

Cognitive Development Assessment

Cognitive development is the area that is concerned with the manner in which human intelligence develops (Sternberg, 1984). Jean Piaget brought forward this theory that is today known as Developmental Stage Theory. This theory looks into the manner in which human beings obtain, internalize, and utilize knowledge (Sternberg, 1984). Piaget argues that cognitive development comes about from the way mental processes are reorganized in relation to biological development and external influence from the environment.

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A child may learn something and believe it is the right thing to do; the experience learnt in life may alter the belief they already hold of something. In this sense, this child will have to reorganize the mental processes in order to accommodate the shocks that may arise from more discoveries that things have a possibility of not being what they have been initially. Piaget illustrates stages of cognitive developments that a human being goes through in order to achieve the highest intelligence accolades. There are three components of this theory:

1. Schemas. These are the blocks or milestones that build up knowledge (Sternberg, 1984).
2. Equilibrium, assimilation and accommodation. These are the basic functions that allows for the systematic development of knowledge from one stage to the next.

3. The four key stages of development.

The sensory motor period begins at birth and lasts up to two years (Sternberg, 1984). At this stage, a child learns the basics of neurological coordination, how to grasp things, and to perform repetitive tasks to produce a sequence of activities. A child learns how to hold and play with objects. The second period lasts from the age of two to seven years (Kiel, 1989). It is the Pre-Operational stage. This stage begins with verbal representations and slowly advances to a level when the child develops simple logical sequences. This is to mean that they do not have to understand all the rules of a given situation but they know what to do or not to do. The third stage is the concrete operational stage. The child develops organization, reasons logically, and can classify objects. This is the stage at which the child develops the concept of conservation. In the fourth stage known as the formal operational stage, the child develops abstract thinking and starts incorporating formal logic. Their thinking patterns deviate from the reality. Understanding the stages of cognitive development is essential for parents. It allows them to know what is normal and what can be abnormal during the development of their children. In his study, Piaget lays emphasis on the working nature and development of the mind of a child. His research is focused on maturation. He argues that a child goes through concrete stages before attaining emotional and physical independence.

Conservation stage comes about during the phase of concrete operations. At this stage, children develop logical thinking. At this level, a child knows that a quantity is a constant despite the alterations that may occur in the substance or container. The tasks in this stage involve those that seek to show the child that a substance, an object, or quantity remains constant even after a physical transformation occurs. At this stage, a child should be in a position to know that a plaster of Paris remains the same even after its transformation into various shapes. A liter of

water is the same when placed into a bottle or in a rectangular container. A child should know that quantities and properties of substances remain constant despite different circumstances under which substances may be available. Piaget's famous conservation test that came up with the principle of invariance was subjected to great criticism. In this famous test, two beakers are filled with two liquids of same color and quantity. The contents are put into a different thinner beaker. The child is given a task of determining if the amount of the liquid remains constant. According to Piaget, inability to identify that the liquid remains constant arises out of the child's pre-operational state of the mind that does not allow the child to see the reversibility of substance in question. Critics claim that this test is extremely complex given that this stage includes children of ages 7 to 12.

They maintain that cultural orientation and expectations may inform such confusion. The child's environment influences the response that he/she may give in relation to such a test. A child from a desert may be more conversant with matters of sand than that of water due to familiarity. A case of a kilogram of wool and stone is elaborate in this scenario. In relation to the expected outcome, the ages under consideration are questioned as the ability to give a correct answer is more a question of intelligence rather than of an expected cognitive ability. A fairly bright child may get confused by the fact that a kilogram of stone is just as heavy as a kilogram of cotton just from the physical appearance. Therefore, making conclusions on the basis of such complex tests is not advisable. According to Kiel (1989), cross-cultural experiences also contribute to differences in expected responses. Children from very conservative backgrounds where there exists a fear form of relationships between the young and the old may respond in accordance to how the question comes or what answer they think adults expect from them and

not what they think of the situation. Repetition of the question may lead to the child altering the response with the thought that the question keeps on popping up due to a wrong answer.

Basic concepts acquired in the conservation stage are influential because they will inform all conservation in life. Researchers have also found out that there are differences in the age at which children grasp the concept of conservation, Those from developed nations adopt conservation on the same level unlike their age mates from less developed economies. This is a clear indicator that exposure to information may be an important factor in determining the age at which children from different economic backgrounds develop this cognitive milestone. Conservation expects a child to differentiate between the necessary truth, based on what is acceptable by the society, and contingent truth.

Seriation occurs at the third stage, i.e. the phase of Concrete operations. The child exhibits increased logic at this stage and can sort out objects according to color, shape, and size. (Kiel, 1989). This implies that the child can pick out objects from a mixed jargon and rearrange them in order of preference. This is an exhibition of a higher level of mental processing capacity. In a buffet, a child who has developed seriation can serve vegetarian food from the variety. Alternatively, he/she may eat only beans from a mixture of maize and beans. However, it is difficult to assert that a child who can sort out objects from a mixed situation and rearrange them according to shapes and colors has developed seriation. This is because the arrangement of similar objects in a similar place or manner away from others may be informed by other factors such as artistic talents or attraction to colors. Research is yet to prove the extent of this theory that a child with pens and pencils has the same casing. Justification will occur if a child will be able to differentiate pens according to colors without looking at tips.

Classification stage exhibits ability to name and classify objects according to given characteristics. At this stage, a child believes that given objects can be a part of or can accommodate other sets of objects. Children can impose other objects on structures around them. Kiel (1989) in his studies found that the relationship between objects is manifested in a more complex manner using two sets of classification.

Hierarchical Classification

At this point, children will add classes to those they already know, but concrete application of these added objects will begin only in adolescence. A typical example is a mathematics problem. A child who is familiar with $1+1$ will gradually accept and reconcile with the fact that there can exist $1+1+4+2$, though the mind may not be ready to tackle it until later. The child may be in a position to attempt such a sum.

Matrix Classification

This form of classification involves the multiplication of classes. Children are able to group and identify objects in an incomplete matrix.

This theory reasons that children learn how to classify objects early in life, but it is until later in life that they learn how to effectively classify information. Children in middle school have a good mastery of classification skills because they have overcome the problem of centration (Kiel 1989).

Piaget's stages of development have met critics from many sides. Piaget himself acknowledged the fact that development does not always occur in a smooth manner as he depicts it in his theories. He argues that different circumstances under which children grow up determine their levels of development. According to Sternberg (1984), children have been able to master some skills associated with older ages in some instances. Recent work and schools of knowledge

have come up with new neo-scientific findings that were not present during the time of Piaget. The new school argues that domains of knowledge develop as children acquire and assimilate knowledge. The acquisition of knowledge cannot happen to all children of a given age group due to socio-economic reasons. This explains the disparity that may arise in Piaget's theories.

References

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