Piaget’s Stages of Cognitive Development

Piaget’s theory of cognitive development states that our cognitive abilities develop through four specific stages.

LEARNING OBJECTIVE

- Differentiate between Piaget’s sensorimotor, preoperational, concrete operational, and formal operational stages of cognitive development

KEY POINTS

- Jean Piaget developed his cognitive-developmental theory based on the idea that children actively construct knowledge as they explore and manipulate the world around them.
- The four stages of Piaget's theory of cognitive development correspond with the age of the child; they include the sensorimotor, preoperational, concrete operational, and formal operational stages.
- The sensorimotor stage occurs from birth to age 2 and is characterized by the idea that infants "think" by manipulating the world around them.
- The preoperational stage occurs from age 2 to age 7 and is characterized by the idea that children use symbols to represent their discoveries.
- The concrete operational stage occurs from age 7 to age 11 and is characterized by the idea that children’s reasoning becomes focused and logical.
- The formal operational stage occurs from age 11 to adulthood and is characterized by the idea that children develop the ability to think in abstract ways.

TERMS

- transitivity
  The idea that if A is related to B, and B is related to C, then A must be related to C.
- assimilation
  The absorption of new ideas into an existing cognitive structure.
- deductive reasoning
  Inference in which the conclusion cannot be false given that the premises are true.
- object permanence
  The understanding (typically developed during early infancy) that an object still exists even when it disappears from sight or other senses.
The Swiss cognitive theorist Jean Piaget is one of the most influential figures in the study of child development. He developed his cognitive-developmental theory based on the idea that children actively construct knowledge as they explore and manipulate the world around them. Piaget was interested in the development of "thinking" and how it relates to development throughout childhood. His theory of four stages of cognitive development, first presented in the mid-20th century, is one of the most famous and widely-accepted theories in child cognitive development to this day.

Jean Piaget

*Piaget's theory of child development is still one of the most widely accepted in modern psychology.*

**Stages of Cognitive Development**

Piaget believed that as children grow and their brains develop, they move through four distinct stages that are characterized by differences in thought processing. In his research, he carefully observed children and presented them with problems to solve that were related to object permanence, reversibility, deductive reasoning, transitivity, and assimilation (described below). Each stage builds upon knowledge learned in the previous stage. Piaget's four stages correspond with the age of the children and are the *sensorimotor, preoperational, concrete operational,* and *formal operational* stages.
Piaget’s Stages of Cognitive Development

Jean Piaget’s theory of cognitive development includes four stages: sensorimotor, pre-operational, concrete operational, and formal operational.

**Sensorimotor Stage**

The sensorimotor stage occurs from birth to age 2. It is characterized by the idea that infants "think" by manipulating the world around them. This is done by using all five senses: seeing, hearing, touching, tasting, and smelling. Children figure out ways to elicit responses by "doing", such as pulling a lever on a music box to hear a sound, placing a block in a bucket and pulling it back out, or throwing an object to see what happens. Between 5 and 8 months old, the child develops **object permanence**, which is the understanding that even if something is out of sight, it still exists (Bogartz, Shinskey, & Schilling, 2000). For example, a child learns that even though his mother leaves the room, she has not ceased to exist; similarly, a ball does not disappear because a bucket is placed over it.

By the end of this stage, children are able to engage in what Piaget termed **deferred imitation**. This involves the ability to reproduce or repeat a previously-witnessed action later on; rather than copying it right away, the child is able to produce a mental representation of it and repeat the behavior later on. By 24 months, infants are able to imitate behaviors after a delay of up to three months.

**Preoperational Stage**

The preoperational stage occurs from age 2 to age 7. During this stage, children can use symbols to represent words, images, and ideas, which is why children in this stage engage in pretend play. A child’s arms might become airplane wings as she zooms around the room, or a child with a stick might become a brave knight with a sword. Language development and make-believe play begin during this stage. Logical thinking is still not present, so children cannot rationalize or understand more complex ideas.
Children at this stage are very egocentric, meaning they focus on themselves and how actions will impact them, rather than others. They are not able to take on the perspective of others, and they think that everyone sees, thinks, and feels just like they do.

Concrete Operational Stage

The concrete operational stage occurs from age 7 to age 11. It is characterized by the idea that children's reasoning becomes focused and logical. Children demonstrate a logical understanding of conservation principles, the ability to recognize that key properties of a substance do not change even as their physical appearance may be altered. For example, a child who understands the principles of conservation will recognize that identical quantities of liquid will remain the same despite the size of the container in which they are poured. Children who do not yet grasp conservation and logical thinking will believe that the taller or larger glass must contain more liquid.

Children begin to organize objects by classes and subclasses, and they can perform mathematical operations and understand transformations, such as addition is the opposite of subtraction and multiplication is the opposite of division. They still think in very linear ways and can only conceptualize ideas that can be observed directly—they have not yet mastered abstract thinking (described below). By the end of this stage, children will develop true mental operations and master the concepts of reversibility, transitivity, and assimilation. Reversibility is the idea that something can be changed back to its original state after it has been altered (for example, pouring water back and forth between two differently shaped glasses and still having the same amount of water). Transitivity is the concept of relation—for example, if A is related to B and B is related to C, then A must also be related to C. Finally, assimilation is the absorption of new ideas, information, or experiences into a person's existing cognitive structure, or what they already know or understand of the world.

Piaget determined that in this stage, children are able to incorporate inductive reasoning, which involves drawing inferences from observations in order to make a generalization. In contrast, children struggle with deductive reasoning, which involves using a generalized principle in order to try to predict the outcome of an event.

Formal Operational

The formal operational stage occurs from age 11 to adulthood. It is characterized by the idea that children develop the ability to think in abstract ways. This enables children to engage in the problem-solving method of developing a hypothesis and reasoning their way to plausible solutions. Children can think of abstract concepts and have the ability to combine various ideas to create new ones. By the end of this stage, children have developed logical and systematic thinking, are capable of deductive reasoning, and can create hypothetical ideas to explain various concepts.

Beyond Formal Operational Thought

As with other major contributors of theories of development, several of Piaget’s ideas have been challenged by later research. For example, several contemporary studies support a model of
development that is more continuous than Piaget’s discrete stages (Courage & Howe, 2002; Siegler, 2005, 2006). Many others suggest that children reach cognitive milestones earlier than Piaget describes (Baillargeon, 2004; de Hevia & Spelke, 2010).

Many developmental psychologists suggest a fifth stage of cognitive development, known as the postformal stage (Basseches, 1984; Commons & Bresette, 2006; Sinnott, 1998). In postformal thinking, decisions are made based on situations and circumstances, and logic is integrated with emotion as adults develop principles that depend on contexts. One way that we can see the difference between an adult in postformal thought and an adolescent in formal operations is in terms of how they handle emotionally charged issues.

It seems that once we reach adulthood, our problem-solving abilities change: as we attempt to solve problems, we tend to think more deeply about many areas of our lives, such as relationships, work, and politics (Labouvie-Vief & Diehl, 1999). Because of this, postformal thinkers are able to draw on past experiences to help them solve new problems. Problem-solving strategies using postformal thought vary depending on the situation. Adults can recognize, for example, that what seems to be an ideal solution to a disagreement with a coworker may not be the best solution for a disagreement with a romantic partner.