Lecture Notes

# Chapter 13: Cognitive Development Through Adolescence

## Learning Objectives

* Recognize how cognitive abilities and skills change throughout development
* Describe the stages of development according to Piaget and reactions to his theory
* Discuss cognitive development studies that diverge from Piaget’s theory of development
* Analyze common answers to the question “How do children develop cognitively?” as they differ from Piaget’s theory of development

**Outline**

**I.** Setting the Stage

**A. Stage theories of cognitive development** describe development as consisting of a series of qualitative different periods, called **stages**.

**1.** Each stage represents a different way of making sense of the world.

**2.** Stage theories assume that children go through stages in a fixed order, never skipping stages or going backward.

**3.** Most stage theorists also claim **universality** for their stages, seeing them as applicable to children from all cultures and environments.

**B. Nonstage theories of cognitive development** do not see qualitative changes at different developmental periods.

**1.** Instead, they view development as the gradual acquisition of one or more abilities (memory capacity, attentional focus, knowledge, and so forth).

**2.** Nonstage theories view children as quantitatively but not qualitatively different from adults.

**II.** Piagetian Theory

**A.** Jean Piaget developed a stage theory of cognitive development that saw children as active participants in their own development.

**1.** Piaget believed that construction of mental structures begins shortly before birth.

**2.** The major mechanism of development in his theory was the *adaptation* of mental structures through two distinct processes.

**a)** *Assimilation* involves the application of mental structures (which Piaget called *schemes*) to new objects in the world.

**b)** *Accommodation,* by contrast, involves changing mental structures to fit new objects.

**B.** Piaget described four major stages of development.

**1.** The **sensorimotor stage** begins at birth and lasts about 18 months.

**a)** During this stage, the infant experiences the world almost entirely through sensory and motor experiences.

**b)** During this stage, the infant acquires the concept of *object permanence.*

**c)** Also during this stage, *primary circular reactions* (repetitive behaviors that are set off by chance, centered on the infant’s own body) give way to *secondary circular reactions,* which are oriented to objects outside the infant’s body, and then to *tertiary circular reactions,* which are directed at producing interesting results.

**d)** By the end of this stage, children have developed mental representations that allow them to store and recall information, as shown in *deferred imitation* behaviors.

**2.** The **preoperational stage** lasts from roughly age 18 months to roughly age 7 years.

**a)** At this stage, the child has acquired the *semiotic function,* which allows the child to use one thing to stand for another.

**b)** Children at this age are rapidly acquiring a vocabulary of words reflecting their new thought capacities.

**c)** However, children at this age are *egocentric* in their thinking and have difficulty taking any viewpoint other than their own.

**d)** Preoperational thinking is *centered* on the child’s own perceptions and is also *static* (focused on states rather than changes).

**e)** Preoperational children lack *reversibility,* the ability to mentally “reverse” an action, which leads them to perform poorly in *conservation* tasks.

**3.** The **concrete operations** stage begins around the age of 6 or 7 and lasts until about the age of 11 or 12.

**a)** At this stage, thinking is *decentered,* allowing a child to attend to more information and take into account more aspects of a situation.

**b)** They acquire *reversibility* and the ability of *classification* during this stage.

**4.** The **formal operations** stage is the final stage of development, beginning in adolescence.

**a)** Adolescents show much more systematic thinking, allowing them to test hypotheses and keep track of results.

**b)** They can also think more abstractly than they could at the concrete operations stage.

**C.** Piaget’s theory has received criticism since the 1970s.

**1.** Critics have pointed out methodological problems with Piaget’s observations of infants (all done with his own children).

**2.** Other theorists have argued that the evidence for distinct stages is not strong.

**III.** Non-Piagetian Approaches to Cognitive Development

**A.** Many psychologists assert that cognitive abilities develop gradually rather than in discrete stages.

**1.** Some theorists use adult models of cognitive processes as a framework within which to understand how children process information.

**2.** Others focus on physiological factors that contribute to cognitive development.

**3.** Still others have rediscovered the work of Russian psychologist Vygotsky, who held that the environment (both physical and social) plays a huge role in the child’s ability to understand concepts.

**B.** Perceptual abilities are crucial to acquiring information about the world around us.

**1.** By 3 months of age, infants show surprise at “impossible events” and begin to show understand of basic principles of physical support.

**2.** Similarly, by the age of 6–7 months, infants shown evidence of using Gestalt principles of similarity to group objects.

**C.** Toddlers acquire syntax rapidly, without formal teaching.

**1.** This leads many developmental psychologists to speak of *language acquisition* rather than *language learning.*

**2.** Many agree with Chomsky’s idea that people are born with *language universals*; they are biologically prepared to learn a human language.

**3.** By the time children are stringing two-word utterances together (around the age of 2), they may be forming simple *pivot grammars* based on the language that they hear around them.

**4.** However, other psychologists argue that regularities in children’s two-word sentences are not evidence for rules of syntax, but for use of a small set of semantic relations between words.

**D.** Researchers also note the difference in use of memory *strategies* by older and younger children.

**1.** Younger children are less likely to rehearse material than older children are.

**2.** When children who do not spontaneously rehearse are induced to do so, their memory performance rises.

**E.** Reasoning abilities improve dramatically from middle to late childhood.

**1.** Osherson and Markman showed that first through sixth graders do not understand tautologies and contradictions, believing that a statement like “Either the chip in my hand is blue, or it is not blue” cannot be verified unless the chip is visible.

**2.** By tenth grade, students are likely to understand that such statements could be evaluated on formal logic alone.

**3.** However, other researchers have shown that even 4- and 5-year-olds can reason logically about syllogisms if problems are about make-believe animals (that is, if the children are not confused by preexisting knowledge).

**4.** Other studies indicate that, even when children can draw logical conclusions, they don’t fully appreciate the idea of validity before age 12 or so.

**IV.** Some Post-Piagetian Answers to the Question “What Develops?”

**A.** One important factor in cognitive development is neurological development.

**1.** Performance on object-permanence tasks correlates with development of the *prefrontal cortex.*

**2.** With development, the brain becomes more fine-tuned and organized.

**a)** Sensation and motor areas develop first.

**b)** Association areas develop a little more slowly.

**c)** Areas involved in top-down control of behavior are the last to develop.

**B.** Working memory capacity and processing speed also develop over time.

**1.** Memory span seems to increase with age.

**2.** Some theorists argue that what develops is not working memory capacity *per se,* but the speed or efficiency with which information is processed.

**C.** The development of attention span also impacts cognitive performance.

**1.** Young children have shorter attention spans than older children.

**2.** Kemler argues that with development, children shift from a **holistic** approach to processing information to a more **analytic** one.

**D.** The acquisition of knowledge is also a crucial aspect of cognitive development.

**1.** Knowledge helps a child acquire and organize new information more efficiently.

**2.** As children grow older, they develop longer and more elaborate scripts, which then help to support many cognitive activities.

**E.** Systematic approaches to cognitive tasks, called **strategies,** are another important development over time.

**1.** Young children are said to suffer from a *production deficiency,* in that they do not produce the appropriate strategy (such as rehearsal) for a given task (such as memorizing).

**2.** Younger children may find it harder to use a strategy than older children do.

**F.** Older children are also better than younger children at evaluating tasks and monitoring their own performance—abilities that are part of **metacognition.**

**1.** *Metacognitive knowledge* about your own strengths and weaknesses, cognitively, improves with age.

**2.** *Metacognitive experiences* help to develop your ability to perform well on cognitive tasks.

**3.** Children’s *theory of mind* (knowledge about the mental states of others) also develops gradually and is more strongly related to language ability than to memory.