eater.

GROWTH

Although children grow very rapidly over the first two years, growth slows during early childhood. From ages 2 through 6, the average child grows 2 to 3 inches taller and gains nearly 5 pounds in weight each year. The average 6-year-old child weighs about 45 pounds and is about 46 inches tall.

Genetics plays a role in physical development (Han-Na et al., 2010). Children's height and rate of growth is closely related to that of their parents' (Malina & Bouchard, 1991). Genes influence the rate of growth by stipulating the amount of **hormones** to be released. Hormones are chemicals that are produced and secreted into the bloodstream by glands. Hormones influence cells and are a way in which genetic instructions are transformed into physical development. **Growth hormone** is secreted from birth and influences growth of nearly all parts of the body. Children with growth hormone deficiencies show slowed growth (Mayer et al., 2010), but growth hormone supplements can stimulate growth when needed (Hardin, Kemp, & Allen, 2007).

Ethnic differences in patterns of growth are apparent in England, France, Canada, Australia, and the United States. Generally, children of African descent tend to be tallest, then those of European descent, then Asian, then Latino. However, there are many individual differences. Even within a given culture, some families are much taller than others (Eveleth & Tanner, 1991).

NUTRITION

From ages 2 to 6, young children's appetites tend to decline as compared with infants and toddlers. This decline is normal and occurs as growth slows. At around age 3, it is not uncommon for children to go through a fussy eating phase where previously tolerated food is no longer accepted and it is hard to introduce new food (Fildes et al., 2014; Nicklaus, 2009). Some argue that young children's common dislike of new foods may be adaptive from an evolutionary perspective because it encourages them to eat familiar and safe foods rather than novel and potentially dangerous foods (Birch & Fisher, 1995).

The overall incidence of picky eating declines with time, but for many children, it is chronic, lasting for several years. Picky eating appears to be a relatively stable individual trait. For example, a difficult temperament at 1.5 years predicted picky eating 2 years later (Hafstad, Abebe, Torgersen, & von Soest, 2013). This example illustrates the dynamic interaction of developmental domains, with temperament, an emotional factor, influencing diet, an influence on physical development. Parents of picky eaters report that their children consume a limited variety of foods, require

foods to be prepared in specific ways, express strong likes and dislikes, and throw tantrums over feeding. Yet in most cases, picky eating does not show significant effects on growth (Mascola, Bryson, & Agras, 2010). Regardless, picky eating is an important concern for parents and may remain so through much of childhood.

Young children require a healthy diet, with the same foods that adults need. Although most children in developed nations eat enough calories, they often do not get enough vitamins or minerals (Collins et al., 2006). Foods high in iron, zinc, and calcium are often ignored in favor of other, less healthy foods. For example, for many children in the United States, juice and soda have replaced milk as naptime snacks (Jahns, Siega-Riz, & Popkin, 2001). Sweetened cereals may contain many vitamins and minerals, but the sugar increases children's risk for early tooth decay and other health problems such as obesity—a weight disorder discussed in Chapter 9—which is the most prevalent disease affecting children in developed countries (Lee et al., 2010; Lewit & Kerrebrock, 1998). One study of cereals compared those marketed to children with those marketed to adults and found that over two thirds of the cereals marketed to children did not meet U.S. nutrition standards for foods served in schools (most often because of too much sugar; Schwartz, Vartanian, Wharton, & Brownell, 2008). One study of 20 child care centers in North Carolina examined the degree to which the center-based-care diet matched federal recommendations for children 2 to 5 years of age. Only about one half to one third of center-based diets met the recommendations for milk, 13% for whole grains, and 7% for dark vegetables. Young children in full-time child care consume diets that may not meet federal guidelines for nutrition (Ball, Benjamin, & Ward, 2008). Common dietary deficiencies of the preschool years include vitamins A, B, D, and K as well as iron and calcium; these deficiencies have negative consequences for growth among children throughout the world (Kennedy, 1998; Lips, 2010; Ramakrishnan, 2002).

In developing countries, many children suffer from malnutrition either chronically or episodically (Petrou & Kupek, 2010). Inadequate nutrition is a threat to children's growth. For example, consider a three-month-long drought that took place in Kenya in 1984. During the drought, children's intake of food declined dramatically, and the elementary school children gained only half as much weight as normal (McDonald, Sigman, Espinosa, & Neumann, 1994). Malnutrition influences development in multiple ways, not simply growth. Malnourished children show cognitive deficits as well as impairments in motivation, curiosity, and the ability to interact with the environment (Arija et al., 2006; Smithers, Golley, Brazionis, & Lynch, 2011). During the drought in Kenya, the children became less active during play and less focused in class (McDonald et al., 1994). Deficits from early malnutrition last. For example, among Ghannan children who survived a severe famine in 1983, those who were youngest at the time of the famine (under age 2) scored lower on cognitive measures throughout childhood and into adulthood than did those who were older (ages 6 to 8; Ampaabeng & Tan, 2013).

Malnutrition is not just a problem for developing countries. Many children in the United States and other developed countries are deprived of diets that support healthy growth because of socioeconomic factors. Low-income families may have difficulty providing children with the range of foods needed for healthy development.

Up to 20% of U.S. children in low-income homes, particularly Hispanic and African American children, suffer from iron deficiency (Brotanek, Gosz, Weitzman, & Flores, 2007; Killip, Bennett, & Chambers, 2007). In 2013, about 14% (or 17.5 million) households were categorized as *food insecure* (i.e., lacking the monetary or other resources to provide adequate food) at some point during the year (Coleman-Jensen, Gregory, & Singh, 2014). In the United States, we have linked inadequate nutrition with stunted growth, health problems, poor school performance and poor relationships with peers (Alaimo, Olson, & Frongillo, 2001; Galal & Hulett, 2003; Hampton, 2007).

MOTOR DEVELOPMENT

The refinement of motor skills that use the large muscles of the body—as well as those that tap hand-eye coordination and require subtle movements—is an important developmental task of early childhood.

Gross Motor Skills

Between the ages of 3 and 6, children make great advances in **gross motor skills**—those that use the large muscles—such as running and jumping. They become physically stronger, with increases in bone and muscle strength as well as lung capacity. Children make gains in coordination as the parts of the brain responsible for sensory and motor skills develop. Now they can play harder and engage in more complicated play activities that include running, jumping, and climbing. Like other aspects of physical (and as we will see, cognitive) development, socioeconomic disadvantage is associated with poor motor skills, perhaps through inadequate nutrition and fewer environmental opportunities to practice motor skills (McPhillips & Jordan-Black, 2007). Low-income communities are more likely to lack resources that support children's play, such as parks, recreation facilities, and safe neighborhoods and streets for outside play.

Young children practice using their large motor skills to jump; run; and ride tricycles, pedal cars, and other riding toys. Coordinating complex movements, like those entailed in riding a bicycle, is challenging for young children as it requires controlling multiple limbs, balancing, and more. As they grow and gain competence in their motor skills, young children become even more coordinated and begin to show interest in skipping, balancing, and playing games that involve feats of coordination, such as throwing and catching a ball. By age 5, most North American children can throw, catch, and kick a ball; climb a ladder; and ride a tricycle. Some can even skate and ride a bicycle.

Young children's motor abilities are also influenced by their context. For example, young children of some nations can swim in rough ocean waves that many adults of other nations would not attempt. Advances in gross motor skills help children move about and develop a sense of mastery of their environment, but it is **fine motor skills** that permit young children to take responsibility for their own care.

Fine Motor Skills

Fine motor skills like the ability to button a shirt, pour milk into a glass, put puzzles together, and draw pictures involve eye–hand and small muscle coordination. As children get better at these skills, they are able to become more independent and do more for themselves. Young children become better at grasping eating utensils and

FIGURE 7.1: Gross and Fine Motor Skill Development in Early Childhood

AGE	GROSS MOTOR SKILL	FINE MOTOR SKILL
2–3 years	Walks more smoothly, runs but cannot turn or stop suddenly, jumps, throws a ball with a rigid body an catches by trapping ball against chest, rides push toys using feet	Unzips large zippers, puts on and removes some clothing, uses a spoon
3–4 years	Runs, ascends stairs alternating feet, jumps 15 to 24 inches, hops, pedals and steers a tricycle	Serves food, can work large buttons, copies vertical line and circle, uses scissors
4–5 years	Runs more smoothly with control over stopping and turning, descends stairs alternating feet, jumps 24 to 33 inches, skips, throws ball by rotating the body and transferring weight to one foot, catches ball with hands, rides tricycle and steers effectively	Uses scissors to cut along a line, uses fork effectively, copies simple shapes and some letters
5–6 years	Runs more quickly, skips more effectively, throws and catches a ball like older children, makes a running jump of 28 to 36 inches, rides bicycle with training wheels.	Ties shoes, uses knife to cut soft food, copies numbers and simple words

become more self-sufficient at feeding. Many fine motor skills are very difficult for young children because they involve both hands and both sides of the brain. With short, stubby fingers that have not yet grown and a cerebral cortex that is not yet myelinated, a challenging task such as tying a shoelace becomes even more frustrating for young children. Tying a shoelace is a complex act requiring attention, memory for an intricate series of hand movements, and the dexterity to perform them. Though preschoolers struggle with this task, by 5 to 6 years of age most children can tie their shoes.

Figure 7.1 summarizes milestones of gross and fine motor skill development in young children.

Thinking in Context 7.1

1. How would you explain to parents the influence of nature and nurture on children's growth? What advice would you give parents about fostering healthy growth in their preschooler?
2. How might contextual factors such as neighborhood, family, school, and culture influence the development of motor skills? How might these factors become more influential over the childhood years?
3. Why do motor skills matter? Consider your own development. What do you recall about the development of your motors skills, for example, when you learned to tie your shoelaces or ride a bike? How did your motor skills influence other aspects of development, such as your relationships with others or your cognitive skills?

BRAIN DEVELOPMENT IN EARLY CHILDHOOD

Continuing from infancy, early childhood is a rapid period of brain growth with an increase in synapses and connections among brain regions (Dubois et al., 2013). At age 2, the brain reaches 75% of its adult weight and 90% by age 5. Children's increasing motor and cognitive abilities are not simply due to the increase in brain matter. As discussed in Chapter 4, the neuron's dendrites are pruned in response to early

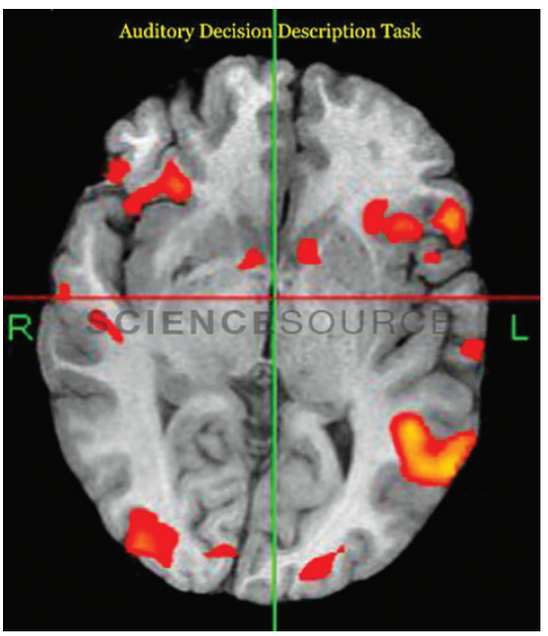
experience, an important part of neurological development (Brown & Jernigan, 2012; Stiles & Jernigan, 2010). In addition, myelination contributes to many of the changes that we see in children's capacities.

As the neuron's axons become coated with fatty myelin, children's thinking becomes faster, more coordinated, and complex. Myelination aids quick complex communication between neurons and makes coordinated behaviors possible (Dubois et al., 2013; Mabbott, Noseworthy, Bouffet, Laughlin, & Rockel, 2006). Patterns of myelination correspond with the onset and refinement of cognitive functions and behaviors (Dean et al., 2014). The first areas of the brain to myelinate govern sensory and motor functions (Deoni et al., 2011). In early childhood, children process information quickly enough to complete sophisticated sequences of physical behavior, such as catching and then throwing a ball. They also become better thinkers, able to hear a question and remember it long enough to answer it appropriately. Experience also matters. As children practice activities, they become routine, which permits them to act more quickly and to multi task, as we will discuss in Chapter 8 (Merzenich, 2001).

LATERALIZATION

In addition to the changes just described, parts of the brain become specialized for different functions. The two halves of the brain, known as hemispheres, may look alike but are not identical. Each hemisphere of the brain (and the parts of the brain that comprise each hemisphere) is specialized for particular functions and become more specialized with experience. This process of the hemispheres becoming specialized to carry out different functions is called **lateralization**. Lateralization ("of the side," in Latin) begins before birth and is influenced both by genes and by early experiences (Friederici, 2006; Goymer, 2007). For example, in the womb, most fetuses face toward the left, freeing the right side of the body, which permits more movement on that side and the development of greater control over the right side of the body (Previc, 1991). In this way, one hemisphere beings to dominate, known as **hemispheric dominance**. Most people experience hemispheric dominance, most commonly with the left hemisphere dominating over the right. Given that the left hemisphere controls the right side of the body (and the right hemisphere controls the left side of the body), most people are right-handed, which is an indicator of hemispheric dominance. About 90% of people in Western countries are right-handed. Among right-handed people, the left hemisphere plays an important role in language and the right hemisphere influences spatial skills. In left-handed people, the right hemisphere is dominant, and language is often shared over both hemispheres rather than in solely the left hemisphere (Szaflarski et al., 2002). In some cultures, left-handedness is discouraged. For example, less than 1% of adults in Tanzania are left-handed because left-handed children often are physically restrained and punished (Provins, 1997). When left-handed children are forced to use their right hands, they typically learn to write with their right hand but carry out most other activities with their left, and brain scans reveal that their brains remain right-dominant (Klöppel, Vongerichten, van Eimeren, Frackowiak, & Siebner, 2007).

FIGURE 7.2: Magnetic Resonance Imaging Illustrating Holistic Brain Activity



Lateralization is visible prior to birth. Fetuses display lateralized mouth movements—with the right side of the mouth showing more movement over the course of gestation (Reissland, Francis, Aydin, Mason, & Exley, 2014). In newborns, the left hemisphere tends to have greater structural connectivity and efficiency than the right—more connections and pathways suggesting that they are better able

LIFE SPAN BRAIN DEVELOPMENT

Brain-Based Education

The brain-based education perspective views learning as multidimensional, including more than academics. Children are encouraged to develop all aspects of their brains, tapping physical, musical, creative, cognitive, and other abilities. According to brain-based educators, the brain changes with experience and is plastic; therefore, everyday experiences such as learning an instrument, role-playing, and learning vocabulary may alter children's brains.

Some brain-based education emphasizes teaching different parts of the brain separately. For example, a common brain-based education instructional strategy is to teach for the left or right lateralized brain. The "left-brain" is said to be the "logical" hemisphere, concerned with language and analysis, while the "right-brain" is said to be the "intuitive" hemisphere concerned with spatial patterns and creativity (Sousa, 2001). Brain-based learning theorists may then encourage teachers to teach specific hemispheres during adapted lessons. To teach to the left hemisphere, teachers have students engage in reading and writing, while right hemisphere–oriented lessons have students create visual representations of concepts (Sousa, 2001).

However, some experts argue that the leap from neurological research to the classroom is large and not supported (Alferink & Farmer-Dougan, 2010). Like most abilities, language and spatial information are processed differently but simultaneously by the two hemispheres. It is highly improbable, then, that any given lesson, regardless of analytic or spatial type, can stimulate activation of only one hemisphere. Although lateralized, the brain functions as a whole.

For many researchers, the problem of brain-based education is its reliance on the brain itself and in its oversimplification of complex theories and research (Alferink & Farmer-Dougan, 2010; Busso & Pollack, 2014). Although we have learned much, brain research is in its infancy. Researchers do not know enough about how the brain functions and learns to draw direct inferences about teaching (Bruer, 2008). For example, magnetic resonance imaging (MRI) research illuminates patterns of brain activity, but researchers do not yet conclusively know what those patterns mean or if those patterns of brain activity have implications for behavior (Willis, 2007). Using these findings to inform education is premature. Many researchers, therefore, find it problematic to state that teaching strategies should be derived from brain research—at least not yet.

On the positive side, however, brain-based education emphasizes active learning. Teachers who foster active learning encourage students to become engaged and participate in their own learning, such as being creative in artwork, physical activity, and story making (Bruer, 2008). Active learning is an important educational strategy. Active learning is in line with cognitive theory, such as Piaget's, which points to the constructive nature of knowledge, that children must interact with the world and actively construct and modify their schemes. Although many developmental researchers argue that the neurological science behind brain-based education is questionable, the active learning practices that comprise many brain-based learning activities advance children's learning.

What Do You Think?

1. **Identify an advantage and a disadvantage to brain-based education. In your view, should preschools emphasize teaching specifically to the left or right hemisphere?**

to control the right side of their bodies (Ratnarajah et al., 2013). Most newborns tend to turn their heads toward the right, causing them to spend more time looking at and using their right hand (Hinojosa, Sheu, & Michel, 2003). Children display a preference for the right or left hand and their subsequent activity makes the hand more dominant because experience strengthens the hand and neural connections, and improves agility.

Despite lateralization, the two hemispheres interact in a great many complex ways to enable us to think, move, create, and exercise our senses (Efron, 1990; Springer & Deutsch, 1998). The **corpus callosum**, a collection of 250 to 800 million neural fibers, connects the left and right hemispheres of the brain, permitting them to communicate and coordinate processing (Banich & Heller, 1998). During early childhood, the corpus callosum grows and myelinates, permitting the two

halves of the brain to communicate in more sophisticated and efficient ways and to act as one, enabling the child to execute large and fine motor activities such as catching and throwing a ball or tying shoelaces (Banich, 1998; Brown & Jernigan, 2012).

PLASTICITY

The human brain has a capacity to change its organization and function in response to experience throughout the life span; this is known as **plasticity** (Kolb, Gibb, & Robinson, 2003). For example, in one study, young children who were given training in music demonstrated structural brain changes over a period of 15 months that correspond with increases in music and auditory skills (Hyde et al., 2009). The brain contains an overabundance of neurons and synapses that allow it to receive any and all kinds of sensory and motor stimulation possible (Johnston et al., 2009). However, our brains are prepared for experiences that are more diverse varied than we actually encounter. Many of our neural connections remain unused. Active synapses, or connections among neurons that are used, continue to function, whereas unused synapses are pruned and the neurons are reserved for future use, such as compensating for brain injury or learning new skills (Huttenlocher, 1994; Johnston et al., 2009). Since the 1990s, brain-based education, deriving classroom activities and educational principles from brain research, has become popular (see Box 7.1; Colburn, 2009; Jensen, 2008).

The brain is most plastic during the first few years of life (Nelson, Thomas, & de Haan, 2006; Stiles & Jernigan, 2010). Plasticity implies that the young child's brain can reorganize itself in response to injury in ways that the adult's brain cannot. Adults who suffered brain injuries as infants and young children often have fewer cognitive difficulties than do adults who were injured later in life. The young child's brain is more flexible and less functionally committed than the adult brain, but the relative advantage of this plasticity is debated (Johnston, 2009).

The immature young brain, while offering opportunities for plasticity, is uniquely sensitive to injury (Johnston et al., 2009; Uylings, 2006). If a part of the brain is damaged at a critical point in development, functions linked to that region will be irreversibly impaired (Luciana, 2003). How well a young child's brain compensates for an injury depends on the age at the time of injury, site of injury, and brain areas and capacities compromised. Generally speaking, plasticity is greatest when neurons are forming many synapses, and it declines with pruning (Kolb et al., 2003; Nelson, 2011). However, brain injuries sustained before age 2, and in some cases 3, can result in more global and severe deficits than do those sustained later in childhood—and more long-lasting deficits (Anderson et al., 2010; Anderson et al., 2014), suggesting that a reserve of neurons is needed for the brain to show plasticity. Research with young children with brain injury showed that most experienced some cognitive deficits 18 months later and social problems at age 8, with more severe injuries associated with generalized deficits and less severe with deficits in visual memory and **executive function** (Gerrard-Morris et al., 2010; Sonnenberg, Dupuis, & Rumney, 2010).

Plasticity is not absolute. Some deficits often remain. The degree to which individuals recover depends on the injury, its nature and severity, age, experiences after the injury, and contextual factors supporting recovery, such as interventions (Anderson, Spencer-Smith, & Wood, 2011; Bryck & Fisher, 2012).

Thinking in Context 7.2

1. Children who suffer brain injuries often regain some, and sometimes all, of their capacities. How might you explain this, given what you have learned about brain development?
2. In your view, what is the most important thing about brain development that parents need to know? How might you teach them?

COGNITIVE DEVLOPMENT IN EARLY CHILDHOOD

Three-year-old Elisa can use language, plan out actions, and think of solutions to problems rather than relying on her motor skills to manipulate materials in a trial-and-error fashion. How do these cognitive skills develop? The three major perspectives on cognition offer address this question in different ways. Cognitive-developmental theories emphasize the structural changes that underlie development. Sociocultural theories point to the role of context and our need to communicate in influencing thought. Information processing theories examine changes in our physical capacities and strategy use as contributors to cognitive change.

PIAGET'S COGNITIVE-DEVELOPMENTAL PERSPECTIVE: PREOPERATIONAL REASONING

Timothy stands up on his toes and releases his parachute toy, letting the action figure dangling from a parachute drift a few feet from him and collapse on the floor. "I'm going to go up high and make it faster," he says, imagining standing on the sofa and making the toy sail far into the clouds. He stands on the sofa and releases the toy, which sails a bit farther this time. "Next time he'll jump out of the plane even higher!" Timothy thinks, excitedly. His friend Martin calls out, "Let's make him land on the moon! He can meet space people!"

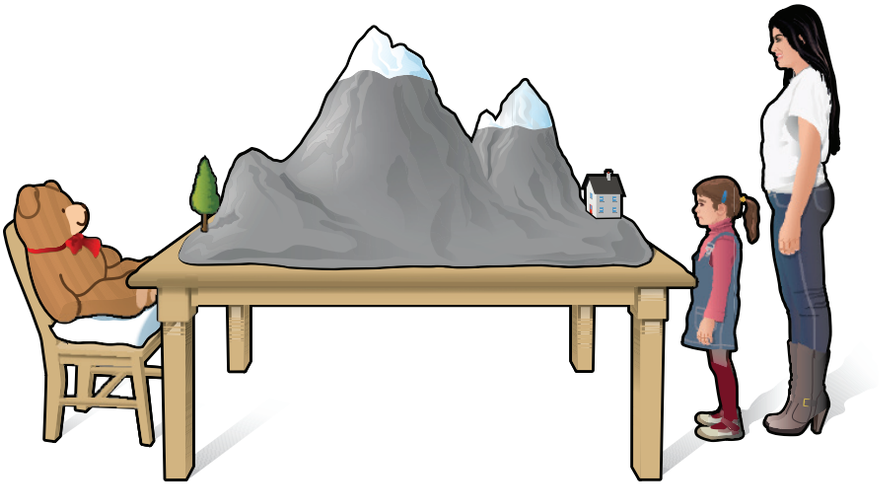
Timothy and Martin learn through play and by interacting with people and objects around them. From the cognitive-developmental perspective, young children's thought progresses from the sensory and motor schemes of infancy to more sophisticated representational thought. **Preoperational reasoning** appears in young children from about ages 2 to 6 and is characterized by a dramatic leap in the use of symbolic thinking that permits young children to use language, interact with others, and play using their own thoughts and imaginations to guide their behavior. It is symbolic thought that enables Timothy and Martin to use language to communicate their thoughts and desires—and it is also what allows them to send their toy on a mission to the moon to visit with pretend space people.

Young children in the preoperational stage show impressive advances in representational thinking, but they are unable to grasp logic and cannot understand complex relationships. For example, a child may not understand that her father was once her grandmother's little boy. Alternatively, a child may not understand that his brother is also his sister's brother. Understanding each of these complex relationships requires the use of cognitive operations that are beyond the preoperational child's capacities. Children who show preoperational reasoning tend to make several common errors, including **egocentrism**, **animism**, **centration**, and **irreversibility**.

Egocentrism

"See my picture?" Ricardo asks as he holds up a blank sheet of paper. Miss Jones answers, "You can see your picture, but I can't. Turn your page around so that I can see your picture. There it is! It's beautiful," she proclaims after Ricardo flips the piece of paper, permitting her to see his drawing. Ricardo did not realize that even though he could see his drawing, Miss Jones could not. Ricardo displays egocentrism, the inability to take another person's point of view or perspective. The egocentric child views the world from his or her own perspective, assuming that other people share her feelings, knowledge, and even physical view of the world. For example, the egocentric child may present Mommy with her teddy bear when Mommy looks sad, not realizing that while the teddy bear may make *her* feel better, Mommy has different needs and preferences.

FIGURE 7.3: The Three Mountain Task



A classic task used to illustrate preoperational children's egocentrism is the *three mountain task*. As shown in Figure 7.3, the child sits at a table facing three large mountains. A doll is placed in a chair across the table from the child, facing him. The child is asked how the mountains look to the doll. Piaget found that young children in the preoperational stage described the scene from their own perspectives rather than the doll's. They could not complete the task correctly because they could not imagine that someone else could see the world differently. The children exhibited egocentrism; they were not able to take another point of view (the doll's; Piaget & Inhelder, 1967).

Animism

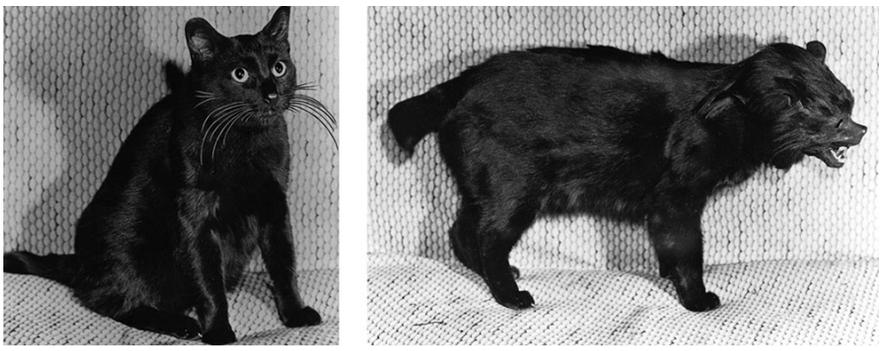
Egocentric thinking can also take the form of animism, the belief that inanimate objects are alive and have feelings and intentions. "It's raining because the sun is sad and it is crying," 3-year-old Melinda explains. Children accept their own explanations for phenomena as they are unable to consider another viewpoint or alternative reason. The 4-year-old child who cries after bumping her head on a table may feel better after her mother smacks the table, saying, "Bad table!" In the child's eyes, the table got what it deserved: payback!

Centration

Preoperational children exhibit centration, the tendency to focus on one part of a stimulus or situation and exclude all others. For example, a boy may believe that if he wears a dress he will become a girl. He focuses entirely on the appearance (the dress) rather than the other characteristics that make him a boy. Consider a group of children who are lined up according to height. If one child is asked, "Who is the tallest?" he or she will correctly point to the tallest child. Then, if the child is asked, "Who is the oldest?" he or she may point to the tallest child. "Who is the smartest?" Again the child points to the tallest child of the group, demonstrating centration: the child focuses on height to the exclusion of the other attributes.

Centration is illustrated by a classic task that requires the preoperational child to distinguish what something appears to be from what it really is, the **appearance–reality distinction**. In a classic study illustrating this effect, DeVries (1969) presented 3- to 6-year-old children with a cat named Maynard (see Figure 7.4). The children were permitted to pet Maynard. Then, while his head and shoulders were hidden behind a screen (and his back and tail were still visible), a dog mask was

FIGURE 7.4: Appearance vs. Reality: Is It a Cat or Dog?



SOURCE: DeVries (1969).

placed onto Maynard's head. The children were then asked, "What kind of animal is it now?" "Does it bark or meow?" Three-year-old children, despite Maynard's body and tail being visible during the transformation, replied that he was now a dog. Six-year-old children were able to distinguish Maynard's appearance from reality and explained that he only *looked* like a dog.

One reason that 3-year-old children fail appearance–reality tasks is because they are not yet capable of effective dual encoding, the ability to mentally represent an object in more than one way at a time (Flavell, Green, & Flavell, 1986). For example, young children are not able to understand that a scale model (like a doll house) can be both an object (something to play with) and a symbol (of an actual house; DeLoache, 2000; MacConnell & Daehler, 2004).

Irreversibility

"You ruined it!" cried Johnson after his older sister, Monique, placed a triangular block atop the tower of blocks he had just built. "No, I just put a triangle there to show it was the top and finish it," she explains. "No!" insists Johnson. "OK, I'll take it off," says Monique. "See? Now it's just how you left it." "No. It's ruined," Johnson sighs. Johnson continued to be upset after his sister removed the triangular block, not realizing that by removing the block she has restored the block structure to its original state. Young children's thinking is characterized by irreversibility, meaning that they do not understand that reversing a process can often undo it and restore the original state.

Preoperational children's irreversible thinking is illustrated by **conservation** tasks that require them to understand that the quantity of a substance is not transformed by changes in its appearance, that a change in appearance can be reversed. For example, a child is shown two identical glasses. The same amount of liquid is poured into each glass. After the child agrees that the two glasses contain the same amount of water, the liquid from one glass is poured into a taller, narrower glass, and the child is asked whether one glass contains more liquid than the other. Young children in the preoperational stage reply that the taller, narrower glass contains more liquid. Why? It has a higher liquid level relative to the shorter, wider glass. They center on the appearance of the liquid without realizing that the process can be reversed by pouring the liquid back into the shorter, wider glass. They are unable to negate the action and fail to understand that the process can be undone by pouring the liquid in the tall, narrow glass back into the shorter wider glass. They focus on the height of the water as it is poured from a short to tall glass, ignoring other aspects such as the change in width that makes the liquid appear to have changed. Young children do not understand that it is still the same water.

FIGURE 7.5: Additional Conservation Problems

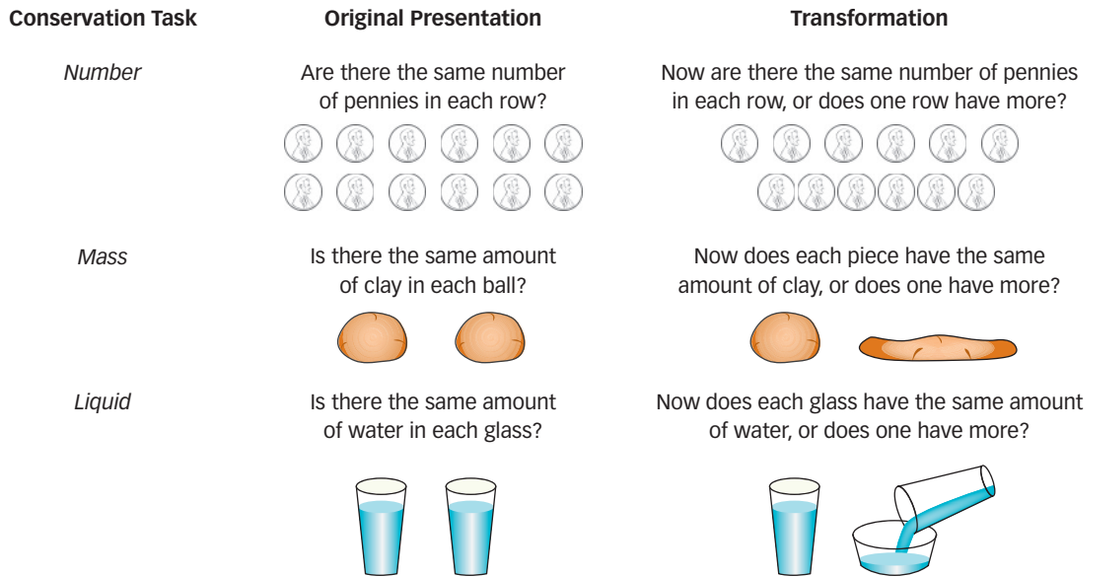


Figure 7.5 displays additional conservation problems. Characteristics of preoperational children's reasoning are summarized in Table 7.1.

Evaluating Piaget's Preoperational Reasoning Stage

Similar to findings that infants are more capable than Piaget envisioned (see Chapter 5), research with young children has contravened some of Piaget's conclusions. Just as Piaget's sensorimotor tasks underestimated infants' cognitive abilities, his tests of preoperational thinking underestimated young children. Success on Piaget's tasks appears to depend more on the child's language abilities than his or her actions. To be successful at the three mountain task, for example, the child must not only understand how the mounds look from the other side of the table but must be able to communicate that understanding. Appearance–reality tasks require not simply an understanding of dual representation but the ability to express it. However, if the task is nonverbal, such as requiring reaching for an object rather than talking about it, even 3-year-old children can distinguish appearance from reality, as we will discuss in the following sections (Sapp, Lee, & Muir, 2000).

Research Findings on Egocentrism and Animism

Simple tasks demonstrate that young children are less egocentric than Piaget posited. When a 3-year-old child is shown a card with a dog on one side and a cat on another and the card is held up between the researcher who can see the cat and the child

TABLE 7.1 Characteristics of Preoperational Children's Reasoning

Egocentrism	The inability to take another person's point of view or perspective
Animism	The belief that inanimate objects are alive and have feelings and intentions
Irreversibility	Failure to understand that reversing a process can often undo a process and restore the original state
Centration	Tendency to focus attention on one part of a stimulus or situation and exclude all others

who can see the dog, the child correctly responds that the researcher can see the cat (Flavell, Everett, Croft, & Flavell, 1981). In a variation of the three mountain task, called the doll and police officer task, the child sits in front of a square board that is divided into four sections by dividers (Hughes, 1975). A toy police officer is placed at the edge of the board. A doll is placed in one section, moved to another section, and so on. With each move the child is asked whether the police officer can see the doll. Finally another police officer is placed on the board and the child is asked to hide the doll from both police officers. In this task, nearly all children ages 3.5 to 5 were able to take the police officers' perspectives and successfully complete the task. By making the task more relevant to children's everyday lives (i.e., hiding)—and less difficult—it became clear that young children are less egocentric than Piaget theorized (Hughes, 1975; Newcombe & Huttenlocher, 1992).

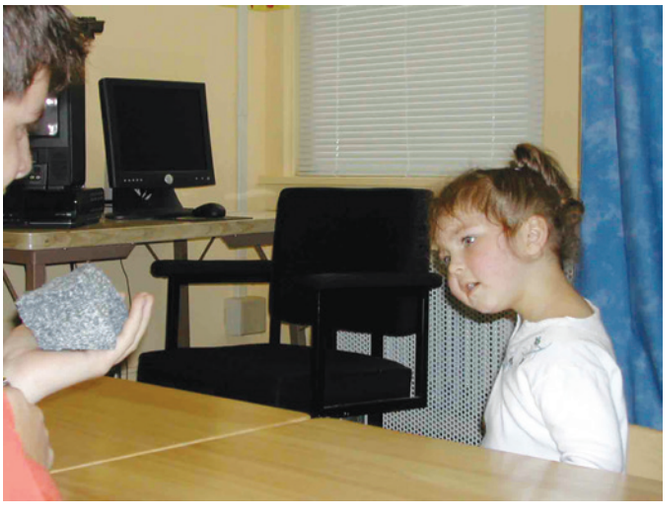
Likewise, although young children sometimes provide animistic answers to questions, they do not display animism as often as Piaget believed. Three-year-old children do not tend to describe inanimate objects with lifelike qualities, even when the object is a robot that can move (Gelman & Gottfried, 1996). Three- and 4-year-old children recognize that living things are regulated by their own internal energy but inanimate objects are not (Gottfried & Gelman, 2005). Most 4-year-old children understand that animals grow, and even plants grow, but objects do not (Backschneider, Shatz, & Gelman, 1993). Sometimes, however, young children provide animistic responses. For example, Dolgin and Behrend (1984) found that animistic statements are not due to a belief that all objects are alive but rather that novel objects that seem to move independently are alive. Three-year-old children may display animism when considering trains and airplanes, believing that they are alive, because these objects appear to move on their own, like other living things (Massey & Gelman, 1988; Poulin-Dublis & Héroux, 1994). Finally, children show individual differences in their expressions of animism and reasoning about living things and these differences are linked with aspects of cognitive development such as memory, working memory, and inhibition (Zaitchik, Iqbal, & Carey, 2014).

Research Findings on Reversibility and the Appearance–Reality Distinction

Piaget (1970) posited that young children cannot solve or be taught to solve conservation problems because they lack the cognitive operations needed to understand reversibility and that transformations in appearance do not change a given substance. However, research has shown that 4-year-old children can be taught to conserve (Gelman, 1969; Hendler & Weisberg, 1992), suggesting that children's difficulties with reversibility and conservation tasks can be overcome (Gallagher, 2008). In addition, when a conservation of numbers task is scaled down to include only three objects instead of six, even 3-year-olds perform well without training (Gelman, 1972).

In the classic appearance–reality task, when 3-year-old children are shown a sponge that looks like a rock, they tend to say that it "really and truly is" a rock (Flavell, Flavell, & Green, 1987; Flavell, Green, & Flavell, 1989). They focus or center on the most salient feature, its rocklike appearance, displaying centration. However, if the children are told to play a trick on someone (i.e., "let's pretend that this sponge is a rock and tell Anne that it is a rock when it really is a sponge") or are asked to choose an object that can be used to clean spilled water, many choose the sponge, illustrating that they can form a dual representation of the sponge as an object that looks like a rock (Rice, Koinis, Sullivan, Tager-Flusberg, & Winner, 1997; Sapp et al., 2000). Research suggests that 3-year-old children can shift between describing the real and fake or imagined aspects of an object or situation and can flexibly describe misleading appearances and function of objects in response to natural conversational prompts, as compared with the traditional appearance–reality tasks, as depicted in Figure 7.6 (Deák, 2006; Hansen & Markman, 2005).

FIGURE 7.6: Appearance Reality Task



Some responses to appearance–reality tasks may reflect how children respond to sequences of questions rather than confusing appearance and reality (Deák, 2006). Some preschoolers will repeat their first answer to every successive question about a topic, making it hard to determine what they understand. These types of errors are related to age as 3-year-old children are especially likely to make such errors, 5-year-olds make few repetitive errors, and 4-year-old children tend to make intermediate errors, suggesting a clear developmental trend in language ability that appears on appearance–reality tests as well as other tests of cognitive ability (Deák, 2006). Preschoolers show an understanding of the appearance–reality distinction, and it develops throughout childhood (Woolley & Ghossainy, 2013).

Researchers generally conclude that typical Piagetian tasks emphasize what young children cannot understand more than what they *can* understand (Beilin, 1992). Traditional appearance–reality tasks require that young children articulate their understanding rather than demonstrate it nonverbally. Often asking different, simplified questions enables children to demonstrate their understanding (Bullock, 1985; Deák, 2006; Hansen & Markman, 2005; Waxman & Hatch, 1992). Certainly young children are more egocentric and illogical than older, school-aged children; however, they are able to demonstrate logical reasoning about simple problems in familiar contexts. Young children can adapt their speech to their listeners, for example, using simpler language when talking to younger siblings (Gelman & Shatz, 1978), suggesting that they can understand that their sibling has a different perspective and capacity for language than they do. Young children also quickly develop increasingly sophisticated representational abilities through their symbolic play activities. Pretending that objects and people are something other than what they really are helps young children to develop capacities for dual representation, and they slowly begin to differentiate misleading appearances from reality (Golomb & Galasso, 1995). Children can also imagine what something looks like and draw a picture to represent that vision, as discussed in Box 7.2.

VYGOTSKY'S SOCIOCULTURAL PERSPECTIVE

A second major approach to understanding cognitive development was developed by the Russian psychologist Lev Vygotsky. According to Vygotsky's sociocultural theory, we are embedded in a context that shapes how we think and who we become. Much of children's learning comes not from working alone but from collaborating with others. Children interact with more skilled partners who serve as models and provide instruction. Over time, children internalize the instruction, making it part of their skill set, and they thereby master tasks. For example, children of the Zinacantec Maya of Chiapas, Mexico, learn by actively participating in informal tasks such as making tortillas and weaving (Maynard, 2002, 2004). Children learn by working alongside more skilled partners who provide assistance when needed (Rogoff, 1998; Rogoff, Mosier, Mistry, & Göncü, 1993). Older and more skilled members of society stimulate children's cognitive development by presenting new challenges and guiding or assisting them with particularly difficult tasks. Parents and child care providers often teach children, but anyone who is more skilled at a given task, including older siblings and peers, can promote children's cognitive development (Maynard, 2002; Rogoff, 1990).

According to the sociocultural perspective, children's social experiences teach them how to think. **Guided participation** (also known as an *apprenticeship in*

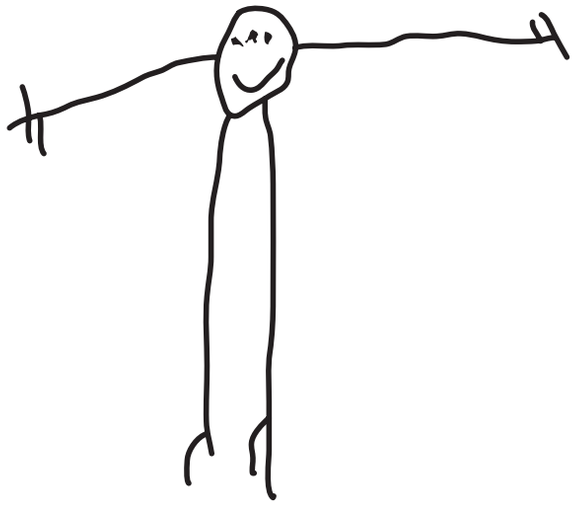
LIVES IN CONTEXT

The Development of Children's Drawing Abilities

"Very pretty! What is it?" asks Jessica as she examines the marked-up page. "A flower," answers 3-year-old Noah. "It's a beautiful flower," Jessica responds as she tries to see a flower in the messy scribbles on the page. Most parents and teachers are familiar with this scenario. What is it that children draw, and does it really have meaning? How does it change over time?

Young children's skills in drawing and writing illustrate the interaction of cognitive and motor domains of development. Drawing reflects fine motor control, planning skills, spatial understanding, and the recognition that pictures can symbolize objects, people, and events (Yamagata, 2007). Young children's drawing skills progress through a predictable sequence alongside cognitive, motor, and brain maturation (Kellogg, 1970). Drawing begins as scribbles during the second year of life (Dunst & Gorman, 2009; Toomela, 2003). At first, the physical gestures children use *are* the content, not the drawing itself. For example, an 18-month-old bounced a crayon around the page, making dots, to indicate that a rabbit jumps (Winner, 1986). One- and 2-year-olds engage in random scribbling, taking great pleasure in moving the crayon over paper and becoming interested in the paper only when they notice that their movements result in drawings. The scribbles of 2-year-olds begin to become patterns, such as vertical and zigzag lines (Dunst & Gorman, 2009). If asked to draw a human figure, 2- to 3-year-olds usually draw a tadpole-like figure with a circle for the head with eyes and sometimes a smiley mouth and then a line or two beneath to represent the rest of the body. Tadpole-like forms are characteristic of young children's art in all cultures (Cox, 1993).

FIGURE 7.7: Two- to Three-Year-Old's Drawing of a Person



By age 3, children's scribbles become more controlled and begin to become pictures, representational forms. Often this happens by accident in that they begin drawing, notice that the shape is recognizable, and label it (Winner, 1986). Three- and 4-year-olds manipulate materials more purposefully and engage in controlled scribbling. Most 3-year-olds can draw circles, squares, rectangles, triangles, crosses, and *X*s, and they begin to combine shapes into more complex designs. Some 3-year-olds create drawings that are recognizable enough for others to identify what their picture represents. Other young children begin to understand the representational function of drawings after adults show them how pictures can be used to stand for people, objects, and places (Callaghan, 1999). Even when drawings appear to be nothing more than scribbles, young children often label them as representing a particular object and remember the label. In one study, children were asked to draw a balloon and a lollipop. The drawings looked the same to adults, but the children were adamant about which was which (Bloom, 2000), suggesting that it is important to ask a child what his or her drawing is rather than guess, because children's creations reflect their perspectives.

Between ages 4 and 5, children's drawings loosely begin to depict actual objects, demonstrating the convergence of fine motor skills and the cognitive development of representational ability. By age 4, children's drawings of people consist of simple figures, mostly heads with legs and arms, and a circle is often used to represent a stomach (Cox, 1997). As cognitive and fine motor skills improve, children create more sophisticated drawings of the human form in which the head and body are differentiated. Five-year-olds include a torso, and after 5, arms and hands are included (Cox, 1997). However, even older preschoolers' drawings contain perceptual distortions. During middle childhood, the use of depth improves, and children's drawings become more perceptually realistic (Cox & Littlejohn, 1995).

The ability to copy a design and write letters predicts cognitive and academic achievement at kindergarten entry and in second grade (Cameron et al., 2012; Dinehart & Manfra, 2013).

What Do You Think?

1. **Suppose a friend has accepted a job working with preschool-aged children. What advice do you give for those times in which a child asks for feedback on an unintelligible drawing?**

thinking) is a form of sensitive teaching in which the partner is attuned to the needs of the child and helps him or her to accomplish more than the child could do alone (Rogoff, 1990). As novices, children learn from more skilled, or expert, partners by observing them and asking questions. The expert partner provides **scaffolding** that permits the child to bridge the gap between his or her current competence level and the task at hand. For example, consider a child working on a jigsaw puzzle. She is

stumped, unable to complete it on her own. Suppose a more skilled partner, such as an adult, sibling, or another child who has more experience with puzzles, provides a little bit of assistance, a scaffold. The expert partner might point to an empty space on the puzzle and encourage the child to find a piece that fits that spot. If the child remains stumped, the partner might point out a piece or rotate it to help the child see the relationship. The partner acts to motivate the child and provide support to help the child finish the puzzle, emphasizing that they are working together. The child novice and expert partner interact to accomplish the goal and the expert adjusts his or her responses to meet the needs of the child. With time, the child internalizes the lesson and learns to accomplish the task on her own. In this way, cognitive development and learning occurs as the child actively internalizes elements of context, such as interactions with more skilled people (Fernyhough, 2008). Scaffolding occurs in formal educational settings, but also informally, any time a partner adjusts his or her interactional style to fit the needs of a child and guide the child to complete a task that he or she could not complete alone.

Effective scaffolding works within the **zone of proximal development**, the gap between the child's competence level, what he can do alone, and what he can do with assistance. The upper limit of this zone is what the child can accomplish with a skilled partner. Over time, the child internalizes the scaffolding, the skill becomes within his range of competence, and his zone of proximal development shifts. Adults tend to naturally provide children with scaffolds (Conner, Knight, & Cross, 1997; Rogoff, 1998). For example, when an adult reads a picture book or storybook to a child, he or she will tend to point to items, label, and describe characters' emotional states; explain; ask questions; listen; and respond sensitively to the child helping the child understand material that they cannot on their own (Adrián, Clemente, & Villanueva, 2007; Danis, Bernard, & Leproux, 2000; Silva, Strasser, & Cain, 2014). Effective teachers take advantage of this pattern of learning by assigning children tasks that they can accomplish with some assistance, providing just enough help so that students learn to complete the tasks independently, and providing learning environments that stimulate children to complete more challenging tasks on their own (Wass & Golding, 2014).

The quality of scaffolding influences children's development. In one study of preschool teachers and children, the degree to which the adult matched the child's needs for help in playing predicted more autonomous play on the part of children over a six-month period (Trawick-Smith & Dziurgot, 2011). Adults act intentionally to encourage and support children's initiative (Zuckerman, 2007). Mothers vary their scaffolding behaviors in response to children; for example, they use different behaviors depending on the child's attention skills, using more verbal engagement, strategic questions, verbal hints, and verbal prompts when children show poor attention-regulating skills (Robinson, Burns, & Davis, 2009). Adults learn as they participate in the child's zone of proximal development, and they modify their behaviors (Ferholt & Lecusay, 2010). In addition, the timing of maternal utterances helps children attend and switch tasks appropriately (Bibok, Carpendale, & Müller, 2009). Moreover, maternal reading, scaffolding, and verbal guidance is associated with 2- to 4-year-olds' capacities for cognitive control and planning (Bibok et al., 2009; Hughes & Ensor, 2009; Moriguchi, 2014).

The contextual nature of learning is illustrated by a study of two generations of Zinacantec Maya children: one generation studied in 1969 and 1970 and a second generation in 1991 and 1993 (Greenfield, Maynard, & Childs, 2003). In the intervening two decades, the community, located in Chiapas, Mexico, was involved in a transition from an economy based primarily on subsistence and agriculture

to an economy based primarily on money and commerce. Researchers examined the number and quality of weaving apprenticeships as well as visual representation ability and concluded that the processes of learning and cognition changed over this period. Over time, there was a greater emphasis on independent cultural learning, abstract thinking, and creativity as well as a movement away from scaffolding, simple representation of tasks, and imitating strategies (Greenfield et al., 2003). Changes in cultural apprenticeships were associated with shifts in the process of child cognition. The contexts in which we are embedded are always changing and evolving, as are our ways of thinking.

INFORMATION PROCESSING PERSPECTIVE

From an information processing perspective, cognitive development entails developing mental strategies to guide one's thinking and use one's cognitive resources more effectively. In early childhood, children become more efficient at attending, encoding and retrieving memories, and problem solving (see Table 7.2).

Attention

The ability to sustain one's attention improves in early childhood through the preschool years. Young children become better at planning, considering the steps needed to complete a particular act, and focusing their attention (Rueda, 2013). Preschoolers can create and abide by a plan to complete tasks that are familiar and not too complex, such as systematically searching for a lost object in a yard (Wellman, Somerville, & Haake, 1979). But they have difficulty with more complex tasks. Preschoolers do not search thoroughly when asked to compare detailed pictures and explain what's missing from one. Young children have difficulty deciding where to begin and how

TABLE 7.2 Development of Information Processing Skills During Early Childhood

Attention	Young children are better able to focus and sustain their attention to complete tasks but have difficulty with complex tasks that require them to switch their attention among stimuli.
Memory	Young children's limited capacity to store and manipulate information in working memory influences their performance on memory and problem-solving tasks. Young children show advances in recognition memory and the ability to use scripts but recall memory lags behind because they are not able to effectively use memory strategies. They often can be taught memory strategies but do not spontaneously apply them in new situations. Episodic memory emerges in early childhood, but the extent and quality of memories increase with age.
Theory of mind	Theory of mind refers to children's awareness of their own and other people's mental processes. When researchers use vocabulary that children are familiar with, observe them in everyday activities, and use concrete examples and simple problems such as those involving belief and surprise, it is clear that young children's understanding of the mind grows and changes between the ages of 2 and 5.
Metacognition	In early childhood theory of mind, an awareness of one's own and others' minds, emerges. Young children demonstrate a growing ability for metacognition, understanding the mind. However, young children's abilities are limited and they tend to fail false belief and appearance–reality tasks, suggesting that their abilities to understand the mind and predict what other people are thinking are limited.

to proceed to complete a task in an orderly way. When they plan, young children often skip important steps (Friedman & Scholnick, 1987; Ruff & Rothbart, 1996). Preschoolers have trouble switching their attention among stimuli (Hanania & Smith, 2010). For example, young children who sort cards according to one dimension such as color may later be unable to successfully switch to a different sorting criteria (Honomichl & Zhe, 2011).

Memory

Unlike infants, young children have language skills and abilities to follow directions, which make it easier to study their memory skills. Researchers can differentiate two types of memories for experiences: **episodic memory** and **autobiographical memory**.

Episodic memory. Episodic memory refers to memory for events and information acquired during those events (Roediger & Marsh, 2003; Tulving, 2002). For example, a researcher might study episodic memory by asking a child, "Where did you go on vacation?" or "Remember the pictures I showed you yesterday?" Most laboratory studies of memory examine episodic memory, such as memory for specific information and for **scripts**.

Memory for information. Shana turns over one card and exclaims, "I've seen this one before. I know where it is!" before selecting its duplicate by turning over a second card from an array of cards. Shana recognizes a card that she has seen before and recalls its location. Children's memory for specific information, such as the location of items, lists of words or numbers, and directions, can be studied using tasks that examine **recognition memory** and **recall memory**. Recognition memory, the ability to recognize a stimulus one has encountered before, is nearly perfect in 4- and 5-year-old children. Recall memory, the ability to generate a memory of a stimulus encountered before without seeing it again, is much poorer in young children (Myers & Perlmutter, 2014). Two-year-olds can recall one or two items whereas 4-year-olds can recall three or four items (Perlmutter, 1984).

Why do young children perform so poorly in recall tasks? Young children are not very effective at using **memory strategies**, cognitive activities that make us more likely to remember. For example, one memory strategy, *chunking*, entails grouping similar items so that they can be recalled together. Preschool children begin to use this memory strategy. When a researcher places either a piece of candy or a wooden peg in each of 12 containers and hands them to young children, asking them to remember where the candy was hidden, by age 4 the children will correctly categorize the containers, placing those that contain candy in one place and those that hold the peg in another, and will demonstrate nearly perfect recall (DeLoache & Todd, 1988).

However, when preschoolers are asked to recall items, they often do not use memory strategies. Even when they are taught to use strategies, they do not apply them in new situations (Gathercole, Adams, & Hitch, 1994; Miller & Seier, 1994). It appears that using strategies is challenging for young children because of their limited working memories. They cannot retain the material to be learned, the strategy, and apply the strategy at the same time. New information a child encounters competes with the information he or she is attempting to recall. Unlike older children and adults, preschoolers are often are unable to inhibit the new information to successfully recall older information (Aslan & Bäuml, 2010). Children do not start to apply strategies consistently and effectively until middle childhood (Kron-Sperl, Schneider, & Hasselhorn, 2008). As with other aspects of development, strategy use and memory interacts with other domains of development. For example, one study of children ages 5 to 8 found that language proficiency predicted rehearsal strategy use (Bebko, McMorris, & Metcalfe, 2014). Memory is also influenced by familiar experiences.

Memory for scripts. Young children remember familiar, repeated everyday experiences, like the process of eating dinner, taking a bath, or going to nursery school or preschool, as scripts, or descriptions, of what occurs in a particular situation. When young children begin to use scripts, they remember only the main details. A 3-year-old might describe a trip to a restaurant as follows: "You go in, eat, then pay." These early scripts include only a few acts but usually are recalled in the correct order (Bauer, 1996). As children grow older and gain cognitive competence, scripts become more elaborate. Consider a 5-year-old child's explanation of a trip to a restaurant: "You go in, you can sit at a booth or a table, then you tell the waitress what you want, you eat, if you want dessert, you can have some, then you go pay, and go home" (Hudson, Fivush, & Kuebli, 1992). Scripts help children understand repeated events, serve as an organization tool, and help children predict what to expect in the future. However, scripts may inhibit memory for new details. For example, in one laboratory study, children were presented with a script of the same series of events repeated in order multiple times as well as a single alternative event. Preschoolers were less likely than older children to spontaneously recall and provide a detailed account of the event (Brubacher, Glisic, Roberts, & Powell, 2011).

Autobiographical memory. Autobiographical memory refers to memory of personally meaningful events that took place at a specific time and place in one's past (Nelson & Fivush, 2004). Most people have no memories prior to age 3, a phenomenon known as **infantile amnesia** (Howe & Courage, 1993). Yet, as discussed in Chapter 5, infants demonstrate recall. Why, then, do we not retain memories from infancy? Just as language development yields new, more complicated ways of thinking and communicating, it also helps us learn how to use our memory (Fivush & Nelson, 2004). Autobiographical memory is thought to serve a social function. Children learn to remember through interactions with adults, and they construct autobiographical memories to share with others (Nelson & Fivush, 2004).

Autobiographical memory develops steadily from 3 to 6 years of age, through adolescence, and is accompanied by increases in the length, richness and complexity of recall memory (Fivush, 2011; Pipe, Lamb, Orbach, & Esplin, 2004). Young children report fewer memories for specific events than do older children and adults (Baker-Ward, Gordon, Ornstein, Larus, & Clubb, 1993). But by age 3, they are able to retrieve and report specific memories, especially those that have personal significance, are repeated, or are highly stressful (Fivush, 1993; Nuttall, 2014). For example, in one study, children who were at least 26 months of age at the time of an accidental injury and visit to the emergency room accurately recalled the details of these experiences even after a two-year delay (Goodman, Rudy, Bottoms, & Aman, 1990). Eight-year-old children have been found to accurately remember events that occurred when they were as young as 3.5 years of age (Goodman & Aman, 1990).

Young children recall more details about events that are unique or new, such as a trip to the circus, which 3-year-old children will recall for a year or longer (Fivush, Hudson, & Nelson, 1983). Frequent events tend to blur together, and young children tend to not recall them well unless they recur several times. Young children are better at remembering things they did than things they simply watched. For example, one study examined 5-year-old children's recall of an event they either observed, were told about, or experienced. A few days later, the children were more likely to recall details in a more accurate and organized way, requiring fewer prompts, when they had experienced the event (Murachver, Pipe, Gordon, Owens, & Fivush, 1996).

The way adults talk with the child about a shared experience can influence how well the child will remember it (Haden & Fivush, 1996; Reese & Fivush, 1993). Parents with an elaborative conversational style discuss new aspects of an experience, provide more information to guide a child through a mutually rewarding conversation, and affirm the child's responses. Three-year-olds of parents who use an elaborative style engage in longer conversations about events, remember more details, and tend to remember the events better at ages 5 and 6 (Boland, Haden, & Ornstein, 2003; Fivush, 2011; Lange & Canoll, 2003; Reese, Haden, & Fivush, 1993).

Memory improves steadily between ages 4 and 10 with accelerated rates between 5 and 7 (Myers & Perlmutter, 2014; Riggins, 2014). Young children lack knowledge about how to conduct memory searches, determine what is important to recall, and structure narrative accounts of events (Leichtman & Ceci, 1995). They tend to forget information more quickly than older children, rely more on verbatim memory, and confuse different sources of event information (Ackil & Zaragoza, 1995; Levine, Stein, & Liwag, 1999; Warren & Lane, 1995). Between ages 5 and 7, children get better at linking memory and source and contextual details (Riggins, 2014). Older children can conduct internal memory searches, easily recreate images in their heads, think of information similar to the to-be-remembered event, and organize and present the recalled information in a systematic manner (Ceci, Huffman, Smith, & Loftus, 1994). In the early school years, children become more capable of providing detailed and spontaneous memory descriptions; their use of mnemonic strategies increases and they become aware of the needs of listeners.

Young children can have largely accurate memories, but they can also tell tall tales, make errors, and succumb to misleading questions. Children's ability to remember events can be influenced by information and experiences that may interfere with their memories. These can include conversations with parents and adults, exposure to media, and sometimes intentional suggestions directed at changing the child's view of what transpired. Children's vulnerability to suggestion is discussed in Box 7.3.

THEORY OF MIND AND METACOGNITION

Theory of mind refers to children's awareness of their own and other people's mental processes. This awareness of the mind can be considered under the broader concept of **metacognition**—knowledge of how the mind works and the ability to control the mind (Lockl & Schneider, 2007). Let's explore these concepts.

Theory of Mind

Piaget (1929) was the first to probe children's understanding of the mind by asking questions like, "What are dreams? Where do they come from?" He concluded that until about 6 years of age, children do not understand the distinctions among dreams, fantasy, thoughts, and reality. However, other theorists suggest that children's developing language skills may not permit them to fully demonstrate their awareness of mental activity.

When researchers use vocabulary that children are familiar with, observe them in everyday activities, and use concrete examples and simple problems such as those involving belief and surprise, it is clear that young children's understanding of the mind grows and changes between the ages of 2 and 5 (Bower, 1993; Flavell, Green, & Flavell, 1995; Schneider, Schumann-Hengsteler, & Sodian, 2005). For example, 3-year-old children understand the difference between thinking about a cookie and having a cookie. They know that having a cookie means that one can touch, eat, or share it, while thinking about a cookie does not permit such activities (Astington, 1993). Young children also understand that a child who wants a cookie will be happy upon receiving one and sad upon not (Flavell et al., 1995; Moses, Coon, & Wusinich,

APPLYING DEVELOPMENTAL SCIENCE

Children's Suggestibility

The accuracy of children's memory, especially their vulnerability to suggestion, is an important topic because children as young as 3 years of age have been called upon to relate their memories of events that they have experienced or witnessed, including abuse, maltreatment, and domestic violence (Flavell, Friedrich, & Hoyt, 1970; Kail & Park, 1992; Nelson, 1993). How suggestible are young children? Can we trust their memories?

Research suggests that repeated questioning may increase suggestibility in children (La Rooy, Lamb, & Pipe, 2011). For example, in one study preschoolers were questioned every week about events that had either happened or not happen to them; by the 11th week, nearly two thirds of the children falsely reported having experienced an event (Ceci et al., 1994). Preschool-aged children may be more vulnerable to suggestion about many topics, including those containing sexual themes, than either school-aged children or adults (Gordon, Baker-Ward, & Ornstein, 2001; Principe, Ornstein, Baker-Ward, & Gordon, 2000; Rocha, 2013). When children were asked if they could remember several events, including a fictitious instance of getting their finger caught in a mousetrap, almost none of them initially recalled these events; however, after repeated suggestive questioning, more than half of 3- and 4-year-olds and two fifths of 5- and 6-year-olds recalled these events that never happened—often vividly (Poole & White, 1991, 1993).

Young children's natural trust in others may enhance their suggestibility (Jaswal, 2010). In one study, 3-year-old children who received misleading verbal and visual information from an experimenter about a sticker's location continued to search in the wrong, suggested, location despite no success (Jaswal, 2010). In another study, 3- to 5-year-old children watched as an adult hid a toy in one location, then told the children that the toy was in a different location. When retrieving the toy, 4- and 5-year-olds relied on what they had seen and disregarded the adult's false statements, but the 3-year-olds deferred to what the adult had said, despite what they had directly observed (Ma & Ganea, 2010).

In some cases, children can resist suggestion. For example, in one study 4- and 7-year-old children either played games (e.g., dressing up in costumes, playing tickle, being photographed) with an adult confederate or merely watched the games (Ceci & Bruck, 1998). Eleven days later, each child was interviewed by an adult who included misleading questions that were often followed up with suggestions relevant to child abuse. Even the 4-year-old children resisted the false suggestions about child abuse.

Children are more vulnerable than adults, but adults are not entirely resistant to suggestion. Adults who are exposed to information that is misleading or inconsistent with their experiences are more likely to perform poorly during memory interviews—and repeated questioning has similar effects (Ceci & Friedman, 2000; Fivush, 1993; Wysman, Scoboria, Gawrylowicz, & Memon, 2014).

What Do You Think?

1. **In your view, under what conditions do you think children's statements are most likely to be true?**
2. **Suppose you need to question a child about an event. How would you maximize your likelihood of the child's giving you an accurate account of what occurred?**

2000; Wellman, Phillips, & Rodriguez, 2000) and that a child who believes he is having hot oatmeal for breakfast will be surprised upon receiving cold spaghetti (Wellman & Banerjee, 1991). Theory of mind is commonly assessed by examining children's abilities to understand that people can hold different beliefs about an object or event.

False belief. Three-year-old children tend to perform poorly on false *belief tasks*—tasks that require them to understand that someone does not share their knowledge. For example, children who are presented with a familiar Band-Aid box that contains pencils rather than Band-Aids will show surprise but tend to believe that other children will share their knowledge and expect the Band-Aid box to hold pencils (Flavell, 1993; Flavell et al., 1995; Jenkins & Astington, 1996). In addition, the children will believe that they knew all along that the Band-Aid box contained pencils (Birch, 2005). They confuse their present knowledge with the memories for prior knowledge and have difficulty remembering ever having believed something that contradicts their current view (Bernstein, Atance, Meltzoff, & Loftus, 2007; Mitchell & Kikuno, 2000).

Three-year-old children show a pattern of false belief errors that are robust across procedures and cultures (Wellman, Cross, & Watson, 2001; Wellman & Liu, 2004). However, some researchers find that young children are much more competent than they appear because research with infants has suggested that an understanding of false belief may be evident by 15 months of age (Buttelmann, Over,

Carpenter, & Tomasello, 2014; Onishi & Baillargeon, 2005). Similar to arguments regarding object permanence in infancy and egocentrism in early childhood, it may be that the task of understanding the action and communicating that understanding are overwhelming (Helming, Strickland, & Jacob, 2014). Critics counter that false belief findings with infants reflect perceptual preferences and not theory of mind (Heyes, 2014). Instead, the research to date suggests that theory of mind as evidenced by false belief tasks does not emerge until about 3 years of age. Developmental studies reveal a reliable transition in children's ability to reason about beliefs between 3 and 4 years of age (Apperly, Samson, & Humphreys, 2009). By age 3, children can understand that two people can believe different things (Rakoczy, Warneken, & Tomasello, 2007). Four-year-old children understand that people who are presented with different versions of the same event develop different beliefs (Eisbach, 2004; Pillow & Henrichon, 1996). By age 4 or 5, children become aware that they and other people can hold false beliefs (Moses et al., 2000)—representations of reality that are incorrect.

Advanced cognition is needed for children to learn abstract concepts such as belief (Carlson, Moses, & Claxton, 2004; Moses, Carlson, & Sabbagh, 2005). Performance on false belief tasks is associated with measures of executive function—that is, the set of cognitive abilities, such as attention, memory, and inhibitory control, that permit higher cognitive functions such as planning, decision-making, and goal setting (Hughes & Ensor, 2007; Perner, Lang, & Kloo, 2002; Sabbagh, Xu, Carlson, Moses, & Lee, 2006). One longitudinal study following children from ages 2 to 4 found that advances in executive functioning facilitated children's performance on theory of mind tasks (Hughes & Ensor, 2007). Reasoning about false beliefs poses heavy demands on executive functioning, requiring the capacity in working memory or other aspects of executive functioning to construct and retain complex mental representations (Apperly et al., 2009).

Children's performance on false belief tasks is closely related with language development (Bernard & Deleau, 2007; Milligan, Astington, & Dack, 2007). Everyday conversations aid children in developing a theory of mind because everyday conversations tend to center around and provide examples of mental states and their relation with behavior (Ruffman, Slade, & Crowe, 2002). When parents and other adults speak with children about mental states and emotions, connect them to behaviors and experiences, and discuss causes and consequences, children develop a more sophisticated understanding of other people's perspectives (Pavarini, Hollanda Souza, & Hawk, 2012). By interacting with others, children learn how to exchange, adjust, and even revise their beliefs about a given issue (Bernard & Deleau, 2007). The process of interacting with others helps children learn how to perspective take, become capable of taking into account other peoples points of view as well as their own on a given issue at the same time (Hughes & Leekam, 2004). In one longitudinal study of French children, conversational perspective taking ability at 3.5 years of age predicted false belief scores one year later (Bernard & Deleau, 2007).

Interactions with parents offer particularly rich opportunities for children to practice perspective taking (Hughes & Leekam, 2004). Parents may encourage children to talk about mental states, such as desires, emotions, cognitions, and subjective evaluations; these early experiences facilitate children's theory of mind over the preschool years (Lu, Su, & Wang, 2008; Slaughter, Peterson, & Mackintosh, 2007; Symons, 2004). In addition, siblings provide young children with opportunities

for social interaction, pretend play, and practice with deception; young children with siblings perform better on false belief tests than do those without (Jenkins & Astington, 1996; McAlister & Peterson, 2007, 2013; Perner, 2000; Ruffman, Perner, & Parkin, 1999). Success in false belief attribution tasks is most frequent in the case of children who are the most active in shared pretend play (Schwebel, Rosen, & Singer, 1999).

Context and false beliefs. The contexts in which children are embedded contribute to their developing understanding of the mind. Children in many countries, including Canada, India, Peru, Samoa, Thailand, Norway, and China, show similarity in the onset and development of theory of mind between the ages of 3 and 5 (Callaghan et al., 2005; Melinder, Endestad, & Magnussen, 2006; Wellman, Fang, & Peterson, 2011). For example, findings regarding the relation of executive functioning to performance on false belief tasks apply equally to preschoolers in the United States and in China (Sabbagh et al., 2006). Children reared in some contexts, however, show a very different pattern in understanding theory of mind (Lillard, 1998; Vinden, 1996). A study of 8-year-old children from Peru used a culturally appropriate version of the Band-Aid box task in which a sugar bowl contained tiny potatoes (Vinden, 1996). At first, the children believed the bowl contained sugar. After learning that it contained potatoes, they answered typical false belief questions incorrectly believing that others would respond that the bowl contained potatoes. Even at age 8, the children responded incorrectly, unable to explain why others might initially believe that the bowl contained sugar and be surprised to learn otherwise. One explanation is that the children in this study were raised in an isolated farming village where farmers worked from dawn to dusk and there was no reason nor time for deception (Vinden, 1996). The Peruvian children's culture did not include ideas such as false belief, as their day-to-day world was concerned more with tangible activities and things rather than considerations of people's thoughts.

Cross-cultural studies have suggested, however, that compared with European American parents, Chinese parents refer less frequently to mental states when conversing with their children about the past (Lu et al., 2008; Wang, 2001; Wang & Fivush, 2005), yet Chinese children perform just as well as their Euro-American peers on false belief tasks (Liu, Wellman, Tardif, & Sabbagh, 2008; Sabbagh et al., 2006). Whereas research with Western children has shown that mental state talk facilitates the development of theory of mind (Liu et al., 2008; Ruffman, Slade, & Crowe, 2002; Symons, Fossum, & Collins, 2006), a longitudinal study of Chinese children ages 3 to 4 found that theory of mind performance was facilitated not by mental state talk but, instead, by talking about others. In the Chinese context, where parents rarely discuss mental states with their children but often talk about information concerning other people (Wang, 2001, 2004; Wang & Fivush, 2005), children are exposed to little mental state talk and instead, they may develop theory of mind through talking about others—increases in other-references facilitated the children's success in passing the false belief tasks (Lu et al., 2008).

Children's interactions with people in their immediate contexts can also influence the development of theory of mind. Children can be trained in perspective taking. For example, when children are presented with a series of objects that look like a certain thing but are actually something else (candle and apple) and are shown the appearance and real states of the objects, along with explanation, 3-year-olds showed improvements on false belief tasks (Lohmann & Tomasello, 2003). Discussion emphasizing the existence of a variety of possible perspectives in relation to an object can improve performance in false belief tasks—dialogue can facilitate the development of theory of mind (Bernard & Deleau, 2007). Other studies have engaged North American and European children in discussion about the thoughts, beliefs, and desires of characters in stories, especially stories in which characters play tricks to surprise or deceive one another; children who receive the training improved their performance in subsequent false belief tasks (Guajardo &

Watson, 2002; Liu et al., 2008; Milligan et al., 2007; Slaughter & Gopnik, 1996). Similarly, conversation about deceptive objects (e.g., a pen that looked like a flower) also improves performance on false belief tasks (Lohmann & Tomasello, 2003).

Metacognition

Between the ages of 2 and 5, children's understanding of the mind grows. They become aware that thinking takes place inside the mind. Between 3 and 5, children come to understand that they can know something that others do not, that their thoughts cannot be observed, and that there are individual differences in mental states (Flavell, Flavell, & Green, 1983; Pillow, 2008). Young children understand that someone can think of one thing while doing something else, that a person whose eyes and ears are covered can think, and that thinking is different from talking, touching, and knowing (Flavell et al., 1995). However, young children's understanding of the mind is not complete. Three- and four-year-old children do not understand that we think even when we are inactive. They look for visible indicators of thinking and assume their absence indicates the absence of thought. It is not until middle childhood that children understand that the mind is always active (Flavell et al., 1983, 1995; Flavell, 1999). Likewise, preschoolers tend to think of the mind as simply a container for items, but older children tend to see the mind as an active constructor of knowledge that receives, processes, and transforms information (Chandler & Carpendale, 1998; Flavell, 1999).

Young children show limited knowledge of memory functions. Four-year-olds recognize that increasing the number of items on a list makes recall more difficult and that longer retention intervals increase the likelihood of forgetting (Lyon & Flavell, 1993; Pillow, 2008; Wellman, 1977). But they know little about the effectiveness of deliberate memory strategies. For example, when 4-year-old children compare the effectiveness of strategies for free recall, they judged looking at the items to be recalled as more effective than naming, rehearsing, or categorizing them (Justice, 1986). Children in kindergarten showed no preference among the four strategies, but second-grade children judged rehearsal and categorization as more effective than naming or looking. However, one recent study suggests that preschoolers' poor memory performance may result less from metacognitive deficits and instead from over-optimism (Lipowski, Merriman, & Dunlosky, 2013). As we will discuss in Chapter 8, young children have a strong sense of self-confidence and tend to believe that they will be successful in all endeavors. This overconfidence may overshadow their understanding of how their minds work, leading to biased estimates of their abilities (Lipowski et al., 2013). The cognitive advances that take place during early childhood are summarized in Table 7.3.

TABLE 7.3 Cognitive Advances of Early Childhood

ADVANCEMENT	DESCRIPTION
Increased use of mental representation	Uses symbols, language, categorization, and pretend play
Understanding of the nature of objects and everyday experience	Understands that magic cannot alter the nature of everyday experiences Distinguishes animate from inanimate objects Understands that superficial changes do not alter the nature of objects (e.g., number)
Perspective-taking	Takes the perspective of others
Theory of mind	Is aware of own and other's mental processes.
Increases in information processing abilities	Increases in attention on simple tasks Increases in memory, especially episodic and scripts

Thinking in Context 7.3

1. In what ways might brain development account for cognitive changes that we see in early childhood such as increases in information processing capacity and changes in reasoning?
2. How are cultural and contextual factors, such as neighborhood, socioeconomic status, ethnicity and family, reflected in brain development? Cognitive development?
3. Discuss strengths and weaknesses of Piaget's cognitive developmental, Vygotsky's sociocultural, and information processing theory. How well does each account for cultural and contextual factors?

YOUNG CHILDREN'S LANGUAGE DEVELOPMENT

Language acquisition proceeds very rapidly in early childhood. As they enter childhood, young children use telegraphic speech. They slowly learn to use multiple elements of speech, such as plurals, adjectives, and the past tense. Toward the end of early childhood, children show much more complex vocabulary and grammar. Language development is the foundation for emergent literacy, the capacity to learn to read.

VOCABULARY

At 2 years of age, the average child knows about 500 words. Vocabulary acquisition occurs quickly. The average 3-year-old child has a vocabulary of 900 to 1,000 words. By 6 years of age, most children use about 2,600 words and can understand more than 20,000 (Owens, 2001). How is language learned so quickly? As we have discussed in Chapter 5, children use a strategy called fast mapping, which permits them to learn the meaning of a new word after hearing it once or twice. It is a contextually based understanding of a word. Generally, children fast map words for objects more easily than words for actions. However, children under 3 have been shown to fast map new verbs and apply them to other situations in which the same action occurs (Gershkoff-Stowe & Hahn, 2007; Golinkoff, Jacquet, Hirsh-Pasek, & Nandakumar, 1996). Children get better at using fast mapping with age (Brady & Goodman, 2014).

In order to fast map a word, the child must hear it. Young children can learn words simply by overhearing them in conversation or by watching videos (O'Doherty et al., 2011). Preschoolers can learn words from watching videos with both human and robot speakers, but they learn more quickly in response to human speakers (Moriguchi, Kanda, Ishiguro, Shimada, & Itakura, 2011). Parents who wish to foster language development should have frequent conversations with their children in which they use a wide vocabulary (Hoff, Naigles, & Nigales, 2002) as well as read to children because exposure to words through storybook reading leads to increases in vocabulary (Leung, 2008). For example, one study examined the effects of adult–child interaction on 3-year-olds' vocabulary acquisition during storybook reading (Walsh & Blewitt, 2006). All children were read three storybooks repeatedly over four reading sessions. Children who were asked questions about the reading and were encouraged to talk about it showed a greater vocabulary and more novel word knowledge after the fourth session than did children who were not engaged in discussion.

Another strategy that children use to increase their vocabulary is **logical extension**. When learning a word, children extend it to other objects in the same category. For example, when learning that a dog with spots is called a Dalmatian, a child may refer to a Dalmatian bunny (a white bunny with black spots) or a Dalmatian horse. Children make their words their own and apply them to all the situations they want to talk about (Behrend, Scofield, & Kleinknecht, 2001). At about age 3, children demonstrate the **mutual exclusivity assumption** in learning new words. They tend to assume that new words are labels for unfamiliar objects (Littschwager & Markman, 1994; Markman, 1987, 1990). In one study, young children were shown one familiar object and one unfamiliar object. They were told, "Show me the X" where X is a nonsense syllable. The children reached for the unfamiliar object (Markman & Wachtel, 1988). Similarly, young children use the mutual exclusivity assumption to learn the names of parts of objects, such as the brim of a hat, cab of a truck, or bird's beak (Hansen & Markman, 2009).

By 5 years of age, many children can quickly understand and apply most words that they hear. If the word is used in context or explained with examples, most 5-year-olds can learn it. Preschoolers learn words by making inferences given the context—and inferential learning is associated with better retention than learning by direct instruction (Zosh, Brinster, & Halberda, 2013). Certain classes of words are challenging for young children. For example, words that express comparisons are relative in nature; tall and short, or high and low, are used in comparing one object to another—the context defines their meaning. Young children have difficulty understanding that to call an object tall, it is in relation to another object that is short. Children may erroneously adopt the height of tall to refer to all tall things and therefore miss the relative nature of the term (Ryalls, 2000). Children also have difficulty with words that express place and time, such as *here*, *there*, *now*, *yesterday*, and *tomorrow*. Despite these errors, young children make great advances in vocabulary, learning thousands of words each year. Interestingly, bilingual children use these same strategies in learning words (Van Horn & Kan, 2015). They also show similar rates of word learning for words learned in their first and second languages (Kan & Kohnert, 2008, 2011). Learning a second language is discussed in Chapter 9.

EARLY GRAMMAR

Young children quickly learn to combine words into sentences in increasingly sophisticated ways (Owens, 2001). Three-year-old children tend to use plurals, possessives, and past tense. They also tend to understand the use of *I*, *you,* and *we*. Similar to telegraphic speech, their sentences are short, leaving out words like *a* and *the*. However, their speech is more sophisticated than telegraphic speech because some pronouns, adjectives, and prepositions are included. Four- and 5-year-olds use four- to five-word sentences and can express declarative, interrogative, or imperative sentences. Context influences the acquisition of grammar. Four-year-old children will use more complex sentences with multiple clauses, such as "I'm resting because I'm tired," if their parents use such sentences (Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002). Parental conversations and support for language learning are associated with faster and more correct language use (Barrett, 1999). Children often use run-on sentences, in which ideas and sentences are strung together.

"See? I *goed* on the slide!" called out Leona. **Overregularization** errors such as Leona's are very common in young children. They occur because young children are still learning exceptions to grammatical rules. Overregularization errors are grammatical mistakes that young children make because they are applying grammatical rules too stringently. They apply the rules of grammar even when they should not. For example, to create the plural, the rule is to add *s* to the word. However, there are many exceptions to this rule. Overregularization is expressed when children refer to *foots, gooses, tooths,* and *mouses*. Overregularization illustrates that the child understands

and is applying the rules. It is a sign of grammatical sophistication. Despite all of the common errors young children make, one study of 3-year-olds showed that nearly three quarters of their utterances were grammatically correct. The most common error was in making tenses (such as *is/are, fall/felled*; Eisenberg, Guo, & Germezia, 2012). At the end of the preschool years, most children use main grammar rules appropriately and confidently (Tager-Flusberg, 2001).

PRIVATE SPEECH

As Leroy played alone in the corner of the living room, he pretended to drive his toy car up a mountain and explained, "It's a high mountain. Got to push it all the way up. Oh no! Out of gas. Now they will have to stay here." Young children like Leroy often talk aloud to themselves, with no apparent intent to communicate with others. This self-talk, called **private speech**, accounts for 20% to 50% of the utterances of children ages 4 to 10 (Berk, 1986). Piaget and Vygotsky offer different views on the significance of private speech for development.

According to Piaget, private speech is a result of cognitive development and indicative of cognitive immaturity. He posited that children's self-talk, which he called *egocentric speech*, was meaningless, not addressed to anyone, not modified so that a listener can understand it, and simply reflected the egocentrism of the preoperational stage. Research, however, suggests that while children's speech is sometimes egocentric, often it is not. Children can communicate meaningfully with gestures and speech from an early age. Two-year-old children can generate speech relevant to what someone else has said but have difficulty remaining on one conversational topic (Owens, 2001). By 3 years of age, most children pay attention to how their speech affects others. If they are not understood, they attempt to explain themselves more clearly. Four-year-old children, especially girls, will use simpler language when speaking to 2-year-old children, suggesting that they can take others' perspectives (Owens, 2001; Shatz & Gelman, 1973). By 5 years of age, about half of children can stick to a conversational topic for a dozen turns. Thus, research suggests that children's speech is less egocentric that Piaget posited.

Instead, it appears that private speech serves developmental functions. Private speech is thinking; it is personal speech that guides behavior and fosters new ideas (Vygotsky & Minick, 1987). It may be useful to think of private speech is a type of scaffold that the child provides for herself, by talking out loud (Mercer, 2008). Children explain events and activities, plan, and review their knowledge to themselves. Private speech is the child's thought and eventually becomes internalized as *inner speech*, or word-based internal thought, representing the child's transition to verbal reasoning.

Private speech plays a role in **self-regulation**, the ability to control one's impulses and appropriately direct behavior—it increases during the preschool years (Berk & Garvin, 1984). Children are more likely to use private speech during challenging tasks and problem solving, especially when they encounter obstacles or do not have adult supervision (Berk, 1992; Berk & Garvin, 1984; Winsler, Fernyhough, & Montero, 2009). Private speech is used by children to problem solve, plan strategies, and regulate themselves so that they can achieve goals. Children who use private speech during a challenging activity are more attentive and involved and show better performance than children who do not (Alarcón-Rubio, Sánchez-Medina, & Prieto-García, 2014; Behrend, Rosengren, & Perlmetter, 1989; Berk & Spuhl, 1995; Winsler, Diaz, & Montero, 1997). Preschoolers who are aware of their own private speech are more likely to use expressive language skills, use more private speech, and display an understanding of deception than those were less aware of their use of private speech (Manfra & Winsler, 2006).

As children grow older, private speech is used more effectively to accomplish tasks and it declines, becoming a whisper and eventually an entirely internal

dialogue not audible or visible to others (Duncan & Pratt, 1997; Patrick & Abravanel, 2000; Winsler, Carlton, & Barry, 2000). Private speech never completely disappears. It becomes internalized as inner speech, a silent internal dialogue that we use every day to regulate and organize our behavior (Berk, 1986; Fernyhough, 2008; Kohlberg, Yaeger, & Hjertholm, 1968).

However, there is some evidence that private speech may not be as private as suggested. That is, private speech often occurs in the presence of others. When children ages 2.5 to 5 completed a challenging task either in the presence of an experimenter who sat a few feet behind the child, not interacting, or alone, the children engaged in more private speech in the presence of a listener (McGonigle-Chalmers, Slater, & Smith, 2014). This suggests that private speech may have social value and may not simply be a tool for self-regulation.

Research suggests that the pattern of change in private speech is more complicated than Vygotsky indicated. Preschool girls tend to use more mature forms of private speech than boys; the same is true of middle-income children as compared with low-income children (Berk, 1986). This pattern corresponds to the children's relative abilities in language use. Though Vygotsky considered the use of private speech a universal developmental milestone, research suggests that there are individual differences, with some children using private speech little or not at all (Berk, 1992). Talkative children use more private talk than do quiet children (McGonigle-Chalmers et al., 2014). Bright children tend to use private speech earlier, and children with learning disabilities tend to continue its use later in development (Berk, 1992). One of the educational implications of private speech is that parents and teachers must understand that talking to oneself or inaudible muttering is not misbehavior but, rather, a child's effort to complete a difficult task or regulate his or her behavior.

Thinking in Context 7.4

1. How might advances in language development influence other domains of development, such as social or cognitive development?
2. Why might some theorists point to maturation (nature, as opposed to nurture) as the main influence on language development? What do you think?
3. Given what we know about private speech, what advice do you give to parents and teachers?

MORAL DEVELOPMENT IN EARLY CHILDHOOD

Young children's cognitive capacities and skills in theory of mind influence moral reasoning, how they view and make judgments in their social world. Two-year-old children describe behaviors as good and bad. They also respond with distress when viewing or experiencing aggressive or potentially harmful actions (Kochanska, Casey, & Fukumoto, 1995). Young children's understanding of morality grows rapidly. By age 3, children can identify that a child who intentionally knocks another child off of a swing is worse than one who does so accidentally (Yuill & Perner, 1988). Four-year-old children can understand the difference between truth and lies (Bussey, 1992). By age 5, children are aware of many moral rules, such as those regarding lying and stealing. They also demonstrate conceptions of justice (e.g., "it's my turn," "hers is bigger," "it's not fair").

How does moral reasoning develop? There are many perspectives on moral development, as discussed in later chapters. Here we consider two classic views of moral development: social learning theory and cognitive-developmental theory. Both consider a young child's moral values and behavior as first externally influenced. Over time, moral values become internalized and moral behavior becomes guided by inner standards.

SOCIAL LEARNING THEORY

Social learning theory views moral behavior as being acquired through reinforcement and modeling, just like any other behavior (Bandura, 1977; Grusec, 1992). Bandura and McDonald (1963) demonstrated that the moral judgments of young children could be modified through a training procedure involving social reinforcement and modeling. Parents and others naturally dole out reinforcement and punishment that shapes the child's behavior. Modeling also plays a role in children's moral development. Adults and other children serve as models for the child, demonstrating appropriate (and sometimes not!) actions and verbalizations. When children observe a model touching a forbidden toy, they are more likely to touch the toy. Some research suggests that children who observe a model resisting temptation are less likely to do so themselves (Rosenkoetter, 1973). However, models are more effective at encouraging rather than inhibiting behavior that violates a rule or expectation. Children are more likely to follow a model's transgressions rather than appropriate behavior (Hoffman, 1970).

In order to learn by modeling, children must pay attention to the events that are modeled. Attention is influenced by many factors. Children are more likely to imitate behavior when the model is competent and powerful (Bandura, 1977). They are also more likely to imitate a model that is perceived as warm and responsive rather than cold and distant (Yarrow, Scott, & Waxler, 1973). Over the course of early childhood, children develop internalized standards of conduct based on reinforcements and punishments, and observing others and considering their explanations for behavior (Bandura, 1986; Mussen & Eisenberg-Berg, 1977). Those adopted standards are then used by children as guides for behavior. Children attempt to behave in ways that are consistent with their internalizations (Grusec & Goodnow, 1994). In this way, moral values and actions are learned and internalized, as are all behaviors. Children's behavior is shaped to conform with the rules of society.

COGNITIVE-DEVELOPMENTAL THEORY

The cognitive-developmental perspective views moral development through a cognitive lens and examines reasoning about moral issues: Is it ever right to steal even if it would help another person? Is lying ever acceptable? The resolution of moral dilemmas requires that the child consider the perspective, needs, and feelings of others—cognitive changes and related developments in perspective taking the ability underlie moral development. Young children's reasoning about moral problems changes with development as they construct concepts about justice and fairness from their interactions in the world (Gibbs, 1991, 2003).

Piaget (1932) studied moral development by using the same methods that he used to study cognitive development: observation and the Piagetian clinical interview. He observed children playing marbles and asked them questions about the rules. What are the rules to the game? Where do the rules come from? Have they always been the same? Can they be changed? Preschool-aged children play with the marbles without attention or awareness of the rules. Their play is not guided by rules. They engage in solitary play for the sake of pleasure and may play with the marbles in random ways such as tossing them about without regard to the rules. By 6 years of age, children enter the first stage of Piaget's theory of morality, **morality of constraint**, in which children are aware of rules and see them as

sacred and unalterable. Rules are created by adults, passed down to children, must be respected, and have always existed. Children believe that rules cannot be changed; people have always played marbles in the same way. Morality comes from outside in the sense that authority's rules are always right and their punishments are always justified. Moral behavior is behavior that is consistent with the rules that authority figures set.

Lawrence Kohlberg (1969, 1976) investigated moral development by posing hypothetical dilemmas about justice, fairness, and rights that place obedience to authority and law in conflict with helping someone. Responses to the dilemmas change with development; moral reasoning progresses through a universal order of stages representing qualitative changes in conceptions of justice. Young children who display cognitive reasoning at the preoperational stage are at the lowest level of Kohlberg's scheme: **preconventional reasoning**. Similar to Piaget, Kohlberg argued that young children's behavior is governed by self-interest, avoiding punishment and gaining rewards. Moral behavior is a response to external pressure. Young children have not internalized societal norms and their behavior is motivated by desires rather than internalized principles.

Similar to cognitive development, children are active in constructing their own moral understanding through social experiences with adults and peers (Smetana, 1995; Smetana & Braeges, 1990). This is true across cultures. Research with children from Guatemala, India, Turkey, China, and the United States suggests that children do not simply internalize what they see but instead transform and internalize the strategies used by adults by incorporating their own experience and knowledge as well as choosing when to use the strategy and what situations are appropriate (Rogoff, Mistry, Göncü, & Mosier, 1993; Wang, Bernas, & Eberhard, 2008).

As early as 3 years of age, children can differentiate between moral imperatives, which concern people's rights and welfare, and social conventions, or social customs (Smetana & Braeges, 1990). For example, they judge stealing an apple, a moral violation, more harshly than violating a social convention, such as eating with one's fingers (Nucci & Turiel, 1978; Smetana, 1995; Smetana & Braeges, 1990; Turiel, 1998). In one study, 3- and 4.5-year-old children viewed an interchange in which one puppet struggled to achieve a goal, was helped by a second puppet and violently hindered by a third puppet. When asked to distribute biscuits, the 4.5 year-olds but not 3-year-olds were more likely to give more biscuits to the helper than the hinderer puppet. Most explained the unequal distribution by referring to the helper's prosocial behavior or the hinderer's antisocial behavior (Kenward & Dahl, 2011). In addition to moral and conventional issues, between ages 3 and 5 children come to differentiate personal issues, matters of personal choice that do not violate rights, across home and school settings (Nucci, 1996; Nucci & Weber, 1995; Smetana, 1995; Weber, 1999; Yau & Smetana, 2003). Preschoolers believe that they have control over matters of personal choice, unlike moral issues whose violations are inherently wrong.

Cross-cultural research suggests that children in diverse cultures in Europe, Africa, Asia, Southeast Asia, and North and South America differentiate moral, social conventional and personal issues (Killen, McGlothlin, & Lee-Kim, 2002; Nucci, 2001; Smetana, 1995; Turiel, 1998; Yau & Smetana, 2003). However, cultural differences in socialization contribute to children's conceptions. For example, a study of Chinese children ages 3 to 4 and 5 to 6 showed that, similar to Western samples, the children overwhelmingly considered personal issues as permissible and up to the child, rather than the adults. However, the Chinese children's justifications for moral transgressions focused overwhelmingly on the intrinsic consequences of the acts for others' welfare and fairness, as compared with the emphasis on avoiding punishment common in Western samples of preschoolers (Yau & Smetana, 2003). These differences are consistent with cultural preferences for collectivism and individualism.

Social experiences—disputes with siblings over toys, for example—help young children develop conceptions about justice and fairness (Killen & Nucci, 1995). Peers respond to moral offenses with emotion, empathy (i.e., sharing their own loss), or retaliation (Arsenio & Fleiss, 1996). In Western cultures, adults tend to emphasize

the victim's rights and feelings and consequences for the individual. In contrast, Chinese children's behavior is seen as guided by their obligations to the family, and others (Chao, 1995; Yau & Smetana, 2003). One study of 4-year-old Chinese children and their mothers showed that mothers consistently drew children's attention to transgressions and emphasized the consequences for others. The children learned quickly and were able to spontaneously discuss their mothers' examples and strategies, reenact them in their own interactions, and their explanations reflected their own understanding of rules and expectations in their own terms, rather than reflecting simple memorization (Wang et al., 2008).

How adults discuss moral issues, such as truth-telling, harm, and property rights, influences how children come to understand these issues. When adults discuss moral issues in ways that are sensitive to the child's developmental needs, children develop more sophisticated conceptions of morality and advance in their moral reasoning (Janssens & Dekovic, 1997; Walker & Taylor, 1991). As we have seen, there are cultural differences in how people think about moral and conversational issues—and these conceptualizations are communicated, internalized, and transformed by children as they construct their own concepts about morality.

Thinking in Context 7.5

1. Evaluate the social learning and cognitive-developmental perspectives on moral development. What are the strengths and weaknesses of each? In your view, is one better able to account for moral development than another? Why or why not?
2. How might cultural values influence moral development? Is moral development culture-free (i.e., is it an area in which people around the world show the same developmental progression)? Why or why not?

CONTEXTUAL INFLUENCES ON DEVELOPMENT IN EARLY CHILDHOOD

Formal education begins in early childhood, as children begin to attend preschool, prekindergarten (pre-K), and similar institutions. Many children face a particularly challenging risk for development: poverty. Even if they have access to quality education, children reared in homes and communities of pervasive poverty are at risk to develop physical, cognitive, and psychosocial deficits.

EARLY CHILDHOOD EDUCATION

Preschool programs provide educational experiences for children ages 2 to 5. Some preschools are child-centered, allowing children to choose among a variety of activities and play as vehicles for learning. The best preschool programs stimulate all aspects of development—cognitive, physical, social, and emotional—through manipulating materials and interacting with teachers and peers. Children have the opportunity to choose activities that are tailored to their interests and abilities. They learn by doing—through play—and develop confidence and self-esteem. Active play helps children learn to problem solve, get along with others, communicate, and self-regulate.

Other preschool programs emphasize academics more than play, providing children with structured learning environments through which they learn letters, numbers, shapes, and academic skills via drills and formal lessons. When academic instruction is heavily and rigidly emphasized whereby preschoolers do worksheets and passively sit through lessons, children tend to demonstrate signs of stress such as rocking, have less confidence in their skills, and avoid challenging tasks than do children who are immersed in more active forms of play-based learning (Stipek,

Feiler, Daniels, & Milburn, 1995); they also achieve less in grade school (Burts et al., 1992; Hart et al., 1998). Academically oriented preschool programs that emphasize academics over self-directed exploration negatively influence motivation and learning (Stipek et al., 1995). The most effective early childhood education programs include responsive and stimulating daily interactions between teachers and children. Teachers provide educational support in the form of learning goals, instructional support, and feedback, coupled with emotional support and aid in helping children learn behavioral management skills (Hamre, 2014). Responsive teaching is attuned to children's cues and needs rather than being strictly academic.

However, effective early childhood education is defined and influenced by cultural values. In the United States, a society that emphasizes individuality, a child-centered approach in which children are given freedom of choice is associated with the most positive outcomes (Marcon, 1999). Effective early childhood education may vary for other cultures, such as Japan's collectivist culture. The most effective Japanese preschools tend to foster collectivistic values and are society centered with an emphasis on social and classroom routines, skills, and promoting group harmony (Holloway, 1999; Nagayama & Gilliard, 2005). Japanese preschools prepare children for their roles in society and provide formal instruction in academic areas as well as English, art, swordsmanship, gymnastics, tea ceremonies, and Japanese dance. Much instruction is teacher-directed and children are instructed to sit, observe, and listen. Teachers are warm, but address the group as a whole rather than individuals. This structured approach is associated with positive outcomes in Japanese children (Holloway, 1999; Nagayama & Gilliard, 2005), illustrating the role of culture in influencing outcomes of early childhood education. Even within a given country such as the United States, there exist many ethnicities and corresponding cultures, such those of Native Americans and Mexican Americans, for example. In each case, instruction that is informed by an understanding of children's home and community culture fosters a sense of academic belongingness that ultimately influences academic achievement (Gilliard & Moore, 2007).

One of the most successful early childhood education programs in the United States is known as **Project Head Start.** Created in 1965 by the federal government, Project Head Start was designed to provide economically disadvantaged children with nutritional, health, and educational services during their early childhood years, prior to entering kindergarten. In 1994, the program was expanded to serve younger children, from birth to age 3, and their families. There are more than 1,600 Head Start programs in the United States, serving over 900,000 children (see Box 7.4; U.S. Department of Health and Human Services, 2011).

The best evidence for the effectiveness of early childhood education interventions comes from longitudinal studies that span decades. Two major research projects, in addition to Head Start, illustrate the value of quality early childhood education: the Carolina Abecedarian Project and the Perry Preschool Project, carried out in the 1960s and 1970s. Both programs enrolled children from families with incomes below the poverty line. Both projects emphasized providing stimulating preschool experiences to promote motor, language, and social skills as well as cognitive skills including literacy and math concepts. Special emphasis was placed on rich, responsive adult–child verbal communication as well as nutrition and health services. The Abecedarian intervention began in infancy with home visits whereas the Perry Preschool Project included children at ages 3 and 4. Exposure to enriched preschool environments was associated with benefits that lasted well into adulthood. Children in these programs achieved higher reading and math scores in elementary school than their non-enrolled peers (Campbell & Ramey, 1994). As adolescents, they showed higher rates of high school graduation, higher rates of college enrollment, and lower rates of substance abuse and lower rates of pregnancy (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002; Muennig et al., 2011). At ages 30 and 40, early intervention participants showed higher levels of education and income (Campbell et al., 2012; Schweinhart et al., 2005).

ETHICAL AND POLICY APPLICATIONS OF LIFE SPAN DEVELOPMENT

Project Head Start

The rationale for Project Head Start is that early intervention to address factors that may inhibit children's health and learning will prepare them for school and help them get a "head start" on their education. Children served by Head Start are ethnically diverse and tend to come from families with income below the poverty line.

Most Head Start programs include one to two years of preschool as well as nutrition and health services. Parents also receive assistance, such as education about child development, vocational services, and programs addressing their emotional and social needs. Parents are encouraged to be active in Head Start; they serve on committees, contribute to program planning, and act as parent aides in the classroom. Parents must occupy at least one half of the seats of each Head Start program's Policy Council (Zigler & Styfco, 2004). A large part of Head Start's success is that it reaches parents and gets them involved in their children's education. The more involved parents are, the more they learn about child development, which translates into creating a more stimulating learning environment and overall better parenting.

Over the past four decades, a great deal of research has been conducted on the effectiveness of Head Start. The most common finding is that Head Start improves cognitive performance, as illustrated in a study of young children in 18 cities (Zhai, Brooks-Gunn, & Waldfogel, 2011). The first year or two after Head Start children begin elementary school, they perform well and show gains in IQ and achievement scores. However, over time the cognitive effects of Head Start fade such that participants' performance on cognitive measures later in childhood is similar to those who have not participated in Head Start (Duncan, Ludwig, & Magnuson, 2007; McKey et al., 1985; McLloyd, 1998). Why? Early intervention may not compensate for the pervasive and long-lasting effects of poverty-stricken neighborhoods and inadequate public schools (Schnur & Belanger, 2000).

However, there are some lasting benefits. Children who participate in Head Start are less likely to be held back a grade, less likely to be assigned to special education classes, more likely to graduate from high school, and have greater parental involvement in school (Duncan et al., 2007; Joo, 2010; Zigler & Styfco, 1993). At the same time, home environment is often a better and more consistent predictor of long-term outcomes than participation in Head Start (Joo, 2010). Head Start is associated with other long-lasting effects, such as gains in social competence and health-related outcomes including immunizations (Abbott-Shim, Lambert, & McCarty, 2003; Huston, 2008).

Effective intervention and education programs target young children very early in life to help reduce the negative effects of economic and environmental disadvantage (Ramey & Ramey, 1998). Programs must treat the whole child by providing a variety of services to promote development, including health and social services as well as transportation to ensure that children can attend. Programs should encourage parents to provide a broad range of learning experiences for their children outside of school and to become involved in their child's education. Programs that have lasting effects include continuous intervention beyond the preschool years because a two-year program cannot permanently protect a young child from the ravaging effects of economic and neighborhood disadvantage.

What Do You Think?

1. **Why do you think the gains in cognitive and achievement scores shown by children in Head Start fade over time? From your perspective, what can be done to improve such outcomes?**
2. **Consider early childhood interventions such as Head Start from the perspective of bioecological theory. Identify factors at the microsystem, mesosystem, and exosystem that programs may address to promote children's development.**

The success of the Abecedarian, Perry, and Head Start early intervention programs has influenced a movement in the United States toward comprehensive academically oriented preschool, known as pre-K. Pre-K programs are a distinct type of preschool program designed for 4-year-old children specifically to ensure that young children will be ready for kindergarten and will be successful in school by third grade (Colker, 2009). Young children who participate in high-quality pre-K programs enter school more ready to learn than their peers and score higher on reading and math tests than their peers (Gormley, Gayer, Phillips, & Dawson, 2004). About one half of states offer some form of state-funded pre-K without income restrictions, but only 13 states offer pre-K programs in every county (Barnett, Carolan, Squires, Clarke Brown, & Horowitz, 2015). Because all children can benefit from access to quality early childhood education, states such as Oklahoma, Georgia, and Florida provide universal pre-K to all children and many more states are moving in this direction (Williams, 2015).

EFFECTS OF EXPOSURE TO POVERTY

In 2013, children under 18 years of age represented 23% of the U.S. population but comprised 33% of all people in poverty (with poverty defined as a household income of $23,624 for a family of four or $16,057 for an adult and child; Jiang, Ekono, & Skinner, 2015). Young children under the age of 6 are at highest risk of living in poverty as 25% of all children under the age of 6 lived in poverty and an additional 23% are raised in near poverty (defined as 200% poverty level or less). Children from persistently poor families are more likely to experience malnutrition as well as growth stunting in height and weight (Eamon, 2001; Petterson & Albers, 2001). By age 7, they tend to be one inch shorter, on average, than other children (Yip, Scanlon, & Trowbridge, 1993). Children from families with low income show lower levels of cognitive and social functioning than children from more advantaged families (Hanson, McLanahan, & Thomson, 1997; Patterson, Kupersmidt, & Vaden, 1990; Petterson & Albers, 2001). By 2 years of age, children from low socioeconomic backgrounds score lower on standardized tests of cognitive ability (Duncan, Brooks-Gunn, & Klebanov, 1994; Smith, Brooks-Gunn, & Klebanov, 1997). Family income levels within the first four to five years of life predict verbal and achievement outcomes in the early school years (Klebanov, Brooks-Gunn, McCarton, & McCormick, 1998). The effects of poverty are more pronounced for children in families with the lowest income (Duncan & Brooks-Gunn, 2000). Risks to cognitive development, such as maternal education, maternal verbal comprehension, and stressful life events, are more damaging to children at the lowest levels of income than to those who are not poor (Klebanov et al., 1998).

The negative effects of persistent poverty are cumulative, increasing as children get older and have spent a greater proportion of their lives in poverty (Petterson & Albers, 2001). For example, being poor in all of the first four years of life is associated with lower cognitive scores at age 5 as compared with not being poor for all of those years. However, being poor for some, but not all, of those years produces a smaller effect on cognitive development (Duncan & Brooks-Gunn, 2000). Children reared in persistent poverty, who experience repeated instances of poverty, are more likely to have about one-half of the vocabulary of peers at age 3, have a learning disability, repeat a grade, drop out of high school, have emotional or behavior problems, and show aggressive and delinquent behavior in adolescence and adulthood (Dornfeld & Kruttschnitt, 1992; Duncan et al., 1993; Duncan et al., 2007; Najman et al., 2010; Roy, 2014). Overall, verbal ability and achievement are more affected by family income than are mental health and problem behaviors (Duncan & Brooks-Gunn, 2000). Educational resources in the home influence cognitive development of children in poverty. Compared with kindergarteners from families in the bottom fifth of the socioeconomic distribution, children from the most advantaged fifth are four times as likely to have a computer at home, have three times as many books, are read to more often, watch far less television, and are more likely to visit museums or libraries (Duncan et al., 2007).

The quality of home environment predicts children's outcomes. Children reared in low-income homes tend to experience fewer opportunities for learning and mother–child interactions that are less warm, which accounts for a large proportion of the effects of family income on young children's cognitive outcomes (Duncan & Brooks-Gunn, 2000; Duncan et al., 2007). High-quality parenting is associated with enhanced social and emotional functioning and linguistic competence in low- and middle-income children in the United States and United Kingdom (Duncan &

Brooks-Gunn, 2000; Kiernan & Mensah, 2011). Low-income children are less likely to receive high-quality care outside of the home.

Not only is family income important in predicting childhood outcomes but so is the level of income in neighborhoods (Leventhal & Brooks-Gunn, 2000). The presence of affluent neighbors is associated with higher scores on cognitive tests at age 5 (Klebanov et al., 1998). Children who live in poorer neighborhoods are at a higher risk of experiencing negative developmental outcomes than children who live in more affluent neighborhoods. Families with low income often live in extremely poor neighborhoods characterized by social disorganization such as crime, unemployment, and few resources for child development such as playgrounds and parks, child care, health care, and adequate schools (Duncan & Brooks-Gunn, 2000). The salience of a neighborhood's socioeconomic conditions for either supporting or hindering development extends beyond studies conducted in the United States and has been replicated cross-nationally in other developed countries (Caspi & Taylor, 2000; Kohen, Brooks-Gunn, Leventhal, & Hertzman, 2002; Kohen, Leventhal, Dahinten, & McIntosh, 2008).

Neighborhood conditions also influence young children indirectly through effects on parents, family processes such as parenting behaviors, stimulation, and learning opportunities as well as the quality of home environment (Bradley, 1995; Klebanov et al., 1998; Kohen et al., 2008). Neighborhood context and family hardship may influence children by affecting parental mental health; increasing parental conflict; and subsequently, influencing parenting behaviors, which, in turn, influence children's outcomes (Conger et al., 2002; Elder, van Nguyen, & Caspi, 1985; Kohen et al., 2008; Linver, Brooks-Gunn, & Kohen, 2002).

Intervening in Poverty

What resources exist for low-income families, and what are the effects of these resources on child development? From the Great Depression years of the 1930s until the mid-1990s, welfare in the United States took the form of a federal program called Aid to Families with Dependent Children (AFDC), which provided financial benefits to families. Mothers who received AFDC benefits were exempt from any work requirements until their children were older than 6 years of age, although states had the option to require self-sufficiency activities, such as job training, of mothers with preschoolers or even infants (Chase-Lansdale & Vinovskis, 1995; Holland, 2004). In 1996, Congress passed the Personal Responsibility and Work Opportunity Reconciliation Act, which dismantled AFDC; created another welfare program, Temporary Assistance for Needy Families (TANF); and by 2000 resulted in welfare caseloads falling dramatically in every state and by more than 50% nationwide (Administration for Children and Families, 2004).

TANF is known as a welfare-to-work program because it provides families with economic resources with mandated participation in job training and employment activities. The goal of welfare-to-work programs is to increase a mother's self-sufficiency by reducing barriers to employment like child care, enhancing education and literacy, and providing job training (Collins & Aber, 1996; Holland, 2004; Smith, Brooks-Gunn, Kohen, & McCarton, 2001). TANF is intended to transform the welfare system from one that often provided long-term support into a short-term assistance program that encourages poor mothers, including those with very young children, to work. In addition, TANF includes a five-year lifetime limit, but many states have implemented shorter time limits. Many families with children thus forgo receiving public assistance.

Transitional policies also exist, policies designed to cushion the transition to work. The earned income tax credit is a refundable tax credit for low-income workers with children. Its value increases as earnings rise for very low earners, as a reward for successful employment, making work "pay." Two-year transitional child care subsidies exist for parents who forgo welfare receipt for full-time employment. However, two years often is not enough time to ease parents' financial woes.

In addition, parents' awareness and use of these transitional benefits is less than expected; aggressive outreach policies and efforts are needed (Smith et al., 2001).

How successful are welfare-to-work programs? Most studies measure success as changes in parents' welfare dependency and employment status with the emphasis on the mother as provider rather than parent (Smith et al., 2001). In terms of outcomes, there are two trajectories: (1) former recipients who have more schooling, higher cognitive abilities, and fewer mental health problems were more able to find employment and increase family income through wages but (2) former recipients who are high school dropouts or have severe mental health or cognitive impairments were more likely to experience increases in economic and food insecurity after TANF benefits end (Duncan & Brooks-Gunn, 2000; Smith et al., 2001). Less attention has been paid to the effects on mothers' emotional health and parenting behavior or on their children's development. Frequently the jobs that parents are able to obtain require off-peak working hours, such as nights and weekends, and are geographically unsuitable, creating transportation problems and child care difficulties. Children often experience stressful home environments and are left home alone, unsupervised, and are often expected to shoulder a substantial amount of responsibility (Holland, 2004). Little research has examined the effects of welfare-to-work policies on children's development.

Leaving welfare does not necessarily mean that a family is no longer poor. Many welfare-to-work programs increase employment but not income (Morris, 2002). Welfare-to-work programs that increase employment tend to have little effects on school achievement in the preschool and early school years. However, programs that increase both employment and income have beneficial effects on school achievement (Morris, 2002; Morris, Gennetian, & Duncan, 2005).

Early childhood presents opportunities for physical and cognitive growth. Young children get better at exploring and understanding their physical world. As we will see in Chapter 8, young children also get better at exploring their social and emotional world.

Thinking in Context 7.6

Social policies and programs such as early childhood education and community support programs have the potential to intervene and lessen the negative outcomes associated with poverty. In your view, which child and family needs should such programs target? What services might be provided to communities, families, and individuals?

7.1 Apply Your Knowledge:

Researchers who study deception in children must find unique ways of determining when young children are capable of lying. In one study (Saarni, 1984), children were given a desirable toy and promised that they would receive another. Instead, they received an undesirable gift that was not a toy. The child's facial expressions, nonverbal behavior, and emotional displays were recorded. The researchers were interested in when children would begin to mask their feelings and lie about the desirability of the gift. In another study (Lewis, Stanger, & Sullivan, 1989), young children were left alone in a laboratory environment, told by the researcher not to peek at a toy in the researcher's absence, and later questioned about whether they had peeked at the toy. Other studies (Polak & Harris, 1999) entailed the researcher telling children not to touch the toy and later questioning them about whether they had touched the toy in the researcher's absence.

1. How does cognitive development influence children's ability to deceive?
2. What emotional capacities does lying require?
3. When would you expect young children to become capable of lying? Why?
4. What are ethical issues entailed in research on deception in children? How might considerations of children's feelings of guilt, shame, or frustration and their developing capacities for self-regulation inform this question?

Chapter Summary

7.1 Identify patterns of body growth in early childhood.

Growth slows during early childhood. Ethnic differences in patterns of growth are apparent in most Western countries, but there are many individual differences. Malnutrition poses a risk to physical development.

7.2 Contrast advances in gross and fine motor development and their implications for young children's development.

Young children make great advances in gross motor skills, becoming stronger and more coordinated, permitting them to play harder and engage in more complicated play activities. Advances in gross motor skills help children move about and develop a sense of mastery of their environment. Fine motor skills permit young children to take responsibility for their own care.

7.3 Distinguish two processes of brain development and the role of plasticity in development.

Myelination permits quick and complex communication between neurons, leading children's thinking to become faster, more coordinated, and sophisticated. Lateralization begins before birth and is influenced by genes and early experiences and increases in young childhood.

The brain is most plastic during the first few years of life. How well a young child's brain compensates for an injury depends on the age at the time of injury, site of injury, and capacities compromised.

7.4 Contrast Piaget's and Vygotsky's perspectives on young children's thinking.

Piaget explained that children in the preoperational stage of reasoning are able to think using mental symbols, but their thinking is limited because they cannot grasp logic. Simplified and nonverbal tasks demonstrate that young children are more cognitively advanced and less egocentric than Piaget posed. From Vygotsky's sociocultural perspective, children's learning occurs through guided participation, scaffolding within the zone of proximal development. With time, the child internalizes the lesson and learns to accomplish the task on her own. According to Vygotsky, cognitive development and learning entails active internalization of elements of context.

7.5 Discuss changes that occur in attention, episodic memory, and autobiographic memory during early childhood.

The ability to sustain attention improves in early childhood through the preschool years. Episodic memory improves steadily between ages 4 and 10, especially between age 5 and 7. Young children tend to lack knowledge about how to conduct memory searches, determine what is important to recall, and structure narrative accounts of events. Young children's limited working memory makes it difficult for them to use memory strategies. Autobiographical memory develops steadily from 3 to 6 years of age, through adolescence, and is accompanied by increases in the length, richness, and complexity of recall memory.

7.6 Summarize young children's awareness and understanding of the mind.

Young children's theory of mind develops rapidly. They become capable of understanding that people can believe different things, that beliefs can be inaccurate, and that sometimes people act on the basis of false beliefs. Children thereby become able to lie or use deception in play. Children's performance on false belief tasks is closely related with language development, interaction with others, and measures of executive function.

7.7 Describe young children's developing capacities for language.

Young children quickly move from telegraphic speech to combining words into sentences in increasingly sophisticated ways. Soon, young children learn to use multiple elements of speech, such as plurals, adjectives, and the past tense. Children learn new words through fast mapping and logical extension as well as the mutual exclusivity bias in learning new words. Young children make overregularization error. Parental conversations and support for language learning is associated with faster and more correct language use. At the end of the preschool years, most children use main grammar rules appropriately and confidently.

7.8 Contrast social learning and cognitive-developmental perspectives on moral development in early childhood.

Social learning theory explains that children develop internalized standards of conduct based on reinforcements and punishments as well as observing others and considering their explanations for behavior. The cognitive-developmental perspective examines reasoning about moral issues, specifically concerns of justice. Kohlberg explained that young children display preconventional moral reasoning. They have not internalized societal norms, and their behavior is motivated by desires, self-interest, and avoiding punishment rather than internalized principles. As

early as 3 years of age, children in diverse cultures can differentiate between moral concerns from social conventions, or social customs. Social experiences with parents, caregivers, siblings, and peers help young children develop conceptions about justice and fairness.

7.9 Identify and explain two approaches to early childhood education, including their associated outcomes.

Child-centered preschool programs encourage children to manipulate materials; interact with teachers and peers; and learn by doing, through play. Academically oriented preschool programs provide children with structured learning environments through which they learn letters, numbers, shapes, and academic skills via drills and formal lessons. When academic instruction is heavily and rigidly emphasized, children tend to demonstrate signs of stress, have less confidence in their skills, avoid challenging tasks, and show more poor achievement than do children who are immersed in more active forms of play-based learning. However, effective early childhood education is defined and influenced by cultural values.

7.10 Analyze effects of poverty on development and resources to help families in need.

Children from persistently poor families are more likely to experience malnutrition, growth stunting, and increased vulnerability to illness. Children from families with low incomes show lower levels of cognitive, academic, social, and behavioral functioning than children from more advantaged families. The negative effects of persistent poverty are cumulative and influence the child through the quality of the home environment and neighborhood. TANF provides families with economic resources with mandated participation in job training and employment activities. Critics argue that many welfare-to-work programs increase employment but not income.

Key Terms

Animism 000

Appearance–reality distinction 000

Autobiographical memory 000

Centration 000

Conservation 000

Corpus callosum 000

Egocentrism 000

Episodic memory 000

Executive function 000

Fine motor skills 000

Gross motor skills 000

Growth hormone 000

Guided participation 000

Hemispheric dominance 000

Hormones 000

Irreversibility 000

Infantile amnesia 000

Lateralization 000

Logical extension 000

Memory strategies 000

Metacognition 000

Morality of constraint 000

Mutual exclusivity assumption 000

Overregularization 000

Plasticity 000

Preconventional reasoning 000

Preoperational reasoning 000

Private speech 000

Project Head Start 000

Recall memory 000

Recognition memory 000

Self-regulation 000

Scaffolding 000

Scripts 000

Theory of mind 000

Zone of proximal development 000

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