

The First Two Years: Cognitive Development

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 of 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.

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, as well as the hybrid theory.

Chapter Guide

I. Sensorimotor Intelligence

1. Central to Piaget's theory is the idea that infants are active participants in their cognitive development. He thought the core of intelligence was adaptation.
2. Piaget outlined six stages in the development of *sensorimotor intelligence (he called the infants' first period of cognitive development)*.
 - 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** and involve the infant's own body.
 - 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 or deliberate 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.
- f. *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. 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). Object permanence is demonstrated by an infant's searching for something that has fallen from his/her sight. An 8 month old would have limited search abilities. Experiments have shown that infants as young as 2 or 3 months old have some inkling of object permanence.
4. Modern research studies have shown that many infants reach the stages of sensorimotor intelligence earlier than Piaget predicted. One reason Piaget's findings were faulty is that his sample size was too small. Another reason is that Piaget's methods were too simple. 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. Habituation occurs when an infant loses interest in a stimulus that is repeatedly presented.

II. Information Processing

1. **Information-processing theory** models cognition on how computers analyze data. It describes perception as a cognitive process. 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. An affordance is the opportunity for perception and interaction that is offered by people, the environment, and objects.
3. Researchers once believed that perception of a **visual cliff** was solely the result of visual maturity. The infant's reaction to the visual cliff was supposed to measure depth perception. 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**). Infants love seeing and hearing their mothers happy.
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. After about 6 months, infants can retain information for longer periods of time with less training or reminding.
8. 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?

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, emotional, and repetitive speech used by adults in talking to infants. It uses simple vocabulary and short sentences.

or deafness.

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 (recognizable) 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 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- ex. More means “I want another cookie.”), 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 between 18 and 24 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. Interactions between children and objects are more common in English-speaking cultures, while social interactions are more common in other cultures such as the Asian cultures.
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.