TEST YOUR KNOWLEDGE

Test your knowledge of child development by deciding whether each of the following statements is true or false, and then check your answers as you read the chapter.

1. **T** **F** We describe preschoolers as egocentric because they are selfish.
2. **T** **F** We can improve a preschooler's memory by teaching the child to use memory strategies.
3. **T** **F** It is important for children to play because they have fun when they are playing, but the real learning happens in the classroom.
4. **T** **F** It is beneficial for young children to talk out loud to themselves while working on projects.
5. **T** **F** If a young child says “I goed outside,” it helps develop his language skills if the parent corrects him by saying “No, you mean to say, ‘I went outside.’”
6. **T** **F** Using flash cards and workbooks is the best way to ensure that a child develops early literacy skills.
7. **T** **F** When young children use spelling they have “invented” (rather than conventional spelling), it slows down their ability to learn how to spell correctly.
8. **T** **F** Many children who grow up in poverty go on to become adults who contribute positively to society.
9. **T** **F** Participating in a high-quality preschool program can increase a child’s chance of graduating from high school or attending college.
10. **T** **F** There are long-term advantages to starting kindergarten at a slightly older age.

Learning Questions

9.1 What occurs during Piaget’s preoperational stage of cognitive development?
9.2 What are the basic processes associated with Vygotsky’s sociocultural theory?
9.3 How do attention, memory, executive function, and social cognition develop in early childhood?
9.4 Why is play important for cognitive development in early childhood?
9.5 How does language develop in early childhood?
9.6 How do children develop preacademic skills in reading, writing, and arithmetic?
9.7 What risk factors and supports exist for cognitive and language development in early childhood?

The period of early childhood is marked by great steps forward in cognitive development. At age 2, toddlers are just beginning to develop language, and their ability to think logically and in complex ways is very limited. Between 2 and 7, children develop a level of thinking that prepares them to attend school and learn in new ways. In this chapter, we describe Piaget’s preoperational stage of development and explore Vygotsky’s sociocultural theory and its application in early childhood. We then continue examination of the development of the basic mental processes of attention, memory, and executive function that we began in Chapter 6. Young children are also applying their cognitive skills to social problems, and we describe the development and limitations of young children’s social cognition. Language skills are developing rapidly and young children are developing the skills that prepare them for reading, writing, and arithmetic, in large part through their play. Finally, we look at how young children’s cognitive and academic abilities are supported both at home and in preschool settings and what factors may put them at risk.

Piaget’s Theory of Cognitive Development: The Preoperational Stage (2–7 Years)

Piaget defined his second stage of cognitive development largely by what it lacks: operations. For Piaget, operations are mental actions that follow systematic, logical rules. When children are preoperational, they do not think in a logical way. Perhaps this is why we do not have them start formal schooling until late in this stage. However, Piaget also described a new development that helps set the stage for more sophisticated thinking: the ability to use symbols. The second major advance in this stage is the development of intuitive thinking, in which children use their perceptions of the world to try to figure out explanations about what they see.

Use of Symbols

According to Piaget, the major accomplishment of the preoperational stage is the ability to represent actions mentally rather than physically. Toddlers can think about and refer to objects that are not in their immediate vicinity because they can represent...
them in their minds. They can *tell* you about an apple they ate yesterday, unlike the infant who must *show* you an actual apple. A symbol is anything that represents something else that is not present, but symbols at this age are still very concrete. Abstract symbols, such as a balance scale representing the concept of justice, are still outside the understanding of the preoperational child. Three ways in which children demonstrate *symbolic thought* are through play, language, and drawings.

- **Play.** Young children use objects or themselves and other people in their play to symbolically represent something that is not there. For example, while they are actually holding a block, they imagine it is a phone and pretend to talk to someone at the other end who is also a figment of their imagination. Some young children even create an imaginary companion who is so real to them that he or she must have a seat and be served at the dinner table.

- **Language.** For Piaget, the development of language is important because it shows that children can use symbols. Whenever we use a word, it represents something that is not there. Look at this word: **APPLE**. You will notice that it is not round, and if you were to lick the page in your textbook, you would find that it isn’t sweet. It isn’t even red, but you knew the real-world object it stood for when you first read it. In a similar way, if we say “table,” we no longer have to have the table in front of us.

- **Drawings.** Finally, children demonstrate the use of symbols whenever they make a drawing of something, even if no one else can recognize what it represents. Young children demonstrate that they understand the representative nature of pictures because they do not try to eat a picture of an apple but instead understand that the picture only represents a real apple (Preissler & Bloom, 2007).

The use of symbols is a major step forward and liberates children from the immediate physical world, but Piaget emphasized that young children do not yet have the ability to think logically and that much of their understanding of the world is still determined by their immediate sensory and physical experiences. He called the second half of the preoperational stage the *period of intuitive thought*.

### Intuitive Thought

Beginning around age 3, many children enter the “why” stage (Piaget, 1955, 1973). They have some understanding of what they are seeing and experiencing, but now they ask “why?” about anything and everything as they try to figure out the world around them. Piaget believed young children are beginning to put together logical explanations but are still influenced more by what they experience through their senses than by logical reasoning. Piaget called this *intuitive thought* which includes transductive reasoning, egocentrism, animism, and lack of conservation, described below.

Adults and older children usually think logically, using deductive and inductive reasoning to figure out problems. **Deductive reasoning** starts with a general premise (for example, “All apples have cores”) and moves to specific conclusions (“This is an apple; therefore, it must have a core”). Deductive reasoning is the basis of hypothesis testing, which we described in Chapter 2 as necessary for scientific research. **Inductive reasoning** starts with individual examples (“I see many apples, and they all have cores”) and ends with general principles (“Therefore, all apples have cores”). This reasoning is similar to the way we collect observations to develop theories.

Piaget found in his interviews with children that their logic was not consistently either deductive or inductive. Instead, they moved freely from one particular observation to another, creating causal links where none existed. He called this **transductive reasoning**. One example he gives is his daughter Lucienne’s statement: “I haven’t had my nap, therefore it isn’t afternoon,” as if taking her nap caused it to be...
afternoon (Piaget, 1962, p. 232). Preoperational children may base their conclusions on a set of unrelated facts, or they may assume that things that just happen to occur at about the same time cause each other. For example, an angry child might accuse an innocent bystander of doing him harm by reasoning, “You were there when I fell, so it’s your fault that I hurt myself.”

**Egocentrism**

Piaget believed that young children find it difficult to see the world from another person’s point of view, especially if that point of view differs from their own. Piaget called this difficulty **egocentrism** (ego means “I” or “self”; therefore, the child’s world centers around his own point of view). Notice it is not the same as selfishness or egotism (thinking you are the greatest), although young children may have plenty of each of those characteristics as well. It really means the child’s mind is insufficiently developed to allow her to understand that someone else’s perspective could be different from her own. The result may be an apparently “selfish” child who grabs toys from others, but the reason is that she only knows how much she wants the toy and cannot yet understand that someone else wants it just as much. Adults should set appropriate limits on children’s behavior at this age, but they should also help the child become aware of the thoughts and feelings of others to gradually overcome behavior that otherwise appears to be willfully selfish.

Young children have difficulty understanding that other people feel, think, and understand things differently than they do, and the youngest preoperational children have this difficulty even regarding what they think someone else sees. For example, if someone on the phone asks a child how old she is, the child may hold up two fingers to indicate 2 years old, thinking that if she can see her fingers, then the person she’s talking to can as well. Piaget and Inhelder (1956) used the “three mountains task,” illustrated in Figure 9.1, as a way to assess egocentrism. First the child was shown a large model of three mountains on a table. (Piaget lived in Switzerland and mountains were very familiar to the children he tested.) Then, while standing on one side of the table, the child was shown pictures of what the mountains looked like from all four sides of the table. Finally, the child was asked what a doll would see from each side of the table. Regardless of where the doll was, 4-year-old children reported that the doll saw the same view they themselves saw. In other words, children in the preoperational stage did not differentiate between their own point of view and that of another person.

**FIGURE 9.1**

Piaget’s three mountains task.

In Piaget’s three mountains task, a child who is egocentric believes that the teddy bear always sees the same view that she herself sees.

Source: Adapted from Papalia, Olds, and Feldman (1998); Piaget and Inhelder (1956).
Helene Borke (1975) carried out a task similar to the three mountains task but assessed the children’s abilities in a different way. Instead of asking children to pick out a two-dimensional photo to correspond to what the doll saw, she placed the three-dimensional model of the mountains on a turntable and asked the children to turn it to show what the doll saw. Three- and 4-year-olds were successful at these tasks most of the time. She concluded that when children were not overly challenged by other aspects of this task, such as translating between three-dimensional and two-dimensional representations, their ability to understand others’ visual perspective was much greater than Piaget found. In more recent research, most preschool children were able to tell correctly whether an adult sitting across a table saw a picture as upside down when the child himself saw it right side up and vice versa (Bigelow & Dugas, 2008). When we discuss social cognition later in this chapter you will see that Piaget likely underestimated young children’s ability in this regard. Although their ability to see from the point of view of other people may be limited, they are less egocentric than Piaget believed.

**Animism**

Preoperational children also may give human characteristics, such as thought and intention, to inanimate things, a form of thinking called animism. Piaget (1962) gave the following examples: A child saw a swirl of dead leaves and asked, “Do they like dancing?” and another child stated when she missed a train, “Doesn’t the train know we aren’t in it?” (pp. 251–252). Did you think “how cute!” when you read these statements? Animism may serve an adaptive purpose because adults find children who express these thoughts more likeable or endearing and are more likely to want to take care of them (Bjorklund, Hernandez Blasi, & Periss, 2010; Periss, Blasi, & Bjorklund, 2012).

Notice that animism is not the same as pretending. A child who knows she is pretending when she has her doll play a game with her is not displaying animism. However, she does show animism if she truly believes the doll can be angry about losing a game.

**Conservation**

Another important cognitive skill preoperational children have not yet acquired is conservation, the understanding that the basic quantity of something (its amount, volume, or mass) remains the same even if its appearance changes. If you were to take a lump of clay and flatten it into a pancake, make it into a ball, or roll it into a tube, you would realize you still had the same amount of clay because you did not add or remove anything. However, preoperational children may be fooled by the change in appearance and think the new shape has more or less clay than the original.

Piaget believed one reason preschool children are fooled in this way is that they are only able to focus on one aspect of a problem at a time, a cognitive limitation he called centration. For instance, when preoperational children see water in several glasses, they notice only the height of the water and decide the glass with the highest level has more water in it regardless of the width of the different glasses. In Piaget’s terms, they “center” on one aspect (the height of the glass) and ignore the other (the width). When children are in the next stage of development, concrete operations, they begin to decenter and are able to think about more than one aspect of a situation at a time. Now children see the level of the water is higher in one glass but the glass is narrower. Once children understand that they need to consider both the level of the water and the width of the container, they are able to come to the correct solution more easily.

More recently researchers have ascribed young children’s difficulties with tasks such as these to a limited amount of working memory, described in Chapter 6. Young children can only keep one or two things in memory while they puzzle out a solution. When they are overwhelmed with more aspects of a situation, such as the height and the width of the glass while comparing the amount of water, they are unable to solve the puzzle (Cowan, 2014). See **Active Learning: Conservation** for tests you can carry out with young children to understand more about the development of conservation.
**ACTIVE LEARNING**

**Conservation**

1. Conservation of volume (see Figure 9.2a).
   Equipment: two identical transparent containers and a third transparent container of a different shape. The third container should have a different diameter than the other two so that the level of water in it will be different.
   Fill the two identical containers with the same amount of water. Show these to the child and ask, “Do these containers have the same amount of water, or does one have more than the other?” Be sure to adjust the amount of water until the child agrees the containers have the same amount. Then tell the child to watch while you pour the water from one of the identical containers into the third container. Ask the child, “Now do these two containers have the same amount of water, or does one have more than the other?” If the child answers that one has more, ask which one. Whatever the child says, be sure to ask why he or she came to that conclusion.

2. Conservation of mass (see Figure 9.2b).
   Equipment: play dough or clay.
   Make two identical balls of clay. Show them to the child and ask, “Do these two pieces of clay (play dough) have the same amount of clay (play dough), or does one have more than the other?” Be sure to adjust the amount of clay until the child agrees the two pieces have the same amount. Then take one ball and, with the child watching, roll it into a long tube. Ask the child, “Now, do these two pieces of clay have the same amount of clay, or does one have more than the other?” Whatever the child responds, be sure to ask why he or she came to that conclusion.

3. Conservation of number (see Figure 9.2c).
   Equipment: eight identical items, such as pennies or cookies.
   Make two rows of four items parallel to each other. Ask the child, “Does this row have the same number of pennies (or cookies) as this other row?”
row or does one row have more?" If the child does not agree they are the same, show the child by counting that each has four, and then ask again. Once the child has agreed that the rows are the same, move the pennies (or cookies) in one row so they are much farther apart than those in the other row. Then ask the child, "Now, are there the same number of pennies (or cookies) in these two rows, or does one row have more than the other?" Again, be sure to ask the child to explain his or her answer. The child's explanation for his or her answer is the most important part of this experiment because it will tell you how the child reasoned about the changes you made.

In Chapter 2 we introduced the concept of embodied cognition, the idea that thinking arises from a combination of brain, body and environmental experiences. Based on this idea, one group of researchers wondered whether young children would be more likely to understand conservation if they carried out these experiments themselves rather than passively watching them; that is, if they used their bodies to help them think. They asked first graders to pour liquid into two identical containers to the same level and then pour one container into a tall, skinny container. They found that these children were more likely to understand that the amount of liquid did not change than children who just watched the demonstration as shown in Active Learning: Conservation. They found the same result for each type of conservation: volume, mass and number (Lozada & Carro, 2016).

To summarize what Piaget tells us about the preoperational stage, it is marked by an advance to symbolic thinking, but children's thinking at this stage is tied to what they see rather than what they reason out with the use of logic. Their perception is still tied to their own point of view, although they gradually begin to realize that others may see and understand the world differently than they do. Modern research based on the concepts of working memory and embodied cognition has brought both new questions and clarifications to Piaget's original ideas.

Many of the limitations found in preoperational children are overcome in the next stage, called concrete operations. We describe these changes, along with other critiques of Piaget's ideas, in Chapter 12 when we discuss cognitive development during middle childhood.

CHECK YOUR UNDERSTANDING

Knowledge Questions

1. Why did Piaget call his second stage of cognitive development "preoperational"?
2. In Piaget's theory, what is transductive reasoning?
3. If you ask a 3-year-old what to get Mommy for her birthday, he may reply "A toy truck!" Explain why that might be.

Critical Thinking

How do Piaget's concept of centration and the cognitive concept of working memory provide different explanations for young children's inability to understand conservation?

Vygotsky's Sociocultural Theory of Cognitive Development

Lev Vygotsky (1896–1934) lived in Russia, and his work did not become available outside of that country until 1962, when his book Thought and Language was published in English. Since then, his ideas have become very influential in the study and application...
of cognitive theory and have had a large effect on the field of education. In contrast to Piaget, who saw the child as an active but largely independent learner, Vygotsky believed all learning and ideas begin in the social world. Consequently, learning is culturally based because all people are situated within their own culture. The tools, language, and actions of a particular culture are transmitted to children and serve to shape their cognitive abilities (Gauvain & Parke, 2010). Central to Vygotsky’s theory is the idea that children learn through the process of social collaboration with someone who is more knowledgeable than they are.

The Zone of Proximal Development (ZPD)

Vygotsky began his work as a psychologist by working with children who had physical and mental impairments. At first, he simply tested their mental abilities. However, he soon developed the idea that children should be tested twice: the first time performing on their own, and the second time performing with a little help from an adult. This technique assesses both the child’s actual level of achievement and the child’s readiness to learn. The difference between what the child can do independently and what the child can do with the help and guidance of a more skilled adult or peer is what we described in Chapter 2 as the zone of proximal development, or ZPD (Vygotsky, 1978b). It is within this zone that learning occurs.

When we present learning opportunities that are far beyond the child’s current level of understanding, the child cannot benefit from our instruction. If we continue to present something that the child has already mastered, this also does not advance the child’s understanding. It is when we get it just right—in the zone that is just a little beyond the child’s current level—that learning occurs. One of the challenges of being an effective teacher is determining where the ZPD is and staying within it. It is, of course, a moving target. As soon as we have been effective as a teacher, our learner’s ZPD shifts upward, and we need to adjust our teaching to match this new ZPD.

Scaffolding

Jerome Bruner (1983) further developed Vygotsky’s concept of the ZPD to describe what the adult does to help children learn. He borrowed the engineering concept of a scaffold, which is designed to support the construction of a building, and applied it to teaching. Scaffolding is a sensitive process of providing the support that helps the child learn what is just out of reach of his abilities. Once the child understands, the scaffolding is no longer needed and the child can now carry out the task independently (Olson, 2014).

To better understand the process of scaffolding, think about teaching a child to tie her shoes. With an infant, you would simply do it for her. With a 2-year-old, you might hold her hands and do it with her. With a preschooler, you might teach the “bunny ears” approach, in which the child forms two loops and circles one around the other, maybe with a song or rhyme that goes with the process. By age 6 or 7, you can teach the child how to wrap one string around and through the other. When the child can successfully tie on her own, the scaffolding you provide is no longer needed.

In the following example, a teacher demonstrates effective scaffolding in teaching her kindergarten class about a new book they are about to read. Think about which techniques you see here that exemplify the strategy of scaffolding:

**Ms. Palmer:** Now, we are going to talk about shoes, because that’s what our book’s going to be about. Before we are going to start talking about shoes, we need to talk about what happens when we come to a word we don’t know. What are you going to do if you come to a word you don’t know, Declan?

**Declan:** Sound it out.

**Ms. Palmer:** Sound it out, very good. Now, I need to ask you a question, Declan. This word is in our book. (Teacher writes “slippers” on a small white board.) Can you guys figure that word out? Someone tell me what that is? I like what I hear you doing, Declan. I like what Riley’s doing, too.

**Students:** (The children make various attempts to decode the word “slippers.”)
Ms. Palmer: Very good, this is the word “slippers.” But more importantly, what Ms. Palmer heard you doing was… I did not see you going like this s-l-i-p-p-e-r-s. You didn’t try to sound each letter, right? No, I heard Declan go “sliii.” And I heard Riley going, “errs.” Do you know what you guys were doing and you probably don’t even realize it? Do you know? Riley?

Riley: We were chunking.

Ms. Palmer: You were chunking! You guys are so awesome. You were chunking. My favorite way of sounding out. So when it’s a longer word, we need to find chunks that we know. Very good. There are going to be different types of shoes in here. (Ankrum, Genest, & Belcastro, 2014, pp. 43–44)

You might have noticed that Ms. Palmer first introduced a problem (what to do with new words), then invited a student to contribute what he already knew about how to deal with that problem (sounding it out). She then had the students try this strategy and picked out the strategy she wanted them to use (chunking). However, instead of just telling them what to do, she invited them to figure out what they had been doing with a little help from her. Did you see any other aspects of scaffolding in this example?

You will find several applications of Vygotsky’s theory throughout this chapter as you learn more about the development of executive function, language development, fantasy play, and learning to read.

CHECK YOUR UNDERSTANDING

Knowledge Questions

1. According to Vygotsky, how is social collaboration central to children’s learning?
2. What is the zone of proximal development?
3. How does scaffolding relate to Vygotsky’s view of cognitive development?

Critical Thinking

What differences would you expect to find in a preschool classroom that uses Piaget’s ideas compared to one that uses Vygotsky’s ideas? In what ways would they be similar?

Cognitive Processes

In this section, we look at some of the cognitive processes that undergo significant change during early childhood. Although attention, memory, executive function, and social cognition all improve substantially, young children still have many limitations in each of these areas. For instance, their memory is still quite suggestible, so they may develop false memories of things that did not happen to them. We look at both the advances and the limitations that remain in this period of early childhood.

Attention

As children get older, they are increasingly capable of directing and sustaining their attention. However, as anyone who has worked in a preschool can tell you, some children can sit in circle time and pay attention, and others have great trouble doing so. Individual differences in the ability to focus and sustain attention have consequences...
for later development. In a longitudinal study, parents rated their 4-year-old child’s attention span (“Plays with a single toy for long periods of time,” “Child goes from toy to toy quickly”) and the child’s persistence (“Child persists at a task until successful,” “Child gives up easily when difficulties are encountered”). Preschoolers who had more ability to maintain focused attention and who persisted even when faced with difficulties had higher math and reading achievement at age 21 and a greater chance of college completion by age 25 (McClelland, Acocck, Piccinin, Rhea, & Stallings, 2013).

Although individual differences in attention may be in part genetic (Isbell, Stevens, Wray, Bell, & Neville, 2016), they are also influenced by the child’s experiences. For example, there is evidence that preschool children pay attention for a longer time to activities that they get to choose for themselves (DiCarlo, Baumgartner, Ota, & Geary, 2016).

The ability to focus and sustain attention in preschool children has also been linked to differences in families’ economic circumstances. Young children from low-income families tend to have less effective selective attention; that is, they are less able to ignore distracting stimuli (Hampton Wray et al., 2017). Helen Neville and her colleagues (2013) developed a training program for these children based on games that allowed them to practice attention skills. The program also trained parents to promote their child’s attention skills. After 8 weeks, there were positive changes in the way these children’s brains functioned and also in their language skills, nonverbal IQ, and social skills, as well as a reduction in problem behaviors. Parents benefited from the program too, showing reduced stress and a better ability to maintain conversations with their children. This research shows that changes in that environment can lead to improvements in these abilities, which are important building blocks for future academic success.

**Memory**

Although young children’s memory is better than it was in infancy, there are still limitations in their ability to encode information into memory and how accurate or suggestible their memory is.

**Encoding Processes**

Memory is a process of taking in information and encoding, or organizing, it to retrieve and use at a later time. When you read this book, you want to remember the information presented in it so you use **encoding processes**, such as repetition or association to known material, to help ensure you will remember it. Children younger than 5 or 6 usually do not use a deliberate strategy to try to remember something. Even when they are taught to use a strategy, they may apply it, but it does not increase their ability to remember (Clerc & Miller, 2013). Children tend not to use memory strategies spontaneously and effectively until middle childhood, but the age of acquisition and use of these strategies varies enormously between individual children (Schneider, Kron, Hünnerkopf, & Krajewski, 2004). When one group of 6-year-olds was asked how they memorized a group of pictures they had been shown, their answers reflected such individual differences in their use of encoding strategies. While one child used an active encoding strategy: “I looked carefully and I repeated: red, blue, brown,” another had no strategy: “I looked at them, and I remembered them.”

One of the memory strategies young children do use is **scripts** to help them remember what to do in a familiar situation (Nelson, 2014). Just as a script tells the actors what to say and do in a dramatic play, a script as we are using the term here is a memory of what to say and do in particular situations. Children as young as 3 might have a script for familiar activities like going to a restaurant or to the grocery store (and may act out that scenario in play with friends).

If teaching memory strategies doesn’t work, how can adults foster memory development in young children? It is important to talk with children about their activities. If a parent asks the child what he did at preschool that day and has a conversation about it, the child will be more likely to form memories. Another wonderful way to promote memory is through music. You can probably remember the words to a song you have not heard for years when the first few notes are played. Music helps form powerful
memories, which is one reason we teach children using songs. Can you say the alphabet without singing it?

**False Memories**

We all create the story of our lives from our autobiographical memories, but how reliable are our memories? Research has shown it can be fairly easy to influence young children to think they experienced something that never happened. In one study, children were told to imagine taking a hot-air balloon ride and to think in detail about what it was like (Ceci, Bruck, & Loftus, 1998). They were then asked whether this had really happened to them. They were given similar instructions to remember in detail other events, some of which had really happened to them and some of which had not. The researchers repeated this process for 11 weeks, and gradually children began to agree that they had in fact gone on a hot-air balloon ride. In the 12th week, another researcher interviewed each child, telling the child that the previous researcher had said some things that were not true. When the child was asked which things had really happened, many still remembered having taken the fictional balloon ride. As we mentioned in Chapter 2, the suggestibility of young children’s memories makes it especially important that interviewers who take eyewitness testimony from children are trained not to inadvertently create false memories for the child.

Younger preschoolers are more likely to have these types of false memories than older preschoolers, but even adults are vulnerable to creating false memories through suggestion. When adults were given false information about having gotten sick when they drank a certain type of alcohol as a young teen, they tended to remember this as a true memory and expressed distaste for that kind of alcohol (Clifasefi, Bernstein, Mantonakis, & Loftus, 2013).

**Executive Function**

As you learned in Chapter 6, executive function is a higher-order ability of the brain to organize attention, memory, and behavior to reach a goal. We continue our examination of three basic aspects of executive function as they appear in early childhood: inhibitory control, working memory, and cognitive flexibility. Young children demonstrate inhibitory control in a preschool classroom when they remember their thoughts and wait their turn to contribute to discussions during circle time rather than shouting out what they are thinking. They demonstrate working memory when they remember the teacher’s instructions for free choice activities, and they demonstrate cognitive flexibility when they can easily change rules or routines when called on to do so (Moreno, Shwayder, & Friedman, 2017).

The concept of inhibitory control includes both the ability to control one’s own behavior and the ability to ignore irrelevant stimuli to stay focused on a task. These abilities increase rapidly during early childhood (Vandenbroucke, Verschuere, & Baeyens, 2017). They are promoted when caregivers are responsive to children’s behavior and activities. Responsiveness has been defined as

- exhibiting warmth and acceptance,
- responding in a sensitive and contingent manner to children’s cues (e.g., staying attuned and expanding on children’s interests, providing opportunities for children to take the lead during activities, understanding when to step in and help),
- maintaining rather than redirecting children’s attention, and
- providing rich language input and interactive conversations matched to children’s needs (e.g., labeling and connecting objects and actions). (Merz, Landry, Johnson, Williams, & Jung, 2016, pp. 131–132)
Merz et al. (2016) found that inhibitory control increased when childcare providers were trained with a program emphasizing this type of responsiveness to young children.

As you learned in Chapter 6, working memory holds short-term memories while using them to solve problems (Tulsky et al., 2013). The working memory of young children has a very limited capacity. The average 5-year-old can hold one or two pieces of information in mind at a time (Alloway, 2010). This means that “Put your book in your cubby and come sit at the table” may be all the information he or she can handle in working memory at once. A three- or four-item sequence is likely to exceed that capacity. However, working memory increases gradually from the preschool years through adolescence and these developments correspond to age-related changes in the areas of the brain that are activated and in the degree of activation that occurs while carrying out tasks that require working memory (Best, Miller, & Jones, 2009).

The ability to “switch gears” in thinking (that is, to find new solutions to problems when the old ones aren’t working) begins to develop at age 3 and continues to develop through middle childhood (Vandenbroucke et al., 2017). One test that has been used to assess cognitive flexibility in young children is called the Dimensional Change Card Sort (shown in Figure 9.3). In this test children are asked to sort cards according to one criterion (for example, color) and then to switch and sort them by another criterion (for example, shape). Five-year-olds are generally able to make this switch, but it is much harder for three-year-olds, who tend to continue sorting by the first criterion (Doebel & Zelazo, 2015).

By age 5, executive function has developed enough to allow more complex tasks. Active Learning: Executive Function gives you an opportunity to do a simple assessment of several aspects of executive function in young children, including working memory, inhibitory control, and cognitive flexibility.

**ACTIVE LEARNING**

**Executive Function**

As executive function develops, children are better able to regulate their behavior in ways that are crucial for doing well in a classroom setting (Ponitz, McClelland, Matthews, & Morrison, 2009). These include being able to pay attention, follow directions, and inhibit or regulate behavior. You can make a simple assessment of these skills by playing Head-Shoulders-Knees-Toes with a preschool child.

Tell the child that you are going to play a game in which he or she should follow your directions when you say “touch your head” or “touch your toes.” Give the child several opportunities to do this while mixing up the order of your directions, something like this: Touch your head, touch your toes, touch your toes, touch your head, touch your toes. After you have established that the child can follow your directions, tell the child “Okay, now let’s be silly. When I tell you to touch your head, you should touch your toes. When I tell you to touch your toes, you should touch your head.” Observe how easy or difficult it is for the child to inhibit the original response and shift to the contrary response.

Repeat the activity, using the instructions to “touch your shoulders” and “touch your knees.”

If you observe children from about age 3 to age 6, you will see how much these executive functions develop in a relatively short period of time. Three-year-olds will find it difficult to behave contrary to what they are hearing because they must inhibit their initial response and must change from one set of rules to a different set, but 6-year-olds will find it easy and fun.

To prepare for this activity, or if you do not have access to a child, you can watch the video of this Active Learning.

Executive function is a foundation for learning preacademic skills. Preschool children who show greater ability to pay attention, inhibit irrelevant behavior, and actively remember are able to learn basic language, literacy, and arithmetic skills more quickly than others (Center on the Developing Child at Harvard, 2011; Harvey & Miller, 2017).
Children develop these skills through play with peers as well as through sensitive scaffolding by adults (Devine, Bignardi, & Hughes, 2016; Lengua, Honorado, & Bush, 2007). They do best when both their home and preschool provide organized and predictable environments and also provide ample time for unstructured, self-directed play (Barker et al., 2014).

In preschool classrooms teachers are very unlikely to provide activities with the direct goal of promoting inhibitory control, working memory, and cognitive flexibility, but they can accomplish this in a more informal way by extending children’s spontaneous play. For example, if a child is pretending to cook with play dough and dishes, a teacher may say, “What did you put in there? Is it ready yet? Can I have some salt?”

FIGURE 9.3
The Dimensional Change Card Sort task measures cognitive flexibility.

“Play the color game: If it’s red, it goes here; but if it’s blue, it goes there. Here’s a red one. Where does it go?”

“Okay, now we’re not going to play the color game anymore. Now we’re going to play a new game—the shape game. If it’s a rabbit, it goes here; but if it’s a boat, it goes there. Here’s a rabbit. Where does it go?”

In this task children are given three cards with pictures of red rabbits and three with pictures of blue boats. They are then shown a card with a blue rabbit and another with a red boat. The first instructions are to match their cards to the target card by color, so the cards with red rabbits go with the red boat and those with the blue boat go with the blue rabbit. After making this match a number of times, they are then instructed to take the same cards and sort by shape, so the cards with the red rabbits go with the blue rabbit and those with the blue boats go with the red boat. Younger children are less likely to be able to switch and they will continue to sort by color. The ability to change the way they sort the cards when given different instructions increases through early childhood.

That is the secret ingredient” (Moreno et al., 2017, p. 148). Can you see how this teacher is promoting the child’s ability to think in more depth about what he is doing?

Just like adults, young children find it more difficult to think clearly when they are stressed and parents’ stress also contributes to children’s difficulty with executive function (Wagner et al., 2016). Recall from Chapter 5 that when children experience high levels of stress for long periods while their brains are developing, the effect on the brain may last longer than the stress itself. The good news is that intervention in the preschool years can improve these abilities. In one program called Tools of the Mind (2018), based on Vygotsky’s principles of learning, children were encouraged to tell themselves out loud what they were supposed to do, took part in extended fantasy play, and were given aids to memory and attention. Children in this program were later found to have greater executive function, which correlated with greater academic skills, than a comparable group of children who did not take part in the program (Diamond, Barnett, Thomas, & Munro, 2007).

Social Cognition: Theory of Mind

As described in Chapter 6, when we use cognitive processes to understand our social world it is called social cognition. One important aspect of social cognition that develops in childhood is called theory of mind, which refers to the ability “to understand self and others as agents who act on the basis of their mental states (i.e., beliefs, desires, emotions, intentions)” (Astoning & Filippova, 2005, p. 211). Children begin to understand that what goes on in the mind is different from the concrete world. For example, they learn that their dreams are in their own minds and are unknown to other people unless they talk about them (Meyer & Shore, 2001). Over time, as we understand more and more about our own motives, emotions, and thoughts and those of other people, we all become pretty accomplished “mind readers.” See Active Learning: Mind Reading and Mindblindness to experience what it might be like if you did not have a theory of mind.

ACTIVE LEARNING

Mind Reading and Mindblindness

Simon Baron-Cohen (1995) presents the following scenario in his book Mindblindness: “John walked into the bedroom, walked around, and walked out” (p. 1). Think about how you might try to explain this behavior. What could possibly be going on to make this happen?

Write down your ideas about what John might be doing. Next, underline each word in your explanation that reflects something about his possible mental state—for example, wanted, heard, wanted to know, looked for, was confused. After you do this, try to write an explanation for John’s behavior that does not include anything about his mental state.

It is hard for us to think about behavior without interpreting the actor’s state of mind. Here is one attempt by Baron-Cohen (1995): “Maybe John does this every day, at this time: he just walks into the bedroom, walks around, and walks out again” (p. 2). Not very satisfactory, is it? Most of us automatically put ideas about others’ thoughts into our explanations for their behavior.

Imagine what it would be like if you did not have theories about what goes on in other people’s minds. Baron-Cohen uses the term mindblindness to describe the inability to understand and theorize about other people’s thoughts. Mindblindness is characteristic of many people who have autism spectrum disorder. To remind yourself about the characteristics of autism spectrum disorder, see Chapters 5 and 8.
Theory of mind can be broken down into six types of understanding.

1. Diverse desires—different people may like and want different things.
2. Diverse beliefs—different people can hold different beliefs about the same thing.
3. Knowledge access—people who see something also know about it; if they do not see, then they do not know.
4. False belief—people do things based on what they think, even if it is a mistaken belief.
5. Hidden emotion—people can deliberately conceal emotions by managing their facial expression.
6. Sarcasm—in order to be humorous, people sometimes say the opposite of what they really mean. (Slaughter, 2015, p. 170)

Although children in many different cultures develop theory of mind at about the same age, the order in which they develop these different types of understanding may vary (Ahn & Miller, 2012; Shahaeian, Peterson, Slaughter, & Wellman, 2011). For example, in Iran and China where children are encouraged to obtain knowledge but not to express opinions that challenge their elders’ points of view and disrupt family harmony, the first understanding of theory of mind is that others can know things that they do not or vice versa (knowledge access). Children in Australia and the United States are more often encouraged to express their own opinions and they learn that others can have different opinions (diverse desires and beliefs) before they understand that they can have different knowledge (Shahaeian et al., 2011).

Between ages 2 and 4, children develop some ability to understand that other people can believe something that they themselves know to be untrue, called a false belief (Peterson, Wellman, & Slaughter, 2012). A classic experiment designed to test whether children understand that what goes on in someone else’s mind might be different from what is going on in their own is called the false belief paradigm. In these experiments, a child sees a scene something like this: A doll named Louise is shown that a piece of candy is hidden in a certain drawer in a toy kitchen. Louise then leaves, and the experimenter takes the candy and moves it into the refrigerator. When Louise returns, she wants the candy. The child is asked where she thinks Louise will look for it. A child who doesn’t understand that others can have false beliefs will say that Louise will look in the refrigerator. The child knows where the candy is, and it seems to her that Louise must know that too. Children who do understand that others can have false beliefs know that Louise will look first in the drawer where she last saw the candy. By age 4, most children can respond based on an understanding of false beliefs.

You can determine for yourself whether a young child has developed an understanding of false beliefs by following the instructions in Active Learning: False Beliefs.

**ACTIVE LEARNING**

**False Beliefs**

Try the following simple experiment with a child between 3 and 4 and another child who is older.

1. Before you see each child, take a box a child would recognize as containing crayons. Remove the crayons and put something else inside, such as short drinking straws.
2. When you sit down with the child, ask her what she thinks is in the box. She should answer "crayons." Then show her what is really inside. Close the box.
3. Ask her the following: “If [name of a friend] came into the room right now, what would she think is inside this box?” (Continued)
By age 4 children can also actively create false beliefs in others by knowingly lying to them. Although we generally think of lying as a bad thing, being able to lie implies that the child knows that someone else can be tricked into thinking something that the child knows is not true. For example, a child who knows that she has eaten a forbidden cookie may deny it when her mother confronts her. For young children, lying is usually in the service of protecting oneself and is much less likely to be intended to hurt others as is found with older children who lie (Lavoie, Leduc, Arruda, Crossman, & Talwar, 2017).

The ability to understand what others are thinking is a skill that is affected by children’s experiences. When parents discuss emotions with their children, the children are more likely to develop a theory of mind at a younger age (Slaughter, 2015). Children with siblings also tend to develop theory of mind more quickly than those with no siblings. The type of interaction that goes on between siblings, including playing tricks, comforting, and arguing, gives children experience with what is in other people’s minds on a daily basis (McAlister & Peterson, 2013). Children also are more likely to understand false beliefs if their parents’ discipline techniques include asking the child to think about how another person felt when the child is disciplined for hurting that person (O’Reilly & Peterson, 2014; Shahaeian, Nielsen, Peterson, & Slaughter, 2014). You will learn more about the development of theory of mind in older children and teens in Chapters 10 and 15.

CHECK YOUR UNDERSTANDING

Knowledge Questions

1. How can adults help children remember important events or information?
2. How do adults promote children’s inhibitory control?
3. What is theory of mind?
4. Describe the false belief paradigm.

Critical Thinking

What are the differences and similarities between Piaget’s concept of egocentrism and the concept of theory of mind?

Play and Cognitive Development

Play is sometimes seen as an activity that simply takes time away from the “important work” of childhood: academic learning. For example, a number of years ago the U.S. government wanted to narrow the focus of the Head Start preschool program for disadvantaged children to one outcome: literacy. While literacy is certainly a core skill all children should have, this restricted goal ignores preschoolers’ developmental need to learn through exploration and play (Zigler & Bishop-Josef, 2006). As Joan Almon (2003) of the Alliance for Childhood said, “The child’s love of learning is intimately linked with a zest for play” (p. 18). Children not only have fun while they play, but it also is one important way that they learn about the world.

T/F #3

It is important for children to play because they have fun when they are playing, but the real learning happens in the classroom. False
What is play? Perhaps the chief characteristic of play is that it is fun. Other characteristics that have been proposed include the following:

1. Play is done for its own sake, not for any outside goal or purpose.
2. Even when it is an imitation of adult work, play is marked as being different through signals such as exaggeration of activities, role reversals, or laughing.
3. Play is voluntary and spontaneous.
4. Play tends to be repetitive, with similar scenarios played out at different times; for example, a group of children may act out their favorite characters from a book they heard over and over again.
5. Play is undertaken when a child is relaxed and other needs, such as hunger, have been met. (Burghardt, 2011)

Some have argued that play is a universal human behavior. Even children who must work at an early age find ways to play while they are working. For example, fantasy play was found among both poor and middle-class Brazilian children regardless of their ethnic group and location within the country (Gosso, de Lima Salum e Morais, & Otta, 2007). In 2013, the United Nations Committee on the Rights of the Child affirmed its long-time commitment to the importance of play for children's development around the world. As part of this reaffirmation, the Committee said, “Play and recreation are essential to the health and well-being of children and promote the development of creativity, imagination, self-confidence, self-efficacy, as well as physical, social, cognitive and emotional strength and skills. They contribute to all aspects of learning…” (p. 4).

Educators in early childhood programs have felt pressure to focus on academic achievement, preparing children to do well on standardized tests, and to make a choice between play-based, child-centered programs and academic, teacher-directed programs, but this may be a false dichotomy. Kyle Snow (n.d.), Director of the National Association for the Education of Young Children's Center for Applied Research, has proposed that we think of play and instruction in a more complex way, as shown in Figure 9.4. Some programs emphasize the importance of the children's activity over the teacher's activity, some emphasize the opposite, and some that use techniques such as scaffolding and guided play combine both.

In **direct instruction**, a more traditional type of learning, the teacher is active, but the children are primarily passive. By comparison, in **discovery learning**, children are allowed to discover information and understanding for themselves (that is, the

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**FIGURE 9.4**

The interaction of play and direct instruction.

Rather than thinking of the preschool environment as being either play-centered or teacher-directed, we can look at the different ways those two approaches can be combined. If you were choosing a preschool for your young child, which balance would you prefer? Why?

children are active, but the teacher is primarily passive in the process). Guided play allows children to learn in an environment that has been prepared by adults and in which adults are available to scaffold their learning (Weisberg, Hirsh-Pasek, Golinkoff, Kittredge, & Klahr, 2016). They engage in free play, which is fun, voluntary, and flexible, but there also is a learning goal for this play. As you see in Figure 9.4, in guided play, both child and teacher are active participants in the learning process. Finally, when both teacher and child are passive, learning develops through the natural physical and cognitive maturation of the child. Of course, none of the cells in Figure 9.4 are pure examples. Even during discovery learning or free play, a teacher might provide some help or guide children in some way, but the figure is meant to show that her role is minimal compared to the role of the child learner.

The advantage of using discovery learning in a preschool setting is illustrated by research in which children were shown a novel toy with four different interesting results. One tube squeaked, a second one had a hidden mirror, and so on. For one group of 4-year-olds, the experimenter acted as though she discovered the first tube could squeak by accident and seemed surprised and delighted by what she discovered. With the second group, she acted more like a traditional teacher and told the children to watch her as she showed them how to make the first tube squeak. Both groups were then allowed to play with the toy on their own (Bonawitz et al., 2011). All the children could repeat what they saw the researcher do, but the first group played with the new toy longer and discovered more of its features than the group that had received instruction on how to use the toy. The researchers concluded that use of direct instruction made the children less curious and less likely to discover new information on their own.

There are several examples of these different approaches to early childhood education. The Montessori method, developed by Maria Montessori, emphasizes discovery learning. Using learning materials designed to promote physical engagement and sensory exploration, children are encouraged to explore on their own and in groups of children of different ages. Teachers are seen as helpers as the child tries to figure out a problem rather than as instructors who will tell the child how to do it (American Montessori Society, n.d.).

Another approach, based on an educational system developed in the Italian town of Reggio Emilia, emphasizes guided play and scaffolding by teachers. Teachers observe the children’s interests and build on them to enhance learning. For example, if the children become very interested in a spider’s web they discover, the teacher will pick up on this interest, asking them to draw the web and asking about other experiences they have had with spiders. The teacher will continue to use the children’s interest as a basis for all kinds of learning, for example, counting the spider’s legs and reading books about spiders (Biermeier, 2015).

Development of Play

Piaget (1962) described a developmental sequence of play based on children’s cognitive maturity. He hypothesized that the nature of children’s play would change as the level of their thinking changed. Based on this sequence, he proposed three levels:

1. **Practice play**: performing a certain behavior repetitively for the mere pleasure of it—for example, jumping back and forth over a puddle for no purpose other than the enjoyment of doing so. An infant in the sensorimotor stage of development is capable of practice play such as dropping a ball over and over just to see it happen.
2. **Symbolic/sociodramatic play**: using symbolic representations and imagination for play—for example, pretending to drink tea. Toddlers begin to use symbols in play at the end of the sensorimotor period, and preschoolers in the preoperational stage of cognition develop sociodramatic play to a much greater extent.

3. **Games with rules**: making up rules for a game or playing games with preestablished rules, such as baseball or soccer. This type of play is developed most clearly in the next stage, the stage of concrete operations. Piaget argued that younger children try to fit reality to their own purposes through fantasy, while older children begin to fit themselves into the larger reality of the social world around them by following rules.

Since Piaget proposed these stages, researchers have further developed his ideas about the cognitive levels necessary for different types of play. Sara Smilansky (1968) added a stage after practice play, which she labeled **constructive play**, consisting of building or making something for the purposes of play. While practice play begins in infancy when, for example, babies shake a rattle over and over, both symbolic/sociodramatic and constructive play develop during early childhood as children develop the cognitive abilities necessary to pretend, plan, and carry out different scenarios. Young children are not very good at games with rules, as anyone who has ever tried to play Candyland or Chutes and Ladders with a preschooler soon finds out. They are interested in winning but don’t understand the nature of rules and that they apply equally to all players. Piaget believed that children stopped fantasy play when they began taking part in games with rules, but children report that they continue pretend play through age 12 (Lillard, Pinkham, & Smith, 2011), and some continue on into adulthood, as shown by the thousands of adults who attend conventions dressed as cartoon characters or game- or movie-based characters.

### Symbolic/Sociodramatic Play

Symbolic/sociodramatic play, also referred to as **fantasy play**, appears as children move into early childhood in widely diverse cultures around the world, but the content of their play reflects the culture in which it is embedded. For example, young Brazilian children from five different cultural groups were all found to take part in fantasy play, but the content differed. Children in rural and seashore communities were less likely to role-play at adult roles, perhaps because they often already were carrying out adult roles, such as caring for younger siblings. They were more likely to play at being animals that were part of their everyday environment. Urban children were more likely to pretend to be fantasy figures, likely because of greater exposure to media representations of these characters (Gosso et al., 2007).

There are a number of ways in which fantasy play has been linked to cognitive development. Fantasy play seems to promote what Vygotsky called **private speech** more than other activities do (Berk & Meyers, 2013). **Private speech** involves talking to oneself, often out loud, to guide one’s own actions. If you have been with preschoolers, you have most likely seen the way they talk to themselves as they make-believe, giving voice to different characters and having whole conversations all by themselves. In one study, preschool children were given the task of catching plastic fish with a toy fishing pole. In one condition the task was playful (“Pretend you are catching fish for a family to eat”) and in the other condition the task was more worklike (“The more fish you catch, the more stickers you can earn”). The children who engaged in the playful task used more private speech than children who engaged in the non-playful work task (Sawyer, 2017).
The way that fantasy play can facilitate cognitive development is shown by its use as an intervention strategy to help young children develop executive function. In one experimental study, preschool children who worked with an adult to develop and act out a fantasy script, such as going to the moon or pretending to be birds flying around a forest, were compared to other children whose activities with an adult included play, but not fantasy. After 5 weeks, the children in the fantasy group showed greater improvement in both working memory and cognitive flexibility than those in the non-fantasy play group (Thibodeau, Gilpin, Brown, & Meyer, 2016).

Both social and cognitive abilities contribute to a child's ability to play. Play becomes more sophisticated and complicated as children can coordinate activities with others while at the same time developing the ability to use symbols and understand rules. We discuss the social side of play in Chapter 10.

CHECK YOUR UNDERSTANDING

Knowledge Questions

1. Why is play important for developing cognitive skills?
2. How did Piaget categorize types of play?
3. What is constructive play?
4. What are some benefits for children of fantasy play?

Critical Thinking

Create three plans to teach preschoolers early concepts about addition using direct instruction, guided learning, and discovery learning. Explain why you think one approach would work better than the other two.

Language Development in Early Childhood

As we saw in Chapter 6, toddlers up to age 2 have learned to use single words and are beginning to combine them into two-word sentences. This early language ability forms the basis for the rapid developments in language that occur during early childhood.

Development of Syntax

When children put three or more words together, they are beginning to develop the syntax or grammar of their language. They use the simplest combination of words in the right order to convey the meaning they intend. Long before instant messaging and texting, people used to send telegrams. Because they had to pay by the word, they did not say, “I am going to arrive at 11:00 p.m. at the train station,” instead they said, “Arriving station 11 p.m.,” leaving out all unnecessary words. When young children begin to put words together, they act as if they have to pay for each word, and they use only the ones necessary to get their point across. This is called telegraphic speech.

Word order used in telegraphic speech reflects the language children are hearing. For example, word order in English is very likely to be a subject, then a verb, and then the object of the verb: The dog (subject) chased (verb) the cat (object). English-speaking children find it difficult to produce and understand passive sentences in which this order is changed: The cat was chased by the dog. However, children who speak Sesotho, a language found in southern Africa, hear passive sentences frequently and can produce these forms as soon as they learn to speak (Kline & Demuth, 2010).

You can try Active Learning: The Impact of Word Order to see whether the language development of a child you know has advanced to the point where the child understands passive sentences.

Telegraphic speech: A stage in language development in which children only use the words necessary to get their point across and omit small words that are not necessary (for example, Go bye-bye).
Not only are young children beginning to use sentences with more complex word structure, they are also beginning to use more complex forms of the words themselves. Whereas younger children use only the basic forms of words, such as I go store, preschoolers begin to add morphemes. A morpheme is the smallest unit that has meaning in a language. A morpheme may be a word like house, car, or alligator, or it may be any part of a word that has meaning, such as -ed, which indicates past tense, or -s, which indicates a plural. As preschoolers learn to use morphemes appropriately, they no longer say “I walk home” but rather “I walked home” when they mean the past tense.

When children first learn to use added morphemes, they often use them on words for which they don't work. We called these mistakes overregularization because children are using the regular forms on words that follow an irregular pattern. For example, the past tense of I ride is not I rided but rather I rode. Young children seem to learn a rule or pattern, such as “add ‘ed’ to make past tense” but then apply this rule to words that are irregular in form. Interestingly, they may use both the correct and the incorrect version, even in the same sentence: I goed to the store and then went home.

In Chapter 6 we discussed how overregularization provides evidence for Chomsky's nativist theory, because children do not learn to do this by imitating others, but rather seem to form these rules themselves.

**Egocentric Versus Private Speech**

Although their use of language is rapidly increasing, preschoolers still have some limitations to their ability to communicate with others. Piaget (1973) described the inability of young children to take the role of other people in their conversations as egocentric speech.

For example, a child may say something like “I went to that place and saw someone going round and round.” He does not realize that you have no idea what “that place” is or how someone can go “round and round” because he doesn't understand that you don't know everything that he knows. For Piaget, the explanation for egocentric speech is that children are not born social beings; they must learn to be social and to understand other people's points of view. Children's speech reflects this imperfect understanding. Eventually children begin to learn that when others don't understand them, they must adjust what they say to accommodate what the other person does or does not know. When they begin to do this, their communication becomes much more effective. Schematically, Piaget described the development of speech as follows:

Presocial speech ——> Egocentric speech ——> Socialized speech

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**Morpheme:** The smallest unit in a language that has meaning.

**Egocentric speech:** A limitation of young children's communication due to their inability to take the perspective of other people into account.
Vygotsky (1962/1986) had a very different idea about young children’s difficulty with communicative speech. For Vygotsky, children are born social beings so they always intend to communicate, but at some point their speech divides into two types: speech directed at other people and speech directed at themselves. As we noted earlier in the chapter, Vygotsky referred to self-directed speech as private speech. Private speech may seem egocentric because it does not accommodate to those who may be listening, but it is really directed at the child himself and is not meant to be social. Speech directed at other people continues to be communicative, but private speech becomes increasingly silent. Younger children talk to themselves out loud, for example, “I’m using the red crayon.” Somewhat older children more often whisper or mutter to themselves when carrying out a task. Some children may even move their mouths silently. Vygotsky said that this speech becomes internalized eventually as silent speech (“saying it in my head”) and then as thought. Schematically, Vygotsky described the development of speech as follows:

<table>
<thead>
<tr>
<th>Social speech</th>
<th>Communicative speech</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private speech</td>
<td>Inner speech</td>
</tr>
</tbody>
</table>

Research has tended to support Vygotsky’s point of view. Private speech is an essential component of the learning process for Vygotsky. He stated that the child hears what others say to him and then he says it in some form to himself. As we described earlier in this chapter, scaffolding is what the adult does, but private speech is what the child does to change external interactions into internal thoughts. For example, an adult might scaffold a child’s attempts to put together a jigsaw puzzle by saying, “First try to find the pieces with one flat side to put on the outside edge of the puzzle.” You may then hear the child saying to himself, “Flat pieces, find flat pieces.” The child is talking to himself to guide his own actions. Gradually this private (or self-directed) speech becomes inner, unvocalized speech, and finally it becomes thought. Research has shown that young children who talk to themselves in this way are able to carry out difficult tasks more successfully than those who do not talk to themselves as they work (Aro, Poikkeus, Laakso, Tolvanen, & Ahonen, 2015).

Many children also talk to themselves during fantasy play and before they go to bed. Nelson (2015) studied this bedtime speech in a young girl called Emily. One night Emily was recorded saying the following while alone in her bed:

[W]e’re all going to get out of the car, go into nursery school, and Daddy’s going to give us kisses, then go, and then say and then we will say goodbye, then he’s going to work and we’re going to play at nursery school. Won’t that be funny? Because sometimes I go to nursery school cause it’s a nursery school day…. (as cited in Nelson, 2015, p. 173)

Nelson argues that bedtime speech helps Emily understand the world around her. Just as adults might jot down reminder notes to themselves, children go over their experiences and represent them through speech while alone. Emily is remembering what she’s been told and anticipating what will happen the next day, helping her structure her activities in a way that makes sense to her.

Private speech does not end in early childhood. In one study, adults talked out loud to themselves while carrying out a picture-sorting task and the more difficult the task, the more they talked to themselves (Alarcón-Rubio, Sánchez-Medina, & Wünsler, 2013). Try Active Learning: Private Speech to see when even adults may still engage in private speech.

### Active Learning: Private Speech

If you ever find yourself talking out loud when you are alone (that is, using private speech), think about what you are most likely to say to yourself. The chances are you talk about tasks you need to do, giving yourself direction or organizing yourself, as in “Oh…the psych assignment!” or “Almost forgot that!” As adults, we usually do not vocalize this way, but when we are alone or attempting to do something difficult, we may.

(Continued)
How Parents Promote Language Development in Young Children

One thing parents tend not to do with young children is to correct their grammar explicitly. When a child is trying to tell us something, we respond to the content, not the form of what he is saying. When the child says, “Me go store,” we answer, “Oh, are you going to the store?” We do not say, “You should say, ‘I am going to the store.’” If we did, the child would be totally confused. Karmiloff and Karmiloff-Smith (2001) provide the following example of what happened when a mother tried to correct her child’s grammar:

Child: Daddy goed to work.
Mother: Yes, that’s right. Daddy went to work.
Child: Daddy goed to work in car.
Mother: Yes, Daddy went in his car.
Child: Daddy goed his car very fast.
Mother: Ah ha, Daddy went to work in his car. Say went to work, not goed. Daddy went to work.
Child: Daddy wented to work. (p. 102)

As this example shows, sometimes even when we directly try to correct grammar, it doesn’t work. Parents best promote children’s language development when they talk to them frequently, model correct language usage, and elaborate on what the child says. For instance, if the child says “Daddy goed to work,” the child learns best when the parent responds by modeling the correct grammar and then elaborates, promoting further speech by the child: “Yes, Daddy went to work, but he’ll be home in a while. Do you want to talk to Daddy on your (toy) phone?”

CHECK YOUR UNDERSTANDING

Knowledge Questions

1. Give an example of telegraphic speech.
2. Why do young children use overregularization in their speech?
3. Compare egocentric speech and private speech.

Critical Thinking

What aspects of language development in early childhood support each of the following theories described in Chapter 6: behaviorism, social cognitive theory, and nativism?
Preacademic Skills: Reading, Writing, and Arithmetic

Until now, our discussion of language development has focused on spoken language. In this section we introduce another very important aspect of language: the ability to understand and use written language. In addition, we look at how children begin to learn number skills that underlie the ability to do arithmetic. These skills are considered preacademic because they consist of cognitive skills, knowledge, and attitudes that precede and are necessary to carry out the tasks that will come later with formal schooling.

Learning to Read

School is the context in which most children learn to read, write, and do arithmetic, but the groundwork for these achievements is laid throughout the preschool years. We use the term emergent literacy to describe the set of skills that develop before children begin formal reading instruction and provide the foundation for later academic skills. When a young child picks up a book, holds it right-side-up, and turns the pages, “reads” a story by looking at the pictures, or picks up a pencil and scribbles on a paper, these are all emergent literacy skills.

Research on reading typically has looked at how children acquire specific skills such as phonetics (decoding sounds from letters) within the school context, but children also learn about reading, writing, and print material through informal processes, such as parents reading to children before they start school (Lonigan, Purpura, Wilson, Walker, & Clancy-Menchetti, 2013). As in the development of spoken language, the heart of emergent literacy is the interaction between an adult and the child, in this case as the adult reads to the child. From these shared experiences the child develops an awareness of print, learns to recognize and name letters and becomes aware of the sounds associated with different letters (Irwin, Moore, Tornatore, & Fowler, 2012).

The AAP Council on Early Childhood (2014) recommends that physicians encourage parents to read to their young children to promote language skills and create an interest in reading. Reading to young children does more than actually teaching them to read. Reading to children on a regular basis in the first 3 years of life has been linked to a higher level of both language development and cognitive development at age 5 (Rodriguez et al., 2009; Rodriguez & Tamis-LeMonda, 2011). In 2012, 58% of U.S. children between 1 year and 5 years of age were read to every day by members of their family and another 26% were read to several times a week (Pew Research Center, 2013a). This was true for 60% of children in families with incomes over $50,000 but only 42% of those below that level so this is a group of parents who could benefit from having more support and encouragement for reading to their young children.

Using Dialogic Reading

Many adults love to read to children to expose them to books and new ideas that come from them, but the child shouldn’t just be a passive listener. The child must be an active participant in the process. A technique known as dialogic reading is particularly effective in developing early literacy skills (Zevenbergen & Whitehurst, 2008). As the adult and child look at a picture book together, they actively talk about it. The adult engages the child in the process by asking questions and encouraging a dialogue about what
is going on in the story. What is essential to this process, however, is that the partners then switch roles and the child becomes the storyteller and the adult the active listener and questioner (Ghoting & Martin-Díaz, 2006; Institute of Education Sciences, 2007). Dialogic reading provides the essential dimension of active involvement and practice, practice, practice that is required to develop a complex skill like reading.

Vygotsky’s zone of proximal development helps explain why dialogic reading is such an effective technique. As you know, Vygotsky believed children learn best when adults (or more skilled peers) expose them to ideas that are just a bit beyond where they are in their own development. When an adult is successful at keeping the dialogue and questioning during dialogic reading within the child’s zone of proximal development, the interactions build on the child’s existing skills and move the child to the next level of understanding. Techniques such as word-and-picture flash cards and workbooks that emphasize drill and basic skills acquisition are popular with some parents (Neuman, Kaefer, Pinkham, & Strouse, 2014). However, these techniques separate acquiring specific literacy skills from the rich context of reading and do not provide the same sort of sensitive feedback and interaction that dialogic reading can provide.

While techniques such as flash cards have helped low-achieving children and children with cognitive disabilities (Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006), most children can benefit from informal reading-related activities.

The basic technique in dialogic reading is the PEER strategy. During the interaction with the child, the adult prompts the child to talk about the story, evaluates the child’s response, expands on it by rephrasing or adding information, and, to reinforce them for the child, repeats the expanded utterances (Zevenbergen & Whitehurst, 2008). If you are looking at a book with a picture of several animals, you might prompt the child to respond by saying, “Do you see a kitty here?” If the child says, “Here’s a kitty,” you can say, “Yes [the evaluation], and she is sitting next to a doggie [the expansion].” And to complete the sequence, ask the child to repeat what you said. The goal is to ask questions that encourage the child to think about what she is seeing and to build her language skills in answer to your questions. Research on the effects of dialogic reading have found increases in the receptive and productive vocabulary of children from diverse backgrounds in the United States, South Africa, Mexico, and Bangladesh (Vally, Murray, Tomlinson, & Cooper, 2015). These techniques also have improved receptive and expressive language skills and preliteracy skills in typically developing children, preschool English language learners at risk of language delays, and children with autism spectrum disorder (Correa, Lo, Godfrey-Hurrell, Swart, & Baker, 2015; Fleury, Miramontez, Hudson, & Schwartz, 2014; Towson, Gallagher, & Bingham, 2016).

Follow the directions in Active Learning: Using Dialogic Reading to see how you can use this approach when reading with a child.

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**ACTIVE LEARNING**

**Using Dialogic Reading**

Dialogic reading is a skill and requires practice. Use this as an opportunity to read to a young child, preferably 3 or 4 years old. If you choose a book you are familiar with (perhaps a favorite from your own childhood), you will know the story well enough that you can focus your attention on providing prompts for the child. You might want to create a little “cheat sheet” for yourself of the following prompts before you begin, because when you are first using dialogic reading, you will probably find yourself stumped from time to time about what kind of prompt to use next.

- **Completion prompts** leave a blank at the end of a sentence that the child can fill in: “When the girl went to the store, she bought a ______.”

(Continued)
(Continued)

- **Recall prompts** ask the child for information about what has already been read: “Where did the little girl want to go?” or “Why was Emma feeling sad?”
- **Open-ended prompts** ask the child to describe what is happening in a picture.
- **W-prompts** are the w-questions that reporters use when gathering information for a story—who, what, when, where, why, and how (not a w word, but still important for gathering information): “What is Keisha going to do next?” or “Why is Larry excited?”
- **Distancing prompts** take the child out of the storybook to make her think about the real world: “This dog looks a lot like the dog we saw at Aunt Cindy’s house last week. Do you remember that dog? What did you like about him?” (Whitehurst, 1992; Zevenbergen & Whitehurst, 2008)

If you practice this technique, creating these opportunities for learning will become quite natural to you. Finding that zone of proximal development and pitching your comments and questions to a child at just the right level to advance his or her understanding is what many parents, and all good teachers, do all the time.

Children who are at risk for reading difficulties when they enter school can also benefit from preschool programs that provide more specific instruction in the context of shared reading. For example, focusing on new vocabulary can expand meaning-focused skills, and pointing out letters and their sounds can expand the ability to decode written language (Piasta, 2016). Each of these skills must be developed according to the individual child’s readiness to build the emergent skills that will later promote skilled reading.

### Learning to Write

Even very young children love to take a crayon or marker and “write” a letter or story. The earliest writing skills (similar to early reading skills) are basic: Children understand that writing moves from left to right (in English-speaking countries) and from the top of the page down, and that it is meant to convey information. But the process of writing differs for different languages. Table 9.1 shows some of the ways that writing occurs around the world.

**TABLE 9.1**

<table>
<thead>
<tr>
<th>LANGUAGE GROUPS</th>
<th>DIRECTION OF WRITING</th>
<th>WHAT EACH SYMBOL REPRESENTS</th>
<th>NUMBER OF SYMBOLS IN ALPHABET</th>
<th>EXAMPLE FROM THE FIRST LANGUAGE LISTED IN EACH GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>English, French, Spanish</td>
<td>Left to right</td>
<td>Each letter represents a sound.</td>
<td>26, 26, 27</td>
<td>I speak and write English.</td>
</tr>
<tr>
<td>Hebrew, Arabic, Persian/ Farsi</td>
<td>Right to left</td>
<td>Each letter represents a consonant; added marks represent vowels.</td>
<td>22, 28, 32</td>
<td>אני מדבר וכתיב עברית</td>
</tr>
<tr>
<td>Chinese, Japanese, Korean</td>
<td>Top to bottom, then right to left; or it can be written horizontally left to right</td>
<td>Each character represents a word or part of a word.</td>
<td>Thousands</td>
<td>我会说和写中文 or 我会写中文</td>
</tr>
</tbody>
</table>

If you’ve learned to write in English, writing letters and words from left to right probably feels very normal and natural to you, but for children learning to write in these other languages, it feels normal and natural to write from right to left or from top to bottom.
As children's fine motor skills improve, they can begin to write recognizable letters. Figure 9.5 is an example of how writing skills develop in young children. Children love being able to write their own names and often master this skill even before they enter school.

Children will sound out familiar words and often begin to invent their own spelling of words based on how the words sound. The results may initially be incomprehensible—for example, a child might write train as chran—but this first writing is the basis for further learning about spelling and writing. Contrary to what some adults think, using invented spelling does not slow down or prevent a young child from learning conventional spelling (Zhang, Bingham, & Quinn, 2017). It can even help with the task of learning to read (Sénéchal, Ouellette, Pagan, & Lever, 2012).

Learning Arithmetic

As young children are learning to recognize and understand letters and words, they are also beginning to recognize and understand numbers. How do we know when a child understands numbers? The answers three children gave to the question “Which is bigger: seven or nine?” help illustrate the development of the concept of number:

Brie responds quickly, saying “Nine.” When asked how she figured it out, she says, “Well, you go, ‘seven’ (pause) ‘eight’, ‘nine’ (putting up two fingers while saying the last two numbers). That means nine has two more than seven. So it’s bigger.”

Leah says, hesitantly, “Nine?” When asked how she figured it out, she says, “Because nine’s a big number.”

Caitlin looks genuinely perplexed, as if the question was not a sensible thing to ask, and says, “I don’t know.” (Griffin, 2004, p. 173)

Clearly Brie understands what numbers represent while Caitlin does not. Leah is beginning to get the idea. How did Brie learn this concept?

Theorists have hypothesized that human beings have two ways of understanding numbers. The first way is an intuitive sense of quantity that is unlearned and emerges early in infancy. As we saw in Chapter 6, even young infants are surprised when shown one object, then another is added behind a screen but when the screen is removed there are three objects, in other words, 1 + 1 = 3. Children are using this sense of number when they tell you a basket with 10 apples has more than a basket with five apples even though they have not counted the apples. This sense is called the approximate number system (ANS). The ANS does not require language or numerical representation (Bonny & Lourenco, 2013). The second way is a more precise one that relies on the
ability to count and perform basic arithmetic. It requires children to learn the words and symbols for numbers and then to map quantities onto the symbols that represent them. In other words, the child must learn that when they see three objects this corresponds to the symbol \(3\) and the word *three*.

Preschool children appear to develop and use the ANS and the symbolic system of numbers separately. They can estimate that 10 apples is more than 5 apples. They are also learning to count to 10. However, it is not until age 6, on average, that they put this all together to realize that counting is a way to figure out which group has more apples (Kolkman, Kroesbergen, & Leseman, 2013).

There are many different elements young children must bring together when they learn about numbers. They must learn the basic concept that many things are more than one or a few things. They must learn the names of numbers and the order in which they appear. They must learn the symbols for numbers, and finally they must apply all this information to create a one-to-one correspondence between numbers and the objects being counted. This process may be a slow and winding path to the ultimate outcome of the number concept.

**CHECK YOUR UNDERSTANDING**

**Knowledge Questions**

1. What is emergent literacy?
2. Describe the process of dialogic reading.
3. What effect does invented spelling have on children’s ability to learn to write?
4. In what two ways do young children understand numbers?

**Critical Thinking**

Four-year-old Charlie is playing pretend games with his toy cars. His mother says, “That’s enough playtime. Come finish your numbers worksheet.” Can you think of a better way that Charlie’s mother might help him learn about numbers?

**Risk Factors and Supports for Cognitive and Language Development in Early Childhood**

What factors promote children’s cognitive and language development, and what factors create risks that may interfere with children’s ability to achieve their highest potential? In this section we continue the examination begun in Chapter 6 of one of the major threats to optimal cognitive development: poverty. We then look at ways that early education can support cognitive development.

**The Effects of Poverty**

Poverty exists around the world and is a threat to healthy growth and development of all children who grow up without adequate resources. In the United States in 2015, almost half of children under age 18 lived in low-income families and 21% lived in poverty.
(Jiang, Granja, & Koball, 2017). Childhood poverty has been associated with difficulties for children in all areas of development, but the deficits in language development, cognitive functioning, and academic achievement have been most clearly documented (Duncan, Magnuson, & Votruba-Drzal, 2014; Nikulina, Widom, & Czaja, 2010). If you think about all the problems associated with poverty, you would come up with a very long list that includes the following:

- Poor health due to unavailability of health care, unsafe living conditions, and poor diet
- Lack of resources in the neighborhood, including a lack of structured after-school activities
- High rates of depression and posttraumatic stress disorder in both parents and children
- Anxiety linked to caring for a family in a dangerous neighborhood
- High levels of stress that contribute to marital discord and instability
- Safety concerns that limit children’s ability to explore their environment
- Poor schools with inadequate facilities
- Racism or other discrimination
- Segregation leading to a lack of opportunities and social exclusion (Ryan, Fauth, & Brooks-Gunn, 2006)

These factors interact with each other in complex ways to impact children’s academic performance negatively. For instance, parents who are struggling with the stresses of poverty are less likely to provide educational stimulation and guidance in the home. They also have lower expectations for their children’s achievement. Teachers also are more likely to have low expectations for the achievement of students from impoverished families (Benner & Mistry, 2007; Sorhagen, 2013). Families in poverty move homes much more frequently than other families, most often due to unplanned events such as evictions or foreclosures. Moving three or more times in the first 5 years of a child’s life is linked with more attention and behavioral problems, both of which set the child up for later academic difficulties (Ziol-Guest & McKenna, 2014).

Family socioeconomic status (SES) plays a large role in children’s development of language, and this has consequences for later development including readiness to enter school. In a classic study of children’s language environment, Betty Hart and Todd Risley (1995) followed 42 families over a 2-1/2-year period, observing and recording their everyday conversation. The sample consisted of families who were receiving welfare, working-class families, and families in which parents held professional jobs. The difference in the amount of language to which the children were exposed was striking. On average, parents on welfare used 600 words an hour with their toddlers, working-class parents used 1,300 words, and parents with professional jobs used 2,100 words. Although parents in professional families did not initiate verbal interactions with their children any more frequently than other parents, they were more likely to respond to what their children said. They also used more affirmative or encouraging statements and fewer prohibitions, such as “Stop that” or “Don’t.” By the time the children were 3 years old, those in families of professionals had been exposed to over 30 million more words on average than children in welfare families (Hart & Risley, 2003). The effect these different experiences had on the growth of the children’s vocabularies is shown in Figure 9.6.

More recent research has found differences in vocabulary and language processing between children in low SES and high SES families as early as 18 months, and by 24 months the children from poor families were already 6 months behind their more affluent peers (Fernald, Marchman, & Weisleder, 2013). The effect of a family’s SES on children’s language development continues as the children get older.

Researchers have looked at the type of early sentences used by children whose parents had different levels of education (Vasilyeva, Waterfall, & Huttenlocher, 2008).
One group had high school diplomas as their highest level of education, the second group had college degrees, and the third group had professional degrees (for example, a master’s degree, a doctorate, or a professional degree in medicine or law). The researchers found no differences across groups in the children’s use of simple sentences. The children did not differ in the age at which they started producing simple sentences or in the proportion of simple sentences they used. However, differences emerged later in the acquisition and use of complex sentences. Children from families with higher levels of education began producing complex sentences earlier and used them more frequently. Figure 9.7 shows the different paths of development for these two types of sentences. The authors say that children from families with different educational backgrounds move further apart as they grow older, and other research has shown that the disparity continues beyond the preschool years.

Language is a basic building block for academic achievement, but other areas of cognitive development are also important. Children whose families have few resources show lower levels of cognitive development as early as 18 to 24 months of age (Ryan et al., 2006). By the time they enter kindergarten, they are already significantly behind their middle-class peers in preacademic skills that lead to basic skills in reading and math (Duncan et al., 2014; Strang & Piasta, 2016). Figure 9.8 shows the difference in academic proficiencies between children from low income and higher income families found already in kindergarten. When children begin school at a low level, it becomes increasingly difficult for them to catch up, and school can become a source of frustration.

Although there are preschool programs designed to help children from poor families achieve academically, there is also evidence that simply increasing family income through programs such as the Earned Income Tax Credit in the United States and the National Child Benefit program in Canada contribute to higher academic achievement in young children (Duncan et al., 2014). This suggests that families are better able to support their children’s cognitive growth when they have adequate financial resources.
FIGURE 9.7

Differences in the complexity of toddlers’ sentences.

There is little difference in the use of simple sentences among children from families with different levels of education (left). However, there are differences in how many types of complex sentences these children produce (right).


FIGURE 9.8

Academic proficiencies.

Children growing up in poverty are at a disadvantage in academic preparedness even before they enter school. What do you think the long-term effects of this difference might be?

Source: Duncan et al. (2014).

Although educational attainment, employment, and other markers of well-being in adulthood are reduced for children who were ever poor, the majority do graduate high school (78%) and are consistently employed by their late 20s (57%). Most do not have a child in their teen years (78%) and were not arrested by age 20 (76%) (Ratcliffe, 2015). Even with the challenges of growing up in poverty, most of these children grow up to contribute positively to society and there are examples of famous people, such as Oprah Winfrey and former President Bill Clinton, who overcame a childhood history of poverty to reach the highest levels of achievement. We will discuss the concept of resilience, the ability to overcome negative life circumstances, in Chapter 13.
Supporting Academic Readiness

Early childhood education helps prepare all children for the transition into elementary school, but this experience is particularly important for young children growing up in disadvantaged circumstances. We know a good deal about what constitutes high-quality early care and education, but we must be willing as a society to invest the necessary resources to ensure the availability of these opportunities to all children.

Early Childhood Education

In 2015, 67% of 4-year-olds were enrolled in preschool programs in the United States (National Center for Education Statistics [NCES], 2017d). If that sounds like a lot, you may be surprised to learn that in Denmark, France, Iceland, Norway, and Spain 85% of 4-year-olds attend preschool programs, and in those countries, early education begins at younger ages than is typical in the United States.

There is much evidence that attending preschool has positive benefits later in life, but these benefits accrue only when preschool education is of high quality. By one estimate, only 33% of American 4-year-olds attend what would be considered a high-quality program that adequately prepares children for school (U.S. Department of Education, 2015a). High-quality preschools have most of the same characteristics as high-quality child care, described in Chapter 7. The National Association for the Education of Young Children ([NAEYC], n.d.) requires early childhood programs to have a well-planned curriculum designed to promote social, emotional, physical, language, and cognitive development in order to be accredited by their organization. The curriculum must allow for each child’s individual needs and abilities and each child’s progress must be assessed to improve teaching as necessary. Communication with the child’s family is centrally important. Preschool programs with these characteristics are likely to be costly and out of the reach of most poor parents, but the Head Start program was designed to help children in families below a certain income level have a high-quality preschool experience while their parents get the knowledge and resources they need to support their children’s cognitive growth.

Head Start and Early Head Start

The Head Start program was developed in the 1960s to narrow the educational gap between children from different socioeconomic backgrounds so economically disadvantaged children could enter school on par with their more economically advantaged peers. Most people think of Head Start as solely a preschool program, but it is much more than that. As you can see in Figure 9.9, Head Start addresses the whole child, not just cognitive skills, because cognitive skills do not develop in a vacuum; they are intricately related to physical health, emotional well-being, and family support.
Families who take part in this program tend to be more involved in activities such as reading books, playing games, and talking with their children, both while in the Head Start program and through the first years of elementary school (Gelber, Isen, & National Bureau of Economic Research, 2011). Parental involvement also is associated with less controlling behavior on the part of the parent (including less reliance on spanking as a discipline strategy) and more cognitively stimulating activities at home (Ansari & Gershoff, 2016). The increase in cognitive stimulation is, in turn, associated with gains in academic skills, and the decrease in spanking is associated with declines in problem behavior.

In 1994, Head Start was expanded to create the Early Head Start (EHS) program to serve pregnant women and parents of children under 3. The services it offers can include child care provided at a center or in a home, and weekly home visits to promote the parents’ ability to support their children’s development (Head Start, 2014). An assessment of 2-year-olds who had been in Early Head Start since they were 1 year of age found that as toddlers 80% of the sample had good or excellent health and were similar to same-age peers on measures of general development, but were still below national norms for their age on language development (Vogel et al., 2015).

Although research has shown some significant cognitive gains by the end of the Head Start program that prepare students for the transition into kindergarten, longer-term follow-up studies have found that these gains typically disappear at some point before the end of third grade (Love et al., 2005; Puma et al., 2012; U.S. Department of Health and Human Services, 2010). Although these findings are disappointing for a program with such ambitious goals, we need to remember that Head Start is designed as an intervention for disadvantaged children who often are growing up in very difficult circumstances. To some extent, these findings may reflect variability in the quality of the programs offered across the country. For example, in Tulsa, Oklahoma, where the quality of teaching is emphasized, lead teachers have a college degree as well as an early childhood education certification, and are...
rewarded with salaries similar to those earned by public school teachers, the early cognitive effects of participation in Head Start were considerably larger than the average (Gormley, Phillips, & Gayer, 2008; Pianta, Barnett, Burchinal, & Thornburg, 2009). Findings such as these led to a federal mandate to increase the qualifications for teaching staff in Head Start and Early Head Start programs and evidence is accumulating that these changes have improved the quality of teaching in Head Start programs (Kaplan & Mead, 2017).

Other research has looked beyond outcomes in early elementary school and has assessed more than cognitive skills. Across this research, low-income children who attended high-quality preschool programs had a number of positive developmental outcomes, including fewer grade retentions and special education placements than nonparticipants. They were more likely to graduate high school and attend college, earned more as adults, and were less likely to be imprisoned (Bauer & Schanzenbach, 2016; HighScope Educational Research Foundation, 2014; Reynolds, Temple, Robertson, & Mann, 2001; Schweinhart, 2013). Preschool attendance in a high-quality program has also been associated with adult measures of self-control, self-esteem, and positive parenting practices (Bauer & Schanzenbach, 2016).

If the cognitive gains from attending an early intervention program such as Head Start dissipate in many cases over the first couple of years, what accounts for positive long-term outcomes that have been found? One possible answer comes from a study of Head Start children that found significant improvement in executive function over the preschool year (Fuhs & Day, 2011). As you learned, executive function includes the ability to inhibit behavior when necessary, to think flexibly and shift attention from one task to another, to regulate emotional responses, to monitor and assess your own performance, and to plan and organize tasks. Do you see how developing this set of skills as a young student would help the child succeed in school and avoid some problem behaviors in the future?

Based on such research, the argument has been made that the money spent on Head Start (between about $6,000 per child in Oregon and $11,000 per child in Vermont) reaps financial benefits that clearly outweigh the initial expense (Heartland Grant Solutions, 2015; Schweinhart, 2013). When you consider the costs incurred when children require special education services, do not complete high school, or enter the criminal justice system, you can begin to see how the initial expenditures are justified. James Heckman (2011), Nobel prize-winning economist, summarized his research on the effects of early intervention by saying: “Investing early allows us to shape the future; investing later chains us to fixing the missed opportunities of the past” (p. 47). Congress reauthorizes the funding for Head Start each year. Motivated by arguments such as these, the 2017 budget was increased to more than $9.25 billion (Linehan, 2017).

**Educational TV: Sesame Street**

As you recall from Chapter 6, infants do not learn well from TV or other screen media, but this situation is somewhat different in early childhood. There is evidence that educational TV (but not entertainment TV) can improve cognitive functioning and academic performance in preschool children. Research on the educational TV show *Sesame Street* has found positive effects on preacademic skills when young children watch it (Kirkorian, Wartella, & Anderson, 2008). Although there are many educational programs on television, *Sesame Street* has included a research component from its very beginning and, as a result, has more data on its effectiveness than any other program. See *Journey of Research: Educational TV and Sesame Street* for additional information about the history and effectiveness of *Sesame Street*. 

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**T/F #9**

Participating in a high-quality preschool program can increase a child’s chance of graduating from high school or attending college. **True**
JOURNEY OF RESEARCH

Educational TV and Sesame Street

In the 1950s, the first televised educational programs for children often filmed a teacher leading activities typical of a preschool or kindergarten classroom. The teachers were not trained actors, and surveys at the time showed that children greatly preferred watching commercial TV (Lemish, 2007). By the 1960s, Joan Ganz Cooney and the Carnegie Corporation found that the vast majority of homes had a television regardless of their income level and that preschoolers were watching a great deal of television every day (Friedman, 2006). Bringing together top educators, psychologists, and television producers, the group used the latest research to determine how children would best learn from watching television (Lemish, 2007). From the observation that children are greatly attracted to commercials, they developed a show that used the same techniques found in commercials, such as short segments, bright colors, and music, but with educational rather than commercial goals in mind. With the addition of Jim Henson’s Muppets, this show became Sesame Street, which first aired in 1969 (Williams-Raftiollo, 2008).

Today, the U.S. version of Sesame Street is watched by about 8 million people each week, but Sesame Street has gone far beyond the borders of the United States. Twenty versions of the show appear in more than 120 countries around the world (Sesame Street Workshop, 2014). In each version, Sesame Street staff members from the United States work together with local producers, artists, and actors to create a program appropriate for that culture.

Sesame Street sets very specific goals based on research-supported knowledge about children’s development. For example, it has been shown that children learn more from TV when they interact with an adult about what they’ve seen, so Sesame Street has designed segments that encourage parents to watch with their children so they can discuss and reinforce what the show teaches. Many celebrities, actors, and musicians have done guest segments on Sesame Street, including Beyoncé, Jimmy Kimmel, Queen Latifah, Macklemore, Maya Angelou, and LL Cool J, and the program often features parodies of programs adults watch, such as Upside Downton Abbey and a parody of the song Despacito, called El Patito, which means “rubber ducky.” Three- and 4-year-old children may not understand these jokes, but their parents will and this helps get parents involved with watching the show.

Sesame Street is designed to teach preacademic skills that prepare children for reading, writing, and arithmetic but the show teaches much more than that. Messages about the importance of cooperation or friendship have always been a big part of Sesame Street’s mission. Diversity and acceptance of all people has been a central value, with characters from all backgrounds represented in the cast. Sesame Street also has not shied away from big issues that impact children’s lives. In South Africa, on Takalani Sesame, the show introduced a Muppet character, Kami, who was HIV positive and showed both the prejudice Kami experienced and the love and fun the character could have with others (Hawthorne, 2002). The producers of Sesame Street in Bangladesh showed their commitment to educating all children when they sent a fleet of rickshaws equipped with TVs linked to power generators to communities that had no electricity so those children also could watch the program (Gordian, 2012).

There is much research evidence that watching Sesame Street does make a difference for young children. A 15 country meta-analysis found children who watched more Sesame Street programming had greater cognitive knowledge (for example, numbers, letters, and shapes), knew more about local environmental and health issues (for example, recycling or safety rules), and showed greater social reasoning and positive attitudes (for example, less intergroup prejudice) (Mares, Sivakumar, & Stephenson, 2015). Other research has found that viewers were better prepared to learn to read and do arithmetic, and this readiness seemed to truly be a result of watching the show and not of other variables, such as how educated their parents were or how much parents read to their children. This advantage held even through high school, when students who had watched the program at age 5 had higher grades in English, math, and science (Huston, Anderson, Wright, Linebarger, & Schmidt, 2001; Schmidt & Anderson, 2007). To keep pace with rapidly changing media, Sesame Street has added apps for electronic media to help young children with literacy skills, a website with podcasts, computer games and other activities, and a YouTube channel that has received over 1 billion views (AAP Council on Communications and Media, 2016; Luckerson, 2013).
With the advent of new types of media, including mobile and interactive devices, there has been a flood of new educational apps aimed at young children. In a review of research on their educational effectiveness, the AAP Council on Communications and Media (2016) concluded that “most apps parents find under the ‘educational’ category in app stores have no such evidence of efficacy, target only rote academic skills, are not based on established curricula, and use little or no input from developmental specialists or educators” (p. 2). Why do these apps fall so far short of their intended goals? As we saw with younger children, for electronic programs to be truly educational, an adult needs to be involved with preschool children while they are using them. Most commercially available apps do not provide these opportunities. The AAP report says that the best way for preschool children to learn is still through unstructured and social play and responsive interaction with an adult. Parents of preschool children are advised to limit use of electronic media to 1 hour per day of high-quality programming that they watch or use together with their children to help them understand what they are seeing and doing (AAP Council on Communications and Media, 2016).

Starting School

When should children start school? Is it important that they start school-based learning as early as possible, or should they wait until they are mature enough to profit from education? This debate has been ongoing for many years. Children in Germany, Italy, and Spain begin school at age 6, and those in Latvia and Sweden begin at age 7, but starting in September 2019, children in France began their compulsory education at age 3 (McCarthy, 2018). Most U.S. children start school by entering kindergarten when they are about 5 years old, but each state or school district sets its own cut-off dates for school entry. In Connecticut, children enter kindergarten if they will be 5 by January 1st of that school year, while in Nebraska and Hawaii they must be 5 by July 31st before the school year begins (Education Commission of the States, 2018), so some children will be 4 years 8 months when they enter school while others will be 6 years 1 month. As you can imagine, a year and five months difference in age can make a big difference in a child’s maturity or school readiness.

Some parents intentionally hold the child out for a year (called redshirting after a similar practice in college athletics) because they either believe that their child is not ready to enter at the designated age or that the child will have an advantage if he or she is older when beginning school. Is there support for the idea that children are better off starting at younger or older ages? The research indicates that younger children may have some academic and social disadvantages in the earliest years of school, but those differences disappear by later elementary school and middle school (Datar & Gottfried, 2015; Lubotsky & Kaestner, 2016). Because all children are not at the same level of readiness when they begin kindergarten, some have argued that schools should accommodate the needs of their students, regardless of their age or maturity (Kostelnik & Grady, 2009). For example, not all children will be ready to learn to read in kindergarten, so the curriculum should be flexible enough to allow teachers to teach basic prereading skills to younger children to foster their readiness as they enter first grade. Accommodating the needs of the younger children should help ensure that they will catch up as they progress through school.

CHECK YOUR UNDERSTANDING

Knowledge Questions

1. What problems associated with poverty can hinder cognitive and language development in early childhood?
2. What are indicators of a high-quality preschool program?
3. What are some short- and long-term benefits associated with attending a Head Start program?
4. What benefits are there for children who watch Sesame Street?

(Continued)
Critical Thinking

Create arguments for and against the proposal to change the Head Start preschool program for children from low-income families into a literacy program that is aimed specifically at promoting reading.

Conclusion

Young children are constantly asking “Why?” as they try to figure out the world around them. Their natural curiosity is a wonderful basis for their cognitive growth during the period of early childhood. Sensitive scaffolding of information and skills by adults can help promote children’s new knowledge and more sophisticated ways of thinking. Children also learn best through the fun of play, which can maintain their zest for learning. Although there are many limitations on their cognitive abilities, young children who have the supports in their lives that promote their active involvement in their world are preparing the learning abilities that will help them thrive as they enter school.

CHAPTER SUMMARY

9.1 What occurs during Piaget’s preoperational stage of cognitive development?

Children in the preoperational stage advance in their thinking when they begin to use symbols to manipulate information in their minds, although symbols at this age are still very concrete. Children demonstrate their ability to use symbols through play, language, and drawings. They then begin to try to figure out the world using intuitive thought, which includes transductive reasoning, egocentrism, and animism, but they still lack conservation skills.

9.2 What are the basic processes associated with Vygotsky’s sociocultural theory?

Children learn through social interaction with more capable others that moves them just beyond their current level of understanding. The difference between what they can do independently and what they can do only with assistance is the zone of proximal development (ZPD). Through scaffolding an adult helps move the child through the ZPD to full independent achievement.

9.3 How do attention, memory, executive function, and social cognition develop in early childhood?

Young children have limited sustained and selective attention abilities. They have difficulty using encoding processes so their memory is quite limited, but they can use scripts to help their recall. Memory at this age is highly suggestible and this can lead to false memories. As preschool children develop executive function, they show greater ability to inhibit irrelevant thoughts and behavior, use their working memory effectively, and show flexibility in their thinking when needed. Young children’s ability to understand what others know or are thinking, an aspect of theory of mind, is also developing. The inability to understand and theorize about other people’s thoughts has been called mindblindness. Preschool children are developing the ability to understand that others can have a false belief, that is, others can believe something that the child knows to be untrue.

9.4 Why is play important for cognitive development in early childhood?

Play provides a setting in which children are free to explore and interact in an environment of fun that keeps them motivated to learn. Guided play allows children to learn in an environment that has been prepared by adults and that allows adults to scaffold their learning. Discovery learning allows children to discover information and develop new understanding for themselves. Piaget and his followers described four cognitive levels of play: practice play, constructive play, symbolic/sociodramatic play, and games with rules. Cognitive development is promoted when children use private speech during sociodramatic play.
9.5 How does language develop in early childhood?

Young children put essential words together in telegraphic speech and make grammar mistakes through overregularization, but by the end of this period, their language is quite complex. Piaget described egocentric speech in young children as an inability to take the role of the listener, but Vygotksy believed children talk out loud to themselves in private speech as a way of directing their own thoughts and actions. Substantial evidence supports Vygotksy’s ideas. Parents promote language development by responding to children’s speech and modeling the correct way to say something rather than directly correcting their children’s grammar.

9.6 How do children develop preacademic skills in reading, writing, and arithmetic?

Emergent literacy is development of the set of skills that provide the foundation for reading. Dialogic reading is one good approach to helping young children develop early literacy skills. Children are encouraged to write even before they know all the rules for correct spelling. They develop their number concept both from the approximate number system and from the precise number system used by adults.

9.7 What risk factors and supports exist for cognitive and language development in early childhood?

Growing up in poverty creates many challenges for children’s cognitive development. By the time they reach kindergarten, young children growing up in poverty hear and produce fewer words and less complex sentences than children in higher income families. Income enhancement can increase these children’s cognitive and language skills. High-quality preschool has also been shown to improve young children’s cognitive abilities in the near term and real life outcomes in the long term. Head Start is a federally funded program that helps children and families in poverty improve children’s cognitive development through early education and family involvement. Educational media such as Sesame Street have also been shown to improve cognitive development in young children; however, adult interaction is essential to help children make sense of any electronic media they use. Children may start kindergarten at a range of ages, and younger children struggle more academically and socially in the early grades, although these differences disappear in later elementary school and middle school.

KEY TERMS

Animism 286
Approximate number system (ANS) 308
Centration 286
Conservation 286
Constructive play 300
Decenter 286
Dialogic reading 305
Discovery learning 298
Egocentric speech 302
Egocentrism 285
Emergent literacy 305
Encoding processes 291
False belief 296
False belief paradigm 296
Games with rules 300
Guided play 299
Intuitive thought 284
Mindblindness 295
Morpheme 302
Operations 283
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Scripts 291
Symbolic/sociodramatic play 300
Symbolic thought 284
Telegraphic speech 301
Theory of mind 295
Transductive reasoning 284

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