

Stage Theory of Cognitive Development

General

Stage theory of cognitive development (also known as *developmental stage theory* or *genetic epistemology*¹⁾) was introduced by Swiss child psychologist [Jean Piaget](#) in the 1950s. This theory describes **development of cognitive processes** which are key to understanding, but also constrain of learning. According to Piaget,

- *"Learning is no more than a sector of cognitive development that is facilitated by experience."*²⁾

What is stage theory of cognitive development?

In 1947³⁾ Piaget has first introduced his **four stages** of human cognitive development: sensorimotor, preoperational, concrete, and formal, as they are described below. Ages describing when which stage occurs are the average values.

- **Sensorimotor period** (birth to 2 years): In this stage cognitive system of an infant is limited to **motor reflexes**, but also some more complex procedures built on those reflexes. Infant interacts with the environment, learns to understand the world and is acquiring the capacity for internalized thinking.
- **Preoperational period** (2 to 7 years): Children now **develop language** and **mental imagery skills**, but still cannot conceptualize abstractly and don't have sense of time. Intelligence becomes less egocentric and more socialized. A child can now think about events and things that aren't present in the moment of speaking. He can see the world only from his perspective and assumes other do so as well. Teaching a child in this stage must take into account his not fully understand concepts of time phenomenon.
- **Concrete-operational period** (7 to 11 years): Children in this stage of development are able to analyze more perspectives simultaneously. Much of learning is performed through assimilation. Although they can **understand concrete problems** and develop reasoning skills, according to Piaget they still cannot analyze abstract problems and all of their logical consequences.
- **Formal-operational period** (11 to adolescence) : Piaget claims that the final form of cognition is reached in this stage. Abstract thinking capabilities in this stage are very similar to ones of adults. Individual at this stage is also capable of hypothetical and deductive but also reflective and analytical **reasoning skills**. This is supposed to be the final stage of cognitive development and although the knowledge base of an individual is still to be expanded, his thinking capabilities are now as strong as they would get.

The importance of the Piaget's stage model are the **constraints** that stage of cognitive development sets **on learning**. These constraints mean that what can be learned depends on the current developmental stage. One should be taught to apply developed cognitive structures to new material, but to learn new strategies first the related cognitive structure has to evolve.

Learning according to Piaget takes place through two processes: **absorbing** into the existing schemata (mental constructs which individuals use to organize and adapt to environment), and **accommodating** when schema change is required.⁴⁾

Piaget was also concerned with the instructional methodology for children where he was a proponent of:

- **Naturalism** - a belief that **natural learning is always the best learning**. Origins of this idea can be traced back to as far back as [Jean Jacques Rousseau](#) and it means that the best learning occurs through **everyday processes** and **spontaneous acquisition** of operations or concepts through normal experience. This idea seemed intuitively it was at the time accepted even without experimental validation.
- **Constructivism** - Piaget was a constructivist theorist suggesting children **construct** their knowledge through **interaction of their biological predispositions with their experience**. **Active self-discovery** of rules underlying current concepts and outcomes is the key to learning.

These assumptions made Piaget believe that learning using tutoring procedures was ineffective, and that constructive learning should provide much better results. Still, research has soon shown that both assumptions were generally incorrect.

What is the practical meaning of stage theory of cognitive development?

Piaget's theory suggests that in order to make learning effective,

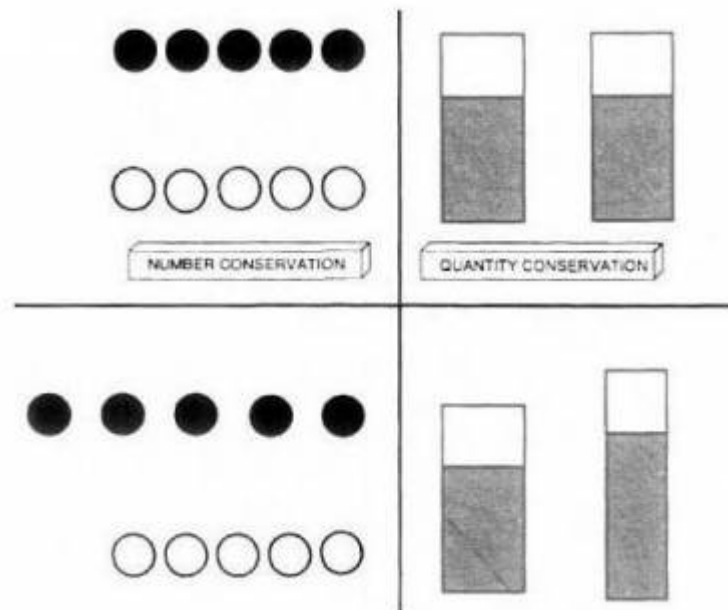
- learner's stage of cognitive development needs to be taken into account or it all be just a waste of time,
- no forced steps forward should be made,
- learning should occur in natural everyday conditions through active experimentation.

Aside from that, Piaget was mostly orientated on learning in

- preoperational period - when children should and can **actively** engage in **learning and exploring**, and
- concrete-operational period - when learning is facilitated through an opportunity to ask **questions** and get **explanations** which allow learner to mentally manipulate information.

What should also be taken into consideration is that although all children go through the same steps during their development, that do it at different rates. Educational process should therefore be more **focused on individuals and small groups** within a class than to the class as a whole unit.

Criticism



One of the suggested ways of measuring the border between preoperational and concrete-operational period Piaget suggested were **conservation experiments**. For example, two equal glasses filled with liquid are presented to a child, after which liquid out of one glass is poured into a third, more narrow glass. The child is then asked which glass holds more liquid. Only a child in the concrete- or formal-operational period should realize both glasses hold equal amount of liquid.

But although according to Piaget's theory, these stage differences cannot be overcome using any kind of training, a number of experiments⁵⁾ have proved the opposite. The child's **ability to learn** (at least for conservation concepts) **is not so strictly defined by his current stage of cognitive development** in accordance with Piaget's theory.

Experiments have also shown that other methods of teaching including tutoring or social learning through observation were at least as successful as learning by self-discovery.

As the result criticisms of Piaget usually emphasized that,

- his development stages are **oversimplified** or **underestimating abilities of children**
- nor him or his coworkers didn't leave an instrument for diagnosing child's current stage of cognitive development,
- his **experiments** were **not designed carefully enough** to exclude other explanations,
- he offered to **little evidence** for his theory, and that
- he didn't address important questions like **social and motivational influences** on cognitive development.

Keywords and most important names

- **Sensorimotor stage, preoperational stage, preoperational stage, formal operations, cognitive development**
- [Jean Piaget](#)

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¹⁾ 'Genetic' here refers to the genesis and development of knowledge, not to biological heredity.

²⁾ Piaget, J. Piaget's theory. In P. H. Mussen (Ed.), Carmichael's manual of child psychology (Vol. 1). New York: Wiley, 1970.

³⁾ Piaget, J. The Psychology of Intelligence. 1947.

⁴⁾ Piaget also uses concepts of schema and schemata, later expanded by Anderson. See: [Schema theory](#)

⁵⁾ For details see: [Zimmerman, Barry J., and Dale H. Schunk. Educational psychology: a century of contributions. Routledge, 2003.](#)

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