Chapter 9: Cognitive and Language Development in Early Childhood

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# Chapter Overview

This chapter builds on topics of cognitive and language development introduced in Chapters 5 and 6 and extends coverage to emerging skills critical at this period in development. Specifically, the chapter is organized around three broad domains—cognitive development, social-cognitive development, and preacademic skills of language, literacy, and math. The section on cognitive development opens with the seminal work of Piaget followed by review of changes to children’s executive functioning and memory from an information processing perspective. The section on social-cognitive development describes growth in children’s theory of mind and reasoning about others’ knowledge and expertise. The final topical section reviews research on young children’s language and emerging literacy and math skills. Each topic covers theoretical foundations, research findings, and influences of family, school, and broader cultural contexts. The closing section on developmental cascades spotlights reverberations of young children’s cognitive and language development for later academic and social domains.

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# Learning Objectives

LEARNING OBJECTIVE 9.1 Describe the hallmarks of the preoperational stage of cognitive development, as advanced by Piaget.

LEARNING OBJECTIVE 9.2 Describe the tasks Piaget created to examine the limits of children’s preoperational thinking.

LEARNING OBJECTIVE 9.3 Explain how cultural context might affect children’s performance on cognitive tasks such as those developed by Piaget.

LEARNING OBJECTIVE 9.4 Describe the components of executive functioning.

LEARNING OBJECTIVE 9.5 Discuss developmental changes in semantic memory and the factors that contribute to change.

LEARNING OBJECTIVE 9.6 Describe developmental changes in young children’s episodic memory, including research on infantile amnesia.

LEARNING OBJECTIVE 9.7 State how a family context of poverty might compromise children’s skills in information processing.

LEARNING OBJECTIVE 9.8 Identify ways that preschool curricula might facilitate children’s executive functioning.

LEARNING OBJECTIVE 9.9 Explain how cultural expectations and practices might lead to differences between East Asian and U.S. European American children in areas of executive functioning.

LEARNING OBJECTIVE 9.10 Explain how children may determine whether an adult is trustworthy.

LEARNING OBJECTIVE 9.11 Explain developmental change in children’s weighing of familiarity with a person against the person’s reliability.

LEARNING OBJECTIVE 9.12 Describe a classic study used to test children’s understanding of false belief.

LEARNING OBJECTIVE 9.13 Identify three factors that might explain why a young child’s theory of mind changes over time.

LEARNING OBJECTIVE 9.14 Explain why theory of mind relates to lying, deception, and persuasion.

LEARNING OBJECTIVE 9.15 List ways that family context supports social-cognitive development.

LEARNING OBJECTIVE 9.16 Explain aspects of the school context that support children’s social-cognitive development.

LEARNING OBJECTIVE 9.17 Describe evidence for the universality of early social-cognitive development.

LEARNING OBJECTIVE 9.18 Discuss improvements in children’s phonological and semantic language skills during early childhood.

LEARNING OBJECTIVE 9.19 Identify grammatical skills in morphology and syntax that children acquire in early childhood.

LEARNING OBJECTIVE 9.20 Identify some conversational skills that emerge in early childhood.

LEARNING OBJECTIVE 9.21 Identify emergent literacy skills that are vital for later reading.

LEARNING OBJECTIVE 9.22 Describe developments in children’s early math cognition.

LEARNING OBJECTIVE 9.23 Summarize features of the home context that promote children’s skills in language, literacy, and math.

LEARNING OBJECTIVE 9.24 Identify ways that family socioeconomic status might affect children’s language, literacy, and math skills.

LEARNING OBJECTIVE 9.25 Identify features that contribute to quality preschool experiences for children.

LEARNING OBJECTIVE 9.26 Describe how cultural context might influence children’s experiences and development in areas of language, literacy, and mathematics.

# Video Materials & Activities

*Various videos and activities enhance student learning of key concepts and facilitate classroom participation and discussion. These include participatory classroom activities; videos on key chapter concepts; videos of the author discussing context, culture, and cascades; videos that highlight research methods and findings described in the chapter; and a list of optional/supplementary videos on relevant topics.*

## Concepts in Action Participatory Classroom Activities

*Activities at the classroom level will stimulate student participation in real time, and facilitate group discussion. Some questions are knowledge and understanding checks, in which professors will be able to use identifiers to track student responses to questions and project responses to facilitate discussions. Other exercises encourage students to “participate” in certain studies to better understand the research material in chapters (available in interactive PPTs).*

###  Activity: Choosing a Research Task

This activity asks students to select the appropriate task to assess a specific cognitive skill. Students will see their responses in real time, and discussion can center on why certain tasks were chosen for each cognitive skill being tested. Tasks can be grouped conceptually (e.g., Piagetian tasks together; executive function tasks together), or in random order to test students on the full range of topic materials.

*Prompts (i.e., cognitive skill that will be assessed):*

Working memory (D)

Cognitive flexibility (C)

Conservation of mass (L)

Whether children understand what something looks like may not be what it actually is (K)

Planning (E)

Inhibitory control (A or B)

Perspective taking/egocentrism (H)

Understanding superordinate-subordinate relations (J)

Grammatical rules around morphology (G)

Theory of mind (F)

Dual representation understanding (I)

*Response options (Note not all options appear for each question):*

1. Day/night task
2. Go/no go
3. Dimensional card sort
4. Memory span
5. Tower of London
6. False belief task
7. Wug test
8. Three mountain task
9. Scale model task
10. Class-inclusion task
11. Appearance reality task
12. Rolling out ball of clay and asking if it has same amount

### Activity: Participating in Inhibitory Control Tasks

This activity allows students to participate in various Stroop tasks to reveal the challenges to inhibitory control, namely suppressing the urge to respond with a dominant response in favor of a non dominant response. At the start the task, students will respond to stimuli that are concordant with their names (that is, they will only need to respond day to a sun and night to the moon; and read out the word **RED** or **GREEN** which will appear in their associated colors). After these “easy” trials, the rules will flip. Students will experience the day-night Stroop task (having to now respond day to a picture of a moon and night to a picture of a sun); similarly, in the color-naming Stroop task they will need to read the word **RED** when it appears in green; and the word **GREEN** when it appears in red). Thus, students must read the word but ignore the color to respond accurately.

This task can be done by just asking students to yell out responses as a group (hearing some errors when rules flip), or response times can be gauged by calculating the latencies between a picture appearing and the student response. In the latter case, students will select the correct answer from two options (“night” or “day” as sun and moon appear), and “red” or “green” as the colored words appear. Students will see their responses in real time, and discussion can center on the difficulties they had in inhibiting the opposing response.

### Activity: Participating in a Cognitive Flexibility Task

This activity allows students to participate in a task that tests cognitive flexibility, or how they respond to a changing rule. Students will see a screen that shows pictures of two boxes, one with a red triangle and the other with a blue circle. They will be asked to sort appearing pictures into their appropriate boxes by color. After 10 trials, they will be asked to now sort pictures by their shape. Students will see their responses in real time, and see how they make errors or slow down when they must change the rule guiding their responses.

## Concepts in Action Videos

*Concepts in Action Videos complement participatory classroom activities to highlight important concepts raised in the activity. Additionally, the videos can serve as stand-alone resources. Students will be able to view the videos on their own in Oxford Insight, and instructors can play the videos following the participatory classroom activities to underscore key points.*

### Concepts in Action Video: Inhibitory Control Tasks

This video recaps the concept of inhibitory control and gives some examples of inhibitory control tasks, including Stroop tasks, the go/no-go task, and the day-night Stroop task.

## Author Videos on Context, Culture, & Cascades

*Context videos feature the author discussing key topics drawn from select “Contexts” and “Culture” sections. Cascades videos feature the author providing select examples of developmental cascades drawn from the end-of-chapter section. Both types of videos are available in Oxford Insight and are approximately 2-5 minutes in length.*

### Author Video: Contextual Influences on Children’s School Readiness

Tamis-LeMonda discusses contextual influences on young children’s cognitive and language development, and specifically highlight how family and features of preschool experiences (namely teacher quality and curriculum) can set children on a path of learning and readiness for school.

### Author Video: Cascades from Social-Cognitive Skills

Tamis-LeMonda discusses how children’s social-cognitive understanding of others blossoms during early childhood, and why such skills show cascading influences to other domains, particularly as a springboard for fostering positive social relationships.

## Research in Action Videos: Developmental Methods and Research

*These short videos explore classic research, current research, and important concepts in child development, bringing methods and concepts to life. They are available for students in Oxford Insight and accompanied by multiple choice questions that can be assigned (~2-5 minutes in length, although some may be longer).*

### Video Topic: Executive Function—The Brain's Control Center: Part 1 (1:38 min)

This video animation gives a high-level overview of the components of executive functions that enable us to plan, focus, and juggle multiple tasks successfully: working memory, inhibitory control, and cognitive flexibility.

### Video Topic: Executive Function—The Brain's Control Center: Part 2 (1:07 min)

This video animation discusses ways that executive functions continue to develop as we age and methods for further developing executive functions skills.

### Video Topic: Are all of Your Memories Real? (2:14 min)

This animated Ted-Ed video discusses a 1990's study where participants recalled getting lost in a shopping mall as children. Some shared these memories in vivid detail, but none of these people had actually gotten lost in a mall. They produced these false memories after psychologists told them they'd gotten lost and parents confirmed it. This video explores why this might have happened and the fallibility of our memory.

## Suggested Supplementary Videos

*These are other recommended videos from the author available on Third Party sites such as YouTube. We cannot guarantee accessibility compliance for third party videos.*

### Video Topic: A Typical Child on Piaget’s Conservation Tasks

This video shows a typical 4.5-year-old participating in Piagetian conservation tasks related to number, length, liquid, mass, and area.

[*YouTube Video:* *A typical child on Piaget’s conservation tasks*](https://www.youtube.com/watch?v=gnArvcWaH6I) *(3:49 min)* )

(Video URL: <https://www.youtube.com/watch?v=gnArvcWaH6I>)

### Video Topic: Mind in the Making: DeLoache Scale Model Presentation

In this video Judy DeLoache explains how researchers use scale models to test children’s symbolic understanding.

[*YouTube Video:* *DeLoache Scale Model Presentation*](https://www.youtube.com/watch?v=AwYznELWJAI) *(1:31 min)*

(Video URL:<https://www.youtube.com/watch?v=AwYznELWJAI>)

### Video Topic: A Language Without Numbers

In this video, linguist Daniel Everett claims that the language of the Piraha has no words for specific numbers. Instead of “one, two, three” they use a few, some, and many.

[*Smithsonian Channel (via YouTube):* *A Language without Numbers?*](https://www.youtube.com/watch?v=nDM8G5tuHF8) *(1:17 min)*

(Video URL: https://www.youtube.com/watch?v=nDM8G5tuHF8)

# Active Learning Resources for Students

*Various resources facilitate student learning through active engagement with questions, exercises, and assignments. These resources include data-in-action exercises and assessment, in which students manipulate independent and dependent variables and observe changing associations in real time; high-level questions that encourage students to “Think Like a Developmentalist” as they solve problems, design studies, and generate new ideas by integrating material across chapter sections; hands-on activities in which students apply what they’ve learned in observations and research-based assignments; and traditional check-your-understanding questions that test students’ knowledge of chapter material at different levels of difficulty. A final chapter summary presents key take-home messages organized around each chapter subheading.*

## Data in Action Exercises and Assessment

*These interactive graphs enable students to manipulate variables to see the effects on key developmental metrics. They will be accompanied by multiple choice questions that can be assigned (in select chapters where relevant).*

### Family Factors and Children’s Cognitive Skills

This exercise shows how family context variables (independent variables) affect specific cognitive skills in children. Students will begin with a scatterplot of dots (each representing a participant child), randomly distributed within a graph, where x and y-axes are unmarked. Then, students click to see the y-axis defined as a specific cognitive skill covered in the chapter. Students can then select the family context variable(s) most centrally related to the specific skill for placement in the x-axis, and see what happens to the dots (or association between the selected X variable and selected Y variable). Some variables will cause dots to move into a positive linear association; and others will cause the dots to move into a negative linear association.

Example **Y** variables (child cognitive skills):

1. Theory of mind
2. Mathematical understanding
3. Details of an episodic memory
4. Executive functioning
5. Language development
6. Suggestibility in reporting of memories

Example **X** variables and related associations:

1. *Parent mental state talk:* Positively relates to child theory of mind
2. *Literacy activities at school (reading fiction about character motives, etc.):* Positively relates to child theory of mind
3. *Puzzle and block play:* Positively relates to mathematical understanding
4. *Chronic poverty & stress*: Negatively relates to executive functioning
5. *Parent vocabulary diversity provided to children:* Positively relates to children’s language development
6. *Misleading questions:* Positively relates to suggestibility
7. *Parents’ talk of past experiences with child:* Positively relates to children’s episodic memory

## Thinking Like a Developmentalist Questions

 *“Thinking Like a Developmentalist” questions appear at the end of each chapter. These questions require students to synthesize knowledge across different sections of the chapter, for example by designing experiments, studies, interventions, or workshops that draw from multiple measures or concepts presented throughout the chapter.*

### Design a Study: Testing Factors that Might Explain Children’s Conservation Skills

A group of 5- and 8-year-old children differ on their ability to conserve number. Your task is to figure out what might explain these age-related differences. One hypothesis is that the younger children’s lack of conservation of number is explained by a general inability to manipulate multiple representations at the same time (as in Piaget’s idea of young children’s problems in centration and tendency to focus on one dimension only). A second hypothesis is that younger children have problems with inhibitory control. A third hypothesis is that younger children’s problem with conservation is explained by working memory. What tasks would you use to test these three hypotheses and how would you design your study?

### Design a Study: Modifying Children’s Episodic Memories

You wonder whether children’s memories about a class trip to a museum can be altered, and which strategies are particularly influential in changing their memories. You also want to see whether you can alter children’s feelings to be especially positive about the class mother who joined them on the trip. What would you do to alter their memories and thoughts about the class mother? Which specific strategies would you test?

### Design a Study: Social Cognitive Skills and Children’s Descriptions of an Episodic Memory

A researcher hypothesizes that individual differences among children in their social-cognitive abilities (in particular, how well they understand others’ minds) might relate to the clarity and organization of a story they tell another person about their trip to the zoo. Notably, children are informed that the person listening had never been to a zoo. How would the researcher test this hypothesis, and which aspects of the child’s story might the researcher assess?

### Prepare a Webinar for Parents: COVID and Young Children’s Learning

During the COVID-19 pandemic, you learn that parents are feeling stressed because their young children are unable to attend preschool, and, as a result, parents have substantially increased the time they permit children to watch screens to occupy their children’s days. However, parents are very worried about their children’s early learning during this time and the fact that their children are not getting opportunities to be educated in preschool. They ask what they can do to support their young children. As a developmental expert, you are asked to give a webinar to parents around their role in young children’s learning. What points would you make and what suggestions would you offer parents who are clearly stressed but have their children’s best interests in mind?

## Observational Assignments and Activities

*These optional activities may be assigned, depending on local rules surrounding child observation. They ask students to go into the real world and observe or interview children or adolescents and then think critically and analytically about what they have observed or learned.*

### Assignment Topic: Recalling Events from the Past

Ask students to think of two memories and write about them: One from before they were 3 years of age, and one from high school. Ask them to write out as many details about the event as they can (where was the location, who was there, what were people wearing, what did everyone do, and so on). Then ask students to roughly quantify how many details they were able to recall from the very early event versus the more recent one. They should relate their findings to what they learned about episodic memories in class, and hand in the two memories they wrote out. (Note: Students need not worry about composing a great essay on the memory, and can simply use bullets to list out the information they recall).

## Check Your Understanding Questions/Answers

*What follows are suggested answers to the “Check Your Understanding” questions at the end of major subsections.*

**Check Your Understanding 9.1**

1. *What is one example of pretend play that illustrates a child’s understanding of dual representation?*

1. A child plays with a toy car and understands that the toy car is both something to play with and something that represents a real, life-size car.

2. *What is an imaginary friend? Should parents be concerned if their children create imaginary friends? Why or why not?*

2. An imaginary friend is a child’s fabrication of a make-believe friend and a relationship with that friend. Parents should not be concerned if their children create imaginary friends because children with imaginary friends typically have a rather mature cognitive understanding about stories and qualities of friends. Also, children with imaginary friends typically tell more elaborative stories than children without imaginary friends and receive similar social-emotional benefits (such as kindness) as they would with real friends.

**Check Your Understanding 9.2**

1. *How would you test a child’s understanding of: (a) conservation; (b) the distinction between appearance and reality; (c) hierarchical classification; and (d) causal understanding?*

1. *Conservation*: Conservation may be tested by administering Piaget’s conservation tasks, which test whether children understand that an entity stays the same even if its form changes; these tasks examine children’s understanding of liquid quantity, solid quantity, and number. For example, to test children’s understanding of liquid quantity, a person could present children with two sets of objects of equal mass or equal number, such as two equal beakers of water. A generally typical, expected response from children is that the two rows are equal. Then, as the children watch, change one of the two entities so that the appearance is different but there is actually no change in mass or amount (i.e., pouring water from one of the beakers into a tall, narrow beaker). After the transformation, ask the children if the objects—in this case, the beakers of water—are still equal.

*The distinction between appearance and reality*: Change the appearance of an entity so that it differs from reality, such as putting a ferocious dog mask on a picture of a cat and asking children if the “cat” is still a cat or ferocious dog (DeVries, 1969).

*Hierarchical classification*: Administer class inclusion problems, tests developed by Piaget. In these tests, ask children to determine which of two groups has more items—a full set of items (superordinate) or a subset of items (subordinate). The two groups may be objects such as a small number of toy dogs together with a large number of toy cats. Ask the children if there are more animals or more dogs to determine if children can distinguish between whole versus subset.

*Causal understanding*: Create specific scenarios reflecting a cause and effect. For example, act out a scene, such as done in research by Harris, German, & Mills (1996), in which a doll walked across the floor with muddy shoes. Ask the children if the floor is dirty now and if the floor was dirty before the doll walked across it (to ensure an understanding of what happened in the story). Next, ask the children counter-to-fact situations, including if they could understand what would have happened if the doll would have taken off her shoes before walking across the floor.

2. *Cite at least three observations suggesting that young children’s thinking is not as limited as Piaget described.*

2. (1) Distinction between appearance and reality: Children younger than 3 years old seem to understand the appearance-reality distinction (contrary to Piaget’s claim) when presented with nonverbal tasks, suggesting that failures in appearance-reality tasks may be due to limited vocabularies and challenges with communication.

 (2) Causal understanding and reasoning: Younger children (about 3- to 5-year-olds) may show notable causal reasoning in tasks that involve the researchers asking questions about cause-effect relations and counter-to-fact situations, such as in the study conducted by Harris, German, & Mills (1996) in which a doll walked across the floor with muddy shoes and researchers asked before/after questions, which showed children’s causal understanding at these young ages.

 (3) Animistic thinking: In contrast to Piaget’s claims about children’s attribution of human qualities to inanimate entities, more recent research suggests that young children can indeed distinguish between animate and inanimate entities. For instance, studies show that children understand that nature creates animals, humans create objects, people do things with objects, and animals do things themselves.

**Check Your Understanding 9.3**

1. *How can the cultural context in which a child is raised affect a child’s preoperational reasoning skills? Provide an example.*

1. Studies indicate how children from school and unschooled communities differ in their categorization capacities, based on their everyday cultural experiences, routines, and activities. As one example of differences in taxonomic categorization, individuals in the U.S. typically grouped objects into superordinate categories (such as vehicles and foods), whereas those from the Kpelle tribe in Liberia organized the objects into functional uses (such as a knife goes with an apple for cutting).

**Check Your Understanding 9.4**

1. *In what situation might a child need to exercise inhibitory control?*

1. One example of a situation in which a child might need to exercise inhibitory control is a scenario that may arise during fully remote learning (due to the current pandemic). A child is faced with the task of attending to a teacher who is engaging the class in a read aloud virtually. The child may be tempted to go on another window to search a topic of interest unrelated to the read aloud. A child who exhibits inhibitory control is able to resist the temptation to check another website and to attend to the read aloud.

2. *Which specific aspect of executive functioning can be demonstrated by a Stroop test?*

2. Inhibitory control, a component of executive functioning that pertains to a child’s ability to respond appropriately to a stimulus while inhibiting a dominant and alternative response.

3. *What type of test would demonstrate a child’s ability to plan?*

3. A Tower of London task tests a child’s ability to plan and execute a sequence of actions.

**Check Your Understanding 9.5**

1. *What are some of the strategies children use for remembering?*

1. Rehearsal (repeating information over and over) and organization (imposing a structure on test items based on their relations to one another).

2. *How does expansion in a child’s knowledge base affect executive functioning?*

2. As a child grows and has new experiences, information in semantic memory, or a type of declarative memory related to the acquisition of facts, rules, and concepts, grows in strength and complexity. Children can therefore draw on their expanding knowledge base to learn new information and place less of a burden on their working memory, or the third component of executive functioning that involves maintaining and manipulating information in the mind. Working memory is essential for concentration, focus, and following instructions.

**Check Your Understanding 9.6**

1. *What is infantile amnesia?*

1. The difficulty people have in remembering events from the first years of life.

2. *Why might forgetting occur?*

2. Early memories may be displaced because neural structures and networks change and develop in the infant and toddler brain. Since neural networks become remodeled, early memories may be forgotten.

3. *Why is young children’s rate of forgetting episodic memories disproportionate to that of older children?*

3. One theory is that the rapid changes to neural networks in infancy may lead to displacement of memories.

4. *What are interview techniques that might influence a child to recall events inaccurately?*

4. Biased interviewing and leading questions may result in an increase in suggestibility, or the tendency to accept false information when recalling an experience. An interviewer who asks specific, closed-ended questions, repetitive questions, provides information before a child does, selectively reinforces statements consistent with his or her own position, and has a high status might influence a child to recall events inaccurately.

**Check Your Understanding 9.7**

1. *What role does stress play in explaining the connection from poverty to child executive functioning skills?*

1. One way chronic poverty may affect children’s executive functioning is by changing a child’s physiological reactions to stress by magnifying levels of cortisol, a stress hormone. In turn, cortisol may compromise children’s executive functioning (such as inhibitory control and working memory span) and forms of self-regulation. Poverty can also affect executive functioning through its associations with impoverished, chaotic, unpredictable, and inconsistent environments.

**Check Your Understanding 9.8**

1. *Describe the Tools of the Mind curriculum and its impact on children’s executive functioning.*

1. Tools of the Mind is a preschool curriculum, designed by Adele Diamond and based on Lev Vygotsky’s theory, aimed at improving preschoolers’ executive functioning through a variety of play-based activities. These play activities all promote attention, inhibitory control, working memory, and cognitive flexibility. Examples of such play activities include: “Buddy Reading”—children take turns reading and practice waiting patiently, and “Freeze”—children dance to music and then stop when the music stops. Such activities may promote children’s executive functioning and positive classroom behaviors.

**Check Your Understanding 9.9**

1. *In which cognitive areas do children from East Asian backgrounds show an advantage over children from U.S. European American backgrounds?*

1. Areas of executive functioning—preschoolers in Beijing performed around 6 months ahead of North American preschoolers on every measure of executive functioning; preschoolers in mainland China are more advanced on tests of inhibitory control and attention control than U.S. preschoolers.

**Check Your Understanding 9.10**

1. *Would a child be more likely to ask their parent or a stranger the name of an object? Why?*

1. A child would be more likely to ask their parent the name of an object because the parent is a familiar, trusted adult in the child’s life.

2. *If two adult strangers interacted with toys, and one knew the name of a toy while the other fixed the toy, when would the child turn to each adult for help with a broken toy?*

2. A child would turn to the adult who knew the name of the toy when the child wanted to know the names or labels of new things, based on the child’s knowledge of the adult who knew names of objects. A child would turn to the adult who fixed the toy when the child needed a toy fixed, as the child knew that the particular adult fixed toys in the past.

**Check Your Understanding 9.11**

1. *Will young children always defer to the advice of a familiar person? Explain your answer.*

1. No, because as children grow in their social cognitive understanding of other individuals, they experience a developmental shift in which they begin to place greater weight on a person’s knowledge than simply assuming someone familiar has knowledge or expertise.

**Check Your Understanding 9.12**

1. *What classic study was used to test children’s understanding of false belief?*

1. Wimmer and Perner (1983) developed a classic study to test children’s false belief understanding. In this study, children between the ages of 3 to 9 were presented with drawings in which “Maxi” placed his chocolate into a cupboard. Maxi went out of the room and his mother put the chocolate in a different cupboard. The examiner asked the children in the study where Maxi would look to find his chocolate when he returned to the room. Children under 5 years old were inaccurate in their belief that Maxi would look in the new location. However, children older than 4 to 5 years of age correctly responded that Maxi would look in the original spot.

**Check Your Understanding 9.13**

1. *What is the theory-theory? Give an example.*

1. The theory-theory is a principle attributing developmental changes in children’s performance on false belief tasks to the revisions and changes children make to their world theories. Theory-theory claims that children modify their earlier experiences through age and experience. Example: A 3-year-old child in the Maxi study that answered incorrectly about where Maxi would look for his chocolate when he returned to the room may develop a theory that Maxi *desired* the chocolate and so would look for it where it last was (the new location). As the child becomes older and has everyday experiences about wants, desires, unreliable information, and so forth, the child would then realize that Maxi would look in the original spot as he did not see his mother move the chocolate to a new location. The child shifts hypotheses about where Maxi will look from a theory based on desire to one based on false beliefs.

2. *How might children’s executive functioning aid their theory of mind?*

2. Strong executive functioning skills have been shown to be related to an improvement in theory of mind tasks. When considering the classic Maxi study of false belief, children need to identify where the chocolate is not truly located, try and narrow down spots where the chocolate may truly be located, and then keep all these pieces of information in mind in an organized way to figure out the correct answer. Being able to control and coordinate attention, memory, and other behaviors offers important skills for theory of mind tasks.

3. *How would you test whether maturation of the brain accounts for improvements in children’s social-cognitive skills?*

3. I would administer a theory-of-mind type task (such as the classic Maxi study of false belief) to children and then relate their performance on that task to EEG recordings that provide information on the maturation of the brain. If data from EEG relate to false belief understanding, it would offer insight into brain maturation specific to social-cognitive development.

**Check Your Understanding 9.14**

1. *Provide research evidence showing that theory of mind helps children with deception and persuasion.*

1. Deception and persuasion both require children to create arguments to change another person’s thoughts and behaviors (thus, an awareness of another person’s own thoughts, beliefs, etc.). Evidence for associations between theory of mind and deception is seen in studies where children’s performance on TOM tasks relates to their lying to a researcher about not having peeked at a toy as instructed. Children who lied had higher scores on theory of mind. Similarly, Slaughter, Peterson, & Moore (2013) developed a study in which children between the ages of 3 and 8 had to try and convince a puppet, controlled by the researcher, to do something that the puppet did not want to do (e.g., eat broccoli). Ultimately, the puppet refused to eat the broccoli. Children had to develop convincing arguments to get the puppet to eat the broccoli. Children’s scores on false belief tasks related to the number of arguments that they came up with.

**Check Your Understanding 9.15**

1. *What role does mental state talk play in children’s social-cognitive development?*

1. Mental state talk refers to statements and questions related to others’ “minds,” by using words such as “think,” “know,” and “want.” These words refer to the child’s ability to reflect on another person’s beliefs and thoughts and, thus, exposure to mental state talk helps to encourage social-cognitive growth.

**Check Your Understanding 9.16**

1. *Why are literacy experiences important for children’s social-cognitive development?*

1. Literacy experiences, such as book-reading activities, help nurture children’s various reasoning skills about characters’ emotions, motives, beliefs, and intentions. As children’s social-cognitive skills grow, children become better equipped to understand characters’ traits and actions.

**Check Your Understanding 9.17**

1. *What evidence supports universal processes in children’s social-cognitive development?*

1. Studies have found developmental transitions in U.S. children’s social-cognitive skills on theory of mind tasks to generalize to children from diverse cultural communities across the world. A major review of 178 false-belief studies, that included more than 4,000 children from different societies, found similar patterns of change. For instance, 3-year-olds had difficulty with theory of mind tasks, whereas 4- to 5-year-olds typically passed these tasks.

**Check Your Understanding 9.18**

1. *Provide an example of how children learn words at three levels of increasing specificity: general, basic, and specific.*

1. Children learn words typically by following a hierarchical structure, from general characteristics to very specific characteristics.

*General*: Children learn and say the word “plant”

*Basic*: Children say the word “flower”

*Specific*: Children say the word “rose”

**Check Your Understanding 9.19**

1. *What two improvements in children’s language skills account for the growing complexity of their grammar?*

1. Development in morphology (the study of words and how words are formed) and development in syntax (the set of rules governing the ordering of parts of speech to create sentences).

2. *What types of grammatical errors do young children commonly make and why?*

2. Learning rules that govern the syntax or grammar of a language takes time to develop, and children learn the general rules of grammar before they learn exceptions to the rule (such as past tense of certain verbs not using the general rule of “ed”). Therefore, young children make mistakes in applying the rules of grammar across the board, and so may say “runned” rather than “ran.”

3. *What is overregularization and why does it occur?*

3. The application of a regular rule (general rules of grammar) to an irregular form (exceptions to the rule). The example of “runned” is one illustration of overregularization. Overregularization occurs because children learn the general rules of grammar before they learn any exceptions to the rules.

**Check Your Understanding 9.20**

1. *What is an example of an error young children might make when communicating with others in the area of pragmatics?*

1. Saying too much or too little with their conversational partners; talking about something off-topic; or failing to consider the listener’s perspective by providing incomplete information when communicating about something the other person had not experienced.

**Check Your Understanding 9.21**

1. *Define and give examples of code-related language skills in young children.*

1. Code-related language skills are the formalities of writing, sounding out, and reading letters and words on a page (Storch & Whitehurst, 2002). Examples: learning the conventions of print, naming and writing letters, and phonological awareness.

**Check Your Understanding 9.22**

1. *How does growth in vocabulary influence children’s understanding of number concepts?*

1. During the second and third years of life, typically, children are exposed to number concepts in their growing vocabularies (e.g., big, bigger, small, smaller, more, less). Also, children learn counting words. This growing mathematical vocabulary is then accessible for young children to use as they learn about early math principles (e.g., counting, magnitude, comparing quantities).

2. *What is the cardinal principle, and what types of math problems show that young children understand cardinality?*

2. Cardinal principle: Each number in a sequence represents a specific number of elements in a set. Math problems in which children must count how many objects are in a set show early evidence of cardinality; at more advanced levels, cardinality is shown when children successfully engage in various operations around numbers such as addition and comparison (e.g., If Michelle has three apples and Jake has two apples, how many apples are there?).

**Check Your Understanding 9.23**

1. *Define recast, expansion, and dialogic reading.*

1. *Recast*: The restructuring of children’s grammatically incorrect sentences into correct sentences.

*Expansion*: The elaboration of children’s sentences with additional details or information.

*Dialogic reading*: A reading style in which adults ask “WH” questions, prompt children to participate, and engage children in discussions during reading time.

2. *Give examples of parent elaborativeness during book reading, and explain how elaborativeness supports children’s narrative skills.*

2. Providing details about stories, asking questions, building on children’s responses, and encouraging children to create and tell stories. High elaborativeness during book reading offers children opportunities to make contributions to the storyline and thus to practice their early narrative skills.

3. *What activities would you engage in as a parent if you wished to promote your child’s math and spatial skills?*

3. Working on puzzles together, playing board games that include counting and numbers, counting, talking about numbers, shapes, and spatial concepts.

**Check Your Understanding 9.24**

1. *Identify several ways that poverty may affect children’s language development.*

1. Children growing up in economically impoverished families may hear fewer words and less grammatically complex language compared to higher income households. In the classic study by Hart and Risley (1995), a “30-million word gap” was experienced by children growing up in lower income households, hearing millions of fewer words over time compared to children from higher income households.

**Check Your Understanding 9.25**

1. *List the features associated with high-quality teaching.*

1. NAEYC (2019) lists a number of high-quality teaching features, including: developing positive relationships with children, frequent teacher-child interactions, acknowledging all children’s abilities, developing strong teacher-family partnerships, supporting children’s developing friendships, and promoting prosocial behaviors in the context of the classroom setting.

2. *Provide examples of preschool curricula shown to yield demonstrable gains in children’s emergent literacy and math.*

2. Literacy-focused preschool curriculum (which focus on “WH” questions, print concepts, etc.), Big Math for Little Kids (which focus on patterns, operations on numbers, space, etc.).

**Check Your Understanding 9.26**

1. *How might the language a child speaks affect their math skills?*

1. The transparency of a language’s ways of expressing number may support math skills. For example, Chinese words for number are clearer than English (such as the word for eleven, ten + one; twelve, 10 + 2, etc.). If a language doesn’t have words for numbers, children will not have opportunities to discuss concepts around number. Example: the Pirahã language has few words related to numbers, terms for quantification, and time. As such, children from this community tend to not ask about time (a mathematical concept), given the limited exposure to words related to such mathematical concepts.

2. *How has research on the Tsimané culture illuminated cultural similarities and differences in children’s math learning?*

2. Families living in the Tsimané culture tend to have no formal education and little or no basic math knowledge. Research by Steven Piantadosi and colleagues tested children from the Tsimané culture on early counting and cardinality understanding and found that children were delayed in math skills compared to children from the U.S. However, the sequence of learning was the same as the sequence of learning of children from more technological societies (example: learning first three or four number words before understanding how counting works).

## Chapter Summary

*What follows is the bulleted chapter summary from the text.*

Piaget and the Preoperational Stage

• According to Piaget, during the preoperational stage children are capable of mental representation, but are unable to perform logical mental operations.

• By 3 years of age, children are capable of dual representation, understanding that something can both be itself and stand for something else.

• Children’s growing representational skills allow them to engage in pretend and fantasy play, and some children create imaginary friends.

• Piaget and followers documented several cognitive limitations of preoperational thinking, including egocentrism, inability to make the appearance-reality distinction, animistic thinking, causal understanding, and lack of conservation of quantities.

• Contemporary research challenges some of Piaget’s claims and yields new insights into young children’s emerging cognitive skills.

• Children’s cultural experiences affect cognitive skills such as conservation and classification.

Cognitive Development from an Information-Processing Perspective

• Young children show improvements in executive functioning skills, in areas of inhibitory control, cognitive flexibility, and working memory. Executive function skills also support children’s abilities in planning, strategy use, and monitoring of performance.

• Semantic memory and episodic memory are two forms of declarative memory that grow in complexity and organization over early childhood.

• Development in semantic memory (sometimes referred to as a child’s knowledge base) helps account for improvements in working memory and processing speed.

• Infantile amnesia refers to the difficulty people have in remembering events from the first years of life, and has been explained with various accounts, including the impact of forgetting on early memories.

• Episodic memory improves in complexity and detail over early childhood.

• Young children’s memories are especially vulnerable to suggestion and misleading information, which has implications for children’s accounts in eyewitness testimony.

• Family poverty can impair children’s executive functioning through effects on the brain.

• School curricula, such as Tools of the Mind, may strengthen children’s executive function skills.

• Chinese children have been shown to outperform U.S. children on measures of executive functioning, which might be explained by cultural values and practices.

Evaluating People’s Knowledge and Expertise

• Children show improvement in their social-cognitive skills around understanding of others’ knowledge and expertise, and are selective in whom they turn to for information and help.

Theory of Mind

• Children show gains in theory-of-mind skills around 4–5 years of age, as revealed in their understanding that people can hold “false beliefs” or mental states thatdiffer from reality and what children themselves believe and know.

• Developmental changes in children’s theory-of-mind skills have been attributed to children’s changing theories about the world (the theory-theory), changing executive functioning skills, and brain development.

Contexts of Social-Cognitive Development

• Individual differences among children on theory-of-mind tasks are influenced by factors in the family (mental state talk, the presence of siblings).

• Children’s school experiences, including interactions with peers, interactions with teachers, and literacy activities support developments in theory of mind.

Growing Language Skills

• During early childhood, children improve in the range and accuracy of their speech sounds, vocabulary size, grammar, and pragmatics.

• Children’s sentence construction grows in complexity as they use parts of speech to modify word meanings and combine separate thoughts (clauses) in sentences.

• Children learn standard grammar rules before they learn exceptions, resulting in the overregularization of grammatical rules.

• Young children grow in the pragmatics of language as they learn norms of conversations.

Literacy and Mathematical Understanding

• Emergent literacy skills rely on oral language and coderelated skills, the latter referring to learning the sounds of letters and recognizing letters and words in print.

• Emergent math skills include counting, discriminating quantities, and discerning patterns. In learning number words, children show a clear developmental progression. Spatial skills are likewise pivotal to math learning.

Contexts: Language, Literacy, and Mathematical

Understanding

• The amount and diversity of parent talk to children, children’s engagement in book reading and shared narratives, and family socioeconomic status relate to young children’s language and literacy skills.

• Parents’ elaborations in narratives and engagement in dialogic reading support children’s language and literacy skills.

• Parent math talk and opportunities provided to children to play with puzzles, blocks, and board games support children’s math skills.

• Teacher quality and curriculum are two features of school contexts that support children’s language, literacy, and math developments.

• Cultural communities differ in their language and literacy practices, routines around book sharing and oral storytelling, and ways that languages encode concepts in math. These cultural differences shape children’s literacy and math skills.

Developmental Cascades

• Young children’s language and literacy skills relate to current and future cognitive and language skills and academic performance in areas of reading, writing, attention, and mathematics.

• Early childhood skills in language support social cognition and social relationships.

• Social-cognitive skills in early childhood shape a variety of social behaviors, including making and keeping friends, moral reasoning, persuasion, lying, and deception.