Chapter Preview

During the first two years of life, cognitive development proceeds at a phenomenal pace. The child is transformed from an infant who can know its world only through a small set of basic reflexes into a toddler who is capable of imitating others, and anticipating and remembering events. Most significant is the development of language. By age 2, the average toddler has a relatively large vocabulary and is able to converse effectively with others.

The chapter begins with a description of Jean Piaget's theory of sensorimotor intelligence, which maintains that infants think exclusively with their senses and motor skills. Piaget's six stages of sensorimotor intelligence are examined, and his concept of object permanence is explained and revisited by more current research.

The second section discusses the information-processing model, which compares cognition with the ways in which computers analyze data. Research investigating infants' perceptual skills indicates that within the first few months infants perceive many of the affordances of their perceptual world. Research also demonstrates that infant memory is more developed than was once believed.

Finally, the chapter turns to the most remarkable cognitive achievement of the first two years: the acquisition of language. Beginning with a description of the infant's first attempts at language, the chapter follows the sequence of events that lead to the child's ability to utter two-word sentences. The chapter concludes with an examination of three theories of language learning and the hybrid theory, which combines aspects of each theory.

What Have You Learned?

The “What Have You Learned?” questions at the end of the text chapter are reprinted here for your convenience in checking students’ understanding of the chapter contents.

1. Why did Piaget call his first stage of cognition sensorimotor intelligence?
2. How do the first two sensorimotor stages illustrate primary circular reactions?
3. If a parent speaks and a baby babbles in response, how does that illustrate stage three?
4. How is object permanence an example of stage four of sensorimotor intelligence?
5. In sensorimotor intelligence, what is the difference between stages five and six?
6. What steps of the scientific method does the “little scientist” follow?
7. Why is becoming bored a sign of infant cognitive development?
8. How do the affordances of this book differ at age 1 month, 12 months, and 20 years?
9. What are several hypotheses to explain why infants refuse to crawl over visual cliffs?
10. What two preferences show that infants are selective in early perception?
11. What conditions help 3-month-olds remember something?
12. What is the crucial difference between implicit and explicit memory?
13. Why is explicit memory difficult for babies under age 2?
14. What linguistic abilities do infants have at 6 months?
15. What is typical of the rate and nature of the first words that infants speak?
16. What have developmentalists discovered about the way adults talk to babies?
17. What are the early signs of grammar in infant speech?
18. According to behaviorism, how do adults teach infants to talk?
19. According to sociocultural theory, why do infants try to communicate?
20. What does the idea that child speech results from brain maturation imply for caregivers?
21. How does the hybrid theory compare to the eclectic approach described in Chapter 2.

Chapter Guide

► “On Your Own” Activities: Developmental Fact or Myth? Portfolio Assignment
► AV: The Journey Through the Life Span, Program 3: Infants and Toddlers; Transitions Throughout the Life Span, Program 6: The Little Scientist; Growing Minds: Cognitive Development in Early Childhood; Development of the Child: Infancy
► Classroom Activity: Design a Study,
► Teaching Tip: Personality Differences Between the Best and Worst Teachers

I. Sensorimotor Intelligence

Instructional Objective: To outline Piaget’s theory of sensorimotor intelligence.

► AV: Cognitive Development; The Infant Mind; First Adaptations; Tim: His Sensory-Motor Development
► Classroom Activities: Active Exploration; Event-Related Potentials
► Teaching Tips: Active Exploration for Sensorimotor Learning; Assessing Infant Cognitive Development: Three Approaches (also appropriate for the section on information-processing theory)
► Internet Activity: Cyberspace Hunt: Jean Piaget
► “On Your Own” Activity: Ordering Exercise

1. Central to Piaget’s theory is the idea that infants are active participants in their cognitive development.

2. Piaget outlined six stages in the development of sensorimotor intelligence.
   a. Stage One: Reflexes (birth to 1 month). The newborn’s reflexes, such as sucking, grasping, staring, and listening, represent its only ways of gaining knowledge about the world.
   b. Stage Two: The First Acquired Adaptations (1–4 months). This stage begins when the infant starts to adapt its reflexes to the environment and to coordinate two actions (for example, grabbing a bottle to suck it). Stages one and two are examples of primary circular reactions.
   c. Stage Three: Making Interesting Sights Last (4–8 months). Infants become more responsive to people and objects in the environment as they learn to repeat specific actions that have elicited pleasing responses.
   d. Stage Four: New Adaptation and Anticipation (8–12 months). Infants become more purposeful in responding to people and objects, anticipating events, and engaging in goal-directed behavior. Stages three and four are examples of secondary circular reactions.
   e. Stage Five: New Means Through Active Experimentation (12–18 months). The little scientists become more active and creative in their exploration of, and trial-and-error experimentation with, the environment.
Stage Six: New Means Through Mental Combinations (18–24 months). By using mental combinations, toddlers begin to anticipate and solve simple problems. This skill enables the toddler to think about consequences, to pretend, and to use deferred imitation. Stages five and six are examples of tertiary circular reactions.

3. (text and A View from Science) A major cognitive accomplishment of infancy is the ability to understand that objects exist independently of one’s perception of them (object permanence), which, according to Piaget, does not develop until about 8 months (during stage four). Experiments have shown that infants as young as 2 or 3 months old have some inkling of object permanence.

4. Advances in scientific investigation enable researchers to better understand infant cognitive development. By using habituation and fMRI, researchers now know that the early years are the prime time for cognitive development. Other research tools include the EEG, ERP, and PET.

II. Information Processing

Instructional Objectives: To make students aware of the extensive cognitive processing of perceptual information that occurs in the first two years, and to discuss research findings on infants’ abilities in terms of affordances and memory.

1. Information-processing theory models cognition on how computers analyze data. Two aspects of this theory as applied to human development are affordances, which are analogous to computer input, and memory, which is analogous to storage and output.

2. According to the environmental view of Eleanor and James Gibson, which of the many affordances people perceive in a given object depends on their developmental level and experiences, their present motivation, and their sensory awareness of what that object might be used for.

3. Researchers once believed that perception of a visual cliff was solely the result of visual maturity. However, later studies show that even 3-month-old infants notice the difference between a solid surface and an apparent drop off; their heart rate drops and their eyes open wide.

4. Two universal principles of infant perception are that they have dynamic perception—that is, their perception is primed to focus on movement and change—and that they are fascinated by other people (people preference).

5. Research has shown that under the right conditions infant memory is much more developed than was once believed. These conditions include (1) using situations that are similar to real life, (2) ensuring that the infant’s motivation is high, and (3) providing reminders and repetition.

6. Carolyn Rovee-Collier has shown that brief reminder sessions evoke and prolong infants’ memory of how to make a mobile move, even after intervals as long as two weeks.

7. Toward the end of the first year, infants can show deferred imitation of a person whose actions they had observed a day earlier.

8. After about 6 months, infants can retain information for longer periods of time with less training or reminding.

9. Most researchers believe there are many types of memory. For instance, implicit memory refers to memories for routines that are hidden until activated by a stimulus;
explicit memory consists of memories that can be recalled on demand. PET scans and fMRI studies reveal that explicit memory depends heavily on the hippocampus. This area of the brain does not reach maturity until 5 or 6 years of age.

III. Language: What Develops in the First Two Years?

Instructional Objective: To describe language development during the first two years, and to discuss several leading theories of language development.

AV: Development of Pre-Verbal Speech; Pre-Verbal Communication; Baby Talk; Beginning Language; Child Language: Learning Without Teaching; Out of the Mouths of Babes; Talking from Infancy: How to Nurture and Cultivate Early Language Development; Language; Language and Thinking

Classroom Activities: Language Rhythms in Manual Babbling; Sequence of Sensorimotor and Language Development; Assessing Sensorimotor and Language Development with Unedited Videotapes; Conversation with a Toddler; Evaluating Sesame Beginnings; Classroom Debate: “Resolved: Language Development Is the Product of Conditioning”

“On Your Own” Activity: Child-Directed Speech

Critical Thinking Activity: Language Development: Nature, Nurture, or Interaction?

1. Infants begin learning language before birth, via brain organization and hearing. Newborns show a preference for hearing speech over other sounds; they prefer child-directed speech (baby talk or motherese), which is the high-pitched, simplified, and repetitive speech used by adults in talking to infants.

2. Between 6 and 9 months of age, babies begin to repeat certain syllables, a phenomenon referred to as babbling.

3. Although deaf babies begin to babble at about the same time as hearing babies, they stop because they cannot hear responses. Deaf babies use about a dozen hand gestures at 10 months of age.

4. The average baby speaks a few words at about 1 year of age. When vocabulary reaches approximately 50 expressed words, as distinct from understood words, it suddenly begins to build rapidly, at a rate of 50 to 100 or more words a month. This language spurt is called the naming explosion, because toddlers learn a disproportionate number of nouns, although the actual ratio of nouns to verbs and adjectives shows cultural influences.

5. The first words, used as holophrases (one-word sentences), occur by about 1 year, the first two-word sentence at about 21 months. Variations of tone and pitch (intonation) are extensive in babbling and holophrases.

6. Grammar becomes obvious at about 21 months when infants begin using two-word combinations.

7. Following B. F. Skinner’s theory, many behaviorists maintain that language is acquired through associations and differential reinforcement of appropriate usage. One study that followed mother–infant pairs over time found that the frequency of early maternal responsiveness predicted the child’s rate of language acquisition many months later.

8. A second, social-pragmatic theory of language proposes that social impulses foster infant language.

9. Noam Chomsky maintains that children have an innate predisposition to learn language and the basics of what he calls a universal grammar, which occurs through a brain structure Chomsky labels the language acquisition device (LAD).

10. Researchers agree with Chomsky that a language trigger is not needed because words are expected by the developing brain.

11. A hybrid theory combines aspects of several theories. Fundamental to this theory is that some aspects of language are best learned in one way at one age, others in another way at another age.