SimplyPsychology

Jean Piaget's Theory of Cognitive Development

By Saul McLeod, published June 06, 2018

Piaget's (1936) theory of cognitive development explains how a child constructs a mental model of the world. He disagreed with the idea that intelligence was a fixed trait, and regarded cognitive development as a process which occurs due to biological maturation and interaction with the environment.

Piaget was employed at the Binet Institute in the 1920s, where his job was to develop French versions of questions on English intelligence tests. He became intrigued with the reasons children gave for their wrong answers to the questions that required logical thinking. He believed that these incorrect answers revealed important differences between the thinking of adults and children.

Piaget (1936) was the first psychologist to make a systematic study of cognitive development. His contributions include a stage theory of child cognitive development, detailed observational studies of cognition in children, and a series of simple but ingenious tests to reveal different cognitive abilities.

What Piaget wanted to do was not to measure how well children could count, spell or solve problems as a way of grading their I.Q. What he was more interested in was the way in which fundamental concepts like the very idea of number, time, quantity, causality, justice and so on emerged.

Before Piaget's work, the common assumption in psychology was that children are merely less competent thinkers than adults. Piaget showed that young children think in strikingly different ways compared to adults.

According to Piaget, children are born with a very basic mental structure (genetically inherited and evolved) on which all subsequent learning and knowledge are based.

Piaget's theory differs from others in several ways:

1. It is concerned with children, rather than all learners.

2. It focuses on development, rather than learning per se, so it does not address learning of information or specific behaviors.

3. It proposes discrete stages of development, marked by qualitative differences, rather than a gradual increase in number and complexity of behaviors, concepts, ideas, etc.

The goal of the theory is to explain the mechanisms and processes by which the infant, and then the child, develops into an individual who can reason and think using hypotheses.

To Piaget, cognitive development was a progressive reorganization of mental processes as a result of biological maturation and environmental experience.

Children construct an understanding of the world around them, then experience discrepancies between what they already know and what they discover in their environment.

There are three basic components to Piaget's cognitive theory:

1. **Schemas**
(building blocks of knowledge).

2. **Adaptation processes** that enable the transition from one stage to another (equilibrium, assimilation, and accommodation).

3. **Stages of Cognitive Development**:
   o [sensorimotor](#),
   o [preoperational](#),
   o [concrete operational](#),
   o [formal operational](#).

Schemas

Imagine what it would be like if you did not have a mental model of your world. It would mean that you would not be able to make so much use of information from your past experience or to plan future actions.

Schemas are the basic building blocks of such cognitive models, and enable us to form a mental representation of the world. Piaget (1952, p. 7) defined a schema as:

> "a cohesive, repeatable action sequence possessing component actions that are tightly interconnected and governed by a core meaning."

In more simple terms Piaget called the schema the basic building block of intelligent behavior – a way of organizing knowledge. Indeed, it is useful to think of schemas as "units" of knowledge, each relating to one aspect of the world, including objects, actions, and abstract (i.e., theoretical) concepts.

Wadsworth (2004) suggests that schemata (the plural of schema) be thought of as 'index cards' filed in the brain, each one telling an individual how to react to incoming stimuli or information.

When Piaget talked about the development of a person's mental processes, he was referring to increases in the number and complexity of the schemata that a person had learned.

When a child's existing schemas are capable of explaining what it can perceive around it, it is said to be in a state of equilibrium, i.e., a state of cognitive (i.e., mental) balance.

Piaget emphasized the importance of schemas in cognitive development and described how they were developed or acquired. A schema can be defined as a set of linked mental representations of the world, which we use both to understand and to respond to situations. The assumption is that we store these mental representations and apply them when needed.

For example, a person might have a schema about buying a meal in a restaurant. The schema is a stored form of the pattern of behavior which includes looking at a menu, ordering food, eating it and paying the bill. This is an example of a type of schema called a 'script.' Whenever they are in a

restaurant, they retrieve this schema from memory and apply it to the situation.

The schemas Piaget described tend to be simpler than this - especially those used by infants. He described how - as a child gets older - his or her schemas become more numerous and elaborate.

Piaget believed that newborn babies have a small number of innate schemas - even before they have had many opportunities to experience the world. These neonatal schemas are the cognitive structures underlying innate reflexes. These reflexes are genetically programmed into us.

For example, babies have a sucking reflex, which is triggered by something touching the baby's lips. A baby will suck a nipple, a comforter (dummy), or a person's finger. Piaget, therefore, assumed that the baby has a 'sucking schema.'

Similarly, the grasping reflex which is elicited when something touches the palm of a baby's hand, or the rooting reflex, in which a baby will turn its head towards something which touches its cheek, are innate schemas. Shaking a rattle would be the combination of two schemas, grasping and shaking.

Assimilation and Accommodation

Jean Piaget (1952; see also Wadsworth, 2004) viewed intellectual growth as a process of **adaptation** (adjustment) to the world. This happens through:

Assimilation

Which is using an existing schema to deal with a new object or situation.

Accommodation

This happens when the existing schema (knowledge) does not work, and needs to be changed to deal with a new object or situation.

Equilibration

This is the force which moves development along. Piaget believed that cognitive development did not progress at a steady rate, but rather in leaps and bounds.

Equilibrium occurs when a child's schemas can deal with most new information through assimilation. However, an unpleasant state of disequilibrium occurs when new information cannot be fitted into existing schemas (assimilation).
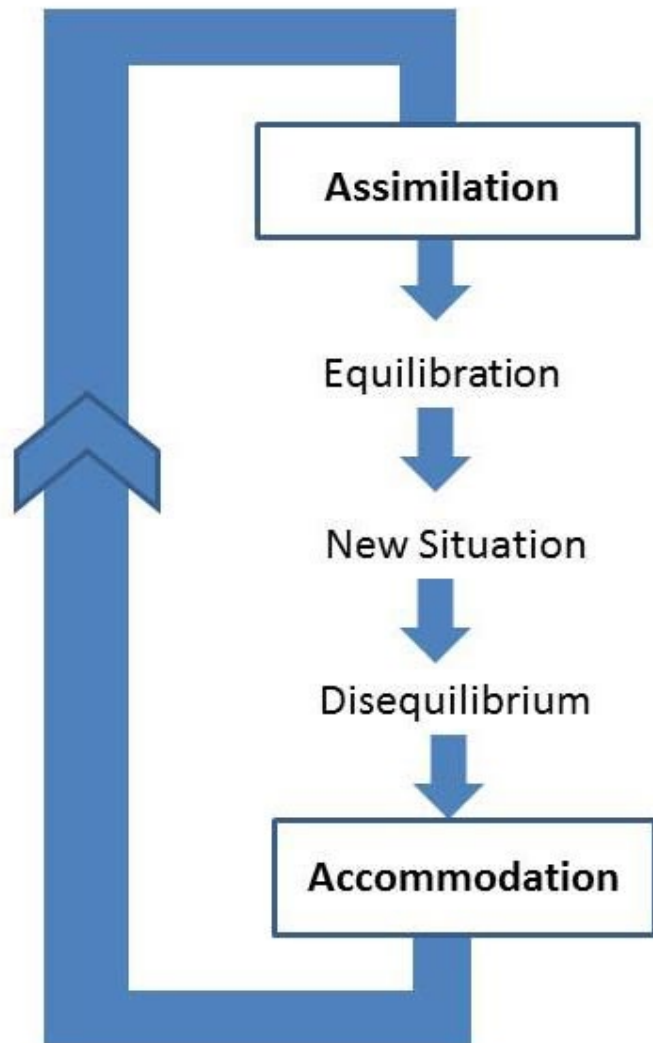
Equilibration is the force which drives the learning process as we do not like to be frustrated and will seek to restore balance by mastering the new challenge (accommodation). Once the new information is acquired the process of assimilation with the new schema will continue until the next time we need to make an adjustment to it.

Example of Assimilation

A 2-year-old child sees a man who is bald on top of his head and has long frizzy hair on the sides. To his father's horror, the toddler shouts "Clown, clown" (Siegler et al., 2003).

Example of Accommodation

In the "clown" incident, the boy's father explained to his son that the man was not a clown and that even though his hair was like a clown's, he wasn't wearing a funny costume and wasn't doing silly things to make people laugh.

With this new knowledge, the boy was able to change his schema of "clown" and make this idea fit better to a standard concept of "clown".

Piaget's 4 Stages of Cognitive Development

Piaget proposed four stages of cognitive development which reflect the increasing sophistication of children's thought:

1. Sensorimotor stage (birth to age 2)
2. Preoperational stage (from age 2 to age 7)
3. Concrete operational stage (from age 7 to age 11)
4. Formal operational stage (age 11+ - adolescence and adulthood)

Each child goes through the stages in the same order, and child development is determined by biological maturation and interaction with the environment.

Although no stage can be missed out, there are individual differences in the rate at which children progress through stages, and some individuals may never attain the later stages.

Piaget did not claim that a particular stage was reached at a certain age - although descriptions of the stages often include an indication of the age at which the average child would reach each stage.

Sensorimotor Stage (Birth-2 yrs)

The main achievement during this stage is object permanence - knowing that an object still exists, even if it is hidden.

It requires the ability to form a mental representation (i.e., a schema) of the object.

Preoperational Stage (2-7 years)

During this stage, young children can think about things symbolically. This is the ability to make one thing - a word or an object - stand for something other than itself.
Thinking is still egocentric, and the infant has difficulty taking the viewpoint of others.

Concrete Operational Stage (7-11 years)

Piaget considered the concrete stage a major turning point in the child's cognitive development because it marks the beginning of logical or operational thought.

This means the child can work things out internally in their head (rather than physically try things out in the real world).

Children can conserve number (age 6), mass (age 7), and weight (age 9). Conservation is the understanding that something stays the same in quantity even though its appearance changes.

Formal Operational Stage (11 years and over)

The formal operational stage begins at approximately age eleven and lasts into adulthood.

During this time, people develop the ability to think about abstract concepts, and logically test hypotheses.

Educational Implications

Piaget (1952) did not explicitly relate his theory to education, although later researchers have explained how features of Piaget's theory can be applied to teaching and learning.

Piaget has been extremely influential in developing educational policy and teaching practice. For example, a review of primary education by the UK

government in 1966 was based strongly on Piaget's theory. The result of this review led to the publication of the Plowden report (1967).

Discovery learning – the idea that children learn best through doing and actively exploring - was seen as central to the transformation of the primary school curriculum.

'The report's recurring themes are individual learning, flexibility in the curriculum, the centrality of play in children's learning, the use of the environment, learning by discovery and the importance of the evaluation of children's progress - teachers should 'not assume that only what is measurable is valuable.'

Because Piaget's theory is based upon biological maturation and stages, the notion of 'readiness' is important. Readiness concerns when certain information or concepts should be taught. According to Piaget's theory children should not be taught certain concepts until they have reached the appropriate stage of cognitive development.

According to Piaget (1958), assimilation and accommodation require an active learner, not a passive one, because problem-solving skills cannot be taught, they must be discovered.

Within the classroom learning should be student-centered and accomplished through active discovery learning. The role of the teacher is to facilitate learning, rather than direct tuition. Therefore, teachers should encourage the following within the classroom:

- o Focus on the process of learning, rather than the end product of it.
- o Using active methods that require rediscovering or reconstructing "truths."
- o Using collaborative, as well as individual activities (so children can learn from each other).

o Devising situations that present useful problems, and create disequilibrium in the child.

o Evaluate the level of the child's development so suitable tasks can be set.

Critical Evaluation

Support

- The influence of Piaget's ideas in developmental psychology has been enormous. He changed how people viewed the child's world and their methods of studying children.

  He was an inspiration to many who came after and took up his ideas. Piaget's ideas have generated a huge amount of research which has increased our understanding of cognitive development.

- His ideas have been of practical use in understanding and communicating with children, particularly in the field of education (re: Discovery Learning).

Criticisms

- Are the stages real? Vygotsky and Bruner would rather not talk about stages at all, preferring to see development as a continuous process. Others have queried the age ranges of the stages. Some studies have shown that progress to the formal operational stage is not guaranteed.

  For example, Keating (1979) reported that 40-60% of college students fail at formal operation tasks, and Dasen (1994) states that only one-third of adults ever reach the formal operational stage.

- Because Piaget concentrated on the universal stages of cognitive development and biological maturation, he failed to consider the effect that the social setting and culture may have on cognitive development.

  Dasen (1994) cites studies he conducted in remote parts of the central Australian desert with 8-14 year old Aborigines. He gave them conservation of liquid tasks and spatial awareness tasks. He found that the ability to conserve came later in the aboriginal children, between aged 10 and 13 (as opposed to between 5 and 7, with Piaget's Swiss sample).

  However, he found that spatial awareness abilities developed earlier amongst the Aboriginal children than the Swiss children. Such a study demonstrates cognitive development is not purely dependent on maturation but on cultural factors too – spatial awareness is crucial for nomadic groups of people.

  [Vygotsky](), a contemporary of Piaget, argued that social interaction is crucial for cognitive development. According to Vygotsky the child's learning always occurs in a social context in co-operation with someone more skillful (MKO). This social interaction provides language opportunities and language is the foundation of thought.

- Piaget's methods (observation and clinical interviews) are more open to biased interpretation than other methods. Piaget made careful, detailed naturalistic observations of children, and from these he wrote diary descriptions charting their development. He also used clinical interviews and observations of older children who were able to understand questions and hold conversations.

  Because Piaget conducted the observations alone the data collected are based on his own subjective interpretation of events. It would have been more reliable if Piaget conducted the observations with another

researcher and compared the results afterward to check if they are similar (i.e., have inter-rater reliability).

Although clinical interviews allow the researcher to explore data in more depth, the interpretation of the interviewer may be biased. For example, children may not understand the question/s, they have short attention spans, they cannot express themselves very well and may be trying to please the experimenter. Such methods meant that Piaget may have formed inaccurate conclusions.

- As several studies have shown Piaget underestimated the abilities of children because his tests were sometimes confusing or difficult to understand (e.g., Hughes, 1975).

  Piaget failed to distinguish between competence (what a child is capable of doing) and performance (what a child can show when given a particular task). When tasks were altered, performance (and therefore competence) was affected. Therefore, Piaget might have underestimated children's cognitive abilities.

  For example, a child might have object permanence (competence) but still not be able to search for objects (performance). When Piaget hid objects from babies he found that it wasn't till after nine months that they looked for it. However, Piaget relied on manual search methods – whether the child was looking for the object or not.

  Later, research such as Baillargeon and Devos (1991) reported that infants as young as four months looked longer at a moving carrot that didn't do what it expected, suggesting they had some sense of permanence, otherwise they wouldn't have had any expectation of what it should or shouldn't do.

- The concept of schema is incompatible with the theories of Bruner (1966) and Vygotsky (1978). Behaviorism would also refute Piaget's

schema theory because is cannot be directly observed as it is an internal process. Therefore, they would claim it cannot be objectively measured.

- Piaget studied his own children and the children of his colleagues in Geneva in order to deduce general principles about the intellectual development of all children. Not only was his sample very small, but it was composed solely of European children from families of high socio-economic status. Researchers have therefore questioned the generalisability of his data.

- For Piaget, language is seen as secondary to action, i.e., thought precedes language. The Russian psychologist [Lev Vygotsky](#) (1978) argues that the development of language and thought go together and that the origin of reasoning is more to do with our ability to communicate with others than with our interaction with the material world.

How to reference this article:

McLeod, S. A. (2018, June 06). *Jean Piaget's theory of cognitive development*. Retrieved from
https://www.simplypsychology.org/piaget.html

APA Style References

Baillargeon, R., & DeVos, J. (1991). Object permanence in young infants: Further evidence. *Child development*, 1227-1246.

Bruner, J. S. (1966). *Toward a theory of instruction*. Cambridge, Mass.: Belkapp Press.

Dasen, P. (1994). Culture and cognitive development from a Piagetian perspective. In W .J. Lonner & R.S. Malpass (Eds.), *Psychology and culture* (pp. 145–149). Boston, MA: Allyn and Bacon.

Hughes , M. (1975). *Egocentrism in preschool children*. Unpublished doctoral dissertation. Edinburgh University.

Inhelder, B., & Piaget, J. (1958). *The growth of logical thinking from childhood to adolescence*. New York: Basic Books.

Keating, D. (1979). Adolescent thinking. In J. Adelson (Ed.), *Handbook of adolescent psychology* (pp. 211-246). New York: Wiley.

Piaget, J. (1932). *The moral judgment of the child*. London: Routledge & Kegan Paul.

Piaget, J. (1936). *Origins of intelligence in the child*. London: Routledge & Kegan Paul.

Piaget, J. (1945). *Play, dreams and imitation in childhood*. London: Heinemann.

Piaget, J. (1957). *Construction of reality in the child*. London: Routledge & Kegan Paul.

Piaget, J., & Cook, M. T. (1952). *The origins of intelligence in children*. New York, NY: International University Press.

Siegler, R. S., DeLoache, J. S., & Eisenberg, N. (2003). *How children develop*. New York: Worth.

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Wadsworth, B. J. (2004). *Piaget's theory of cognitive and affective*

development: Foundations of constructivism. New York: Longman.

Plowden, B. H. P. (1967). *Children and their primary schools: A Report* (Research and Surveys). London, England: HM Stationery Office