

Cognitive Development

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Cognitive development- age related changes eg how children think and behave differently as they get older

Key Concepts

Development is built on thought processes or schemas. Schemas are what every child uses as it interacts with its new, outside world. All the ideas, memories and information about a particular object or thing that a child comes into contact with are sorted into two patterns in the brain.

These are like mental blueprints that link things and behaviours. They form the building blocks of thinking and children pick these up and recognise them from birth.

Children start to realise that certain actions go best with certain objects.

Piaget found that the development of a child's ability to think went through the same stages in a fixed or invariant order, like an alphabet or counting from one to ten. These stages could more or less be tied to the ages of children. This pattern was also universal to all children, everywhere.

Invariant Stages- The same stages in a fixed order, that the child's ability to think goes through.

Universal Stages- The pattern or order of the development of thinking that is the same for all children everywhere.

Interestingly, even though different children may experience different cultures, upbringing and education- he found that it had no effect on cognitive development.

The stages of cognitive development are:

The **sensori-motor stage**- from birth to two years old

The **pre-operational stage**- from 2-7 years old

The **concrete operational** stage- from 7-11 years old

The **formal operational stage**- from about 11 years old and onwards

Core theory- Piaget

Piaget noticed that children of the same age often got the same things wrong. He established that they were thinking alike- but that this changed with age. Piaget observed his children at home and kept detailed diaries of things that they said and did as they matured. He also invented a number of tasks to experiment on other children's thinking at different ages and stages.

Finally, Piaget observed how children solved problems in their natural settings, such as their cribs, sandboxes and playgrounds. He watched them solve problems and asked them to explain the reasoning behind their decisions. From all of this evidence, Piaget went on to collate a general stage theory of cognitive development.

- Stage theory
- Development follows an invariant order or pattern,
- The behaviour in question gets better by the stage.
- The pattern is true for everyone- it is universal.

Infants are not just passive observers, but are actively involved in making sense of what they see, hear, feel and discover. Piaget went on to propose that most children develop their thinking in clear stages. He came up with the four stages of cognitive development.

The sensori-motor stage (0-2)

Thoughts and behaviour are generally the same. Babies spend time examining their surroundings and placing objects into schemas in their minds, through actions that often cause mayhem for the parents. The baby learns to make sense of the information coming in through the senses.

Features of the sensori-motor stage-

- Body Schema- Infant realises that it exists physically and it can recognise itself in a photograph/mirror
- Motor co-ordination- The infant learns to co-ordinate different body parts
- Object permanence- The infant knows that an object or person still exists even if they cannot be seen. When a newborn baby cannot see that thing or person, they do not exist to them anymore. However at around 8 months old babies will look for hidden objects because they have developed object permanence.

The pre-operational stage (2-7)

- Animism- Children at this stage treat inanimate objects as if they are alive, just like themselves.
- Reversibility- A child at this stage cannot work backwards in their thinking.
- Egocentrism- Seeing and thinking of the world only from your point of view. Children entering this stage cannot appreciate somebody else's point of view.

At the end of this stage, children move into the concrete operational stage, their egocentrism is no longer active in their thinking. This is called de-centring. De-centration means that a child understands more than one feature of a situation or object. For example categorising objects by size and colour.

Three mountains experiment-

Three paper mache mountains were put on a table. Each mountain had a different object on top. The child was given a chance to walk around the table and look at the mountains from all angles, then they sat down at one side, while a small doll was placed on the other side of the mountains. The child had to choose from a set of cards, the card that showed what the doll could see. Most children under seven chose the card representing their view. This is an example of egocentric thinking.

The concrete operational stage (7-11)

The growing child overcomes- egocentrism, drops animism and can think backwards.

They also develop-

- Linguistic humour- When children can start understanding and enjoying word games and double meanings. Children will giggle and ask the same questions over and over again.
- Seriation- The ability to put things in order
- Conservation- When children know that the properties of certain objects remain the same even if the objects appear to change. Children at the pre-operational stage don't manage to hold on or conserve what they see if something appears to have changed in some way. (Beakers and glasses of water, same volume, different sized containers.)

Children can conserve and order things as long as they are concrete.

The formal operational stage- (11 and onwards)

Adolescents develop the lifelong ability to think about and solve abstract problems. They develop thinking and reasoning and can compare things such as different theories. They develop hypothetical thinking and can solve problems logically and perhaps scientifically.

Criticisms of Piaget's theory

- The cognitive stages are not as fixed or rigid as Piaget proposed. Some children flick into different stages depending on the circumstances.
- There is no guarantee that people develop through all of the stages. Some researchers argue that only around 50% of adults make it to the formal operational stage at all.

- Development is not an automatic biological process. Piaget may have underestimated the role of parents and other people in intellectual development.
- Piaget ignored different kinds of thinking. Not all thinking is logic/problem solving. He ignored creativity and arts.
- Thinking does not develop in the same way for children everywhere. Aboriginal children develop concrete operational behaviours (useful for survival) much earlier than European children.
- Piaget only describes the kind of thinking that a child can and cannot do, he does not explain how these changes in thinking occur. Some critics argue that this does not make it a proper theory as theories should offer an explanation to how things happen.

Vygotsky

Vygotsky argued that children are born with considerable thinking abilities, but their cognitive development takes place within their culture. The origin of cognitive development does not lie in maturation but in social and cultural influences.

The key concept is that the child picks up tools for thinking such as language, number systems and ideas and these are developed around them in the home. He called this - cultural tools. He believed that our culture teaches us how to think as well as what to think.

We become ourselves through others essentially, being helped forward in thinking by the people around us.

Vygotsky emphasised that everyone is born with their own potential for becoming a fully fledged human being and that other people around us can help us realise that potential. He used the term zone of proximal development.

Zone of proximal development- The gap between where a child is in their learning and where they can potentially get to with the help and support of others.

The word used to stand for this learning through others is scaffolding, a support frame to allow the developing child to get on safely with learning and thinking.

Everyone's cognitive development happens at an individual pace, helped on by significant people around them in their culture. This differs from Piaget's view which assumed that cognitive development progresses naturally.

Core study

Procedure: Piaget used a cross sectional study in his experiment on conservation. He compared children of different ages. Children were shown one at a time two identical parallel rows of counters, with the counters opposite and facing each other one to one.

The researcher then changed the layout of the counters as each child watched, stretching one row out but not removing or adding any counters to either row. The children were then asked one at a time which of the two rows had more counters.

Findings: Children in the preoperational stage tended to say that the stretched row had more counters because it was longer. Children in the concrete operational stage did largely get it right. They knew that the lines were still identical in number of counters and they knew that appearances can be deceiving.

Limitations:

- Piaget was criticised on the way he asked the questions to the children in the experiments- the children were asked twice which usually means that they are wrong. In other research when children were only asked once, a far greater number got the correct answer.
- Piaget was criticised for the nature of the task- the task had no meaning for the children and when a game was played involving 'naughty teddy' 60% of children in the preoperational stage passed the conservation test. The test had been made child friendly and contradicted Piaget.
- Piaget used a relatively small sample of children, they may not be representative of all children. This was a problem since Piaget claimed these stages were universal.

Applications- applied to education and schooling

Piaget:

Readiness- Children can only learn what their current cognitive stage allows them to. Classroom materials, specifications and ways of learning can match the cognitive level of the pupil.

Discovery learning- Learning should be child centred and active. Children learn best by doing. Raise questions and issues instead of giving knowledge.

Peer Support- This means allowing children opportunities for unstructured discussion and collaborative learning. Helps child de-centre and develop ability to see other points of view.

Vygotsky:

Role of teacher- Teacher should actively intervene, to help the child understand knowledge. The teacher is at the time, the main person in their pupil's zone of proximal development.

The spiral curriculum- Vygotsky argued that children are best served in school by a spiral curriculum. This means difficult ideas being presented first simply, and then revisited at a more advanced level later on.

Scaffolding in the classroom-

Other people can advance a child's thinking by providing a support framework or scaffold on which the child can climb and achieve.

Cognitive Development: Conservation of Number

Core Study: Conservation of Number (1952)

Aim: To see at what age a child is able to conserve number

Procedure: Piaget used a cross sectional method in his experiment. This means that it took place at a single point in time and he wanted to gather information rather than controlling a variable over time. He compared the results of children of different ages.

The children were shown, one at a time, two identical parallel rows of counters. The researcher changed the position of the counters while the child watched. They stretched out one row but kept the number of counters the same. The children were then asked which row had more counters in it.

Results: The results showed that the children in the pre-operational stage generally thought that the stretched out row had more counters in it because it was longer. They were unable to conserve the change of the counters. This is because they could not reverse the situation to see that it was the same as before. Children in the concrete operational stage largely got it correct. They said that they both had the same amount of counters. They understood the conservation change.

Conclusion: Piaget concluded that children in the pre-operational stage were unable to conserve as they could not work backwards in the question. As the children got older and more developed, they were able to realise the change in the conservation of number.

Other psychologists, **SAMUEL and BRYANT**, wanted to find out whether the methodology in Piaget's experiment was the reason why under seven's made errors rather than the true lack of information about conservation. They used a larger sample of 252 children, 63 of each aged 5, 6, 7 and 8. They used a laboratory experiment to question the children about the conservation. For this study, they alternated between the mass, number and volume conservation tasks. Instead of the method Piaget used, by asking two questions, they only asked the children one simpler question. The results showed that the children made fewer mistakes when there were less questions being asked. This asks the question – Was Piaget's study reliable because the results are different? The one answer condition provided fewer errors and therefore this could show that it was not the child inability to conserve, but the fact that the experiment was too difficult for them to understand.

Evaluation of the Conservation of Number Study

Piaget's study cannot be generalised to the rest of the world as he only tested on one culture. His work does not explain the cultural difference in individuals and therefore his evidence is not correct for all cultures. The study only used a small sample of children and therefore it may have not been representative of all children. He needed to have a larger sample as he is unable to back up his claim of the theory being universal. If it was universal, there should be a wide variety of children tested.

This experiment was set in artificial surroundings for the children and they were not familiar with it. This could have affected the results because they were anxious or scared about being somewhere different. The results show to be reliable because they have a set of instructions and a method to follow. On the other hand, many psychologists have re-written the experiment because of the confusing and misleading nature of the task. This means that the results could differ if someone was to repeat it. The experiment was not well controlled as there are a number of factors in their development which could have inhibited the results. The study was ethical as they were able to give informed consent, although the children may have not been fully aware of what was happening.

This research can be used in daily life as we are able to apply it into education. It helps us understand the processes and steps that a child goes through while developing. This has high applicability because it is useful and is used in everyday life. This is a benefit to society because it is telling us at the stages which children will grasp a certain aspect of development.

I believe that the research took place in an artificial setting for the child. This means that it cannot have ecological validity as it was not an example of what would happen in everyday life. The task that was completed was not a task that you would encounter everyday of your life so it could be classed as not having high task validity. The face validity was low because there were many factors which could have affected the results such as reversibility and egocentrism. The results could differ if another set of participants was selected in different surroundings. This means that it cannot be ecologically valid. It does allow the participants to act normally and they are aware of the research. There could be implications with individual differences and demand characteristics.