### 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).