



Jean Piaget, 1896–1980.



An example of the dominance in play of assimilation over accommodation—pretending that an old packing case, a box, and a tube are a tank.

The final general point to be made about Piaget’s theory is that it is a stage theory. The main assumption made within stage theories is that all children pass through the same stages of development in the same order. Such theories provide a neat and tidy account of children’s development, but critics argue that in reality development is neither neat nor tidy.

Stages of development

According to Piaget’s stage theory, children’s development goes through the following four stages:

1. *Sensori-motor stage*

This stage lasts from birth to about 2 years of age. It is the stage of intelligence in action, since the infant learns much knowledge by moving around his or her environment. The key achievement of this stage is the concept of **object permanence**. This allows the child to be aware of the existence of objects when they are not in view. Early in the sensori-motor stage, the infant has no awareness of the continued existence of objects: it is literally a case of “out of sight, out of mind”.

KEY TERMS

Object permanence: the belief that objects continue to exist even when they cannot be seen.

Centration: in Piaget’s theory, the tendency to attend to only part of a situation.

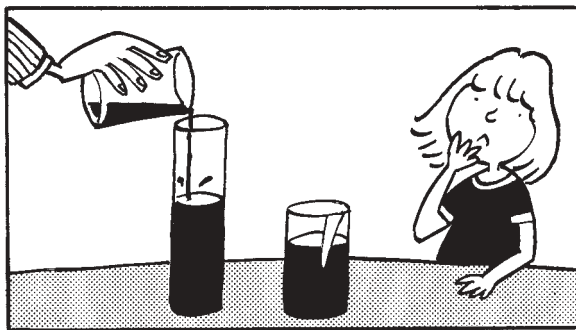
Conservation: an understanding that certain aspects of a situation remain the same in spite of changes to it; it depends on reversibility.

2. *Pre-operational stage*

This key stage lasts between the ages of about 2 and 7 years. Thinking during this stage is dominated by perception. This can lead to error, because things are not always the way they look. Piaget argued that children in the pre-operational stage often pay attention to only part of a given situation; this is called **centration**. The way in which centration produces errors has been shown in studies of conservation. **Conservation** refers to an understanding that certain



In the left-hand picture, the baby is reaching for a toy he can see. In the right-hand one, he searches in the same place for it, although in fact it is hidden under the paper on his right.

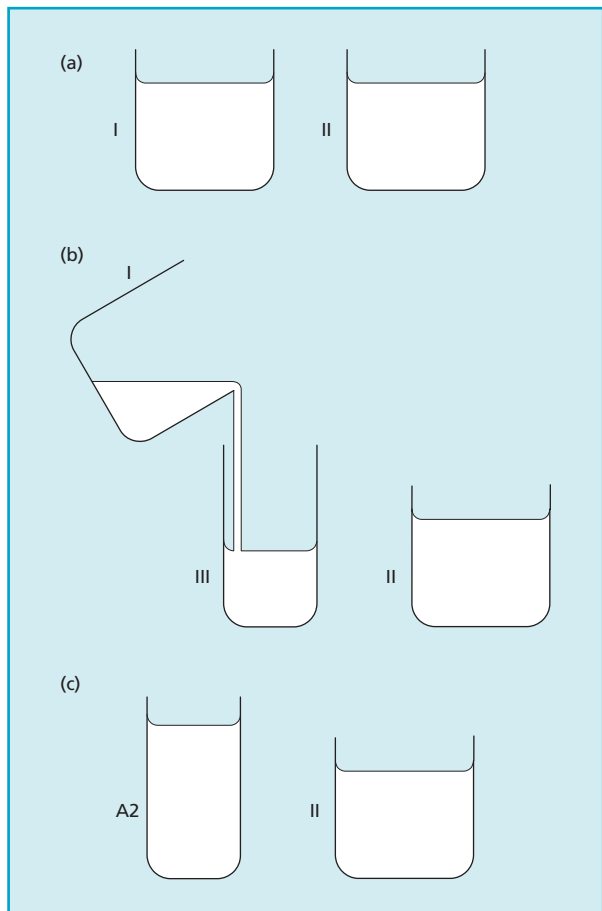


aspects of an object remain the same in spite of various changes to one or more of its dimensions.

In his classic studies on conservation of quantity, Piaget gave the child two glasses of the same size and shape containing the same quantity of liquid. When the child agreed there was the same quantity of liquid in both glasses, all the liquid from one of the glasses was poured into a glass that was taller and thinner. Pre-operational children failed to show conservation. They argued either that there was more liquid in the new container (“because it’s higher”) or that there was more liquid in the original glass (“because it’s wider”). In either case, the child centres (focuses) on only one dimension (height or width).

According to Piaget, pre-operational children also lack what is known as **reversibility**, which in the study just described involves realising that the effect of pouring the liquid from one container into another could be reversed by pouring it back.

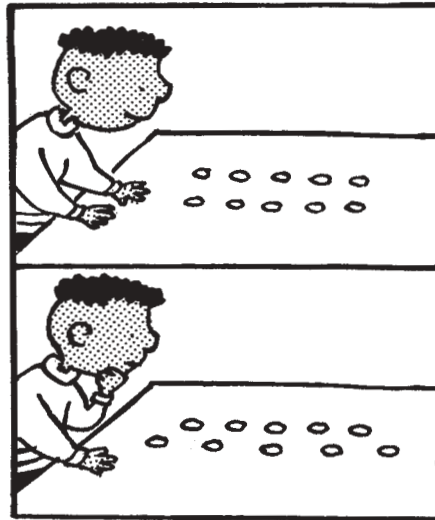
Subsequent evidence has indicated that young children can perform better on conservation tasks than was suggested by Piaget. When an experimenter pours liquid from a broad, short glass into a tall, thin glass, he or she deliberately changes the situation. As a result, children may assume that he or she intends to change the amount of liquid. McGarrigle and Donaldson (1974) tested this notion on a number conservation task. Six-



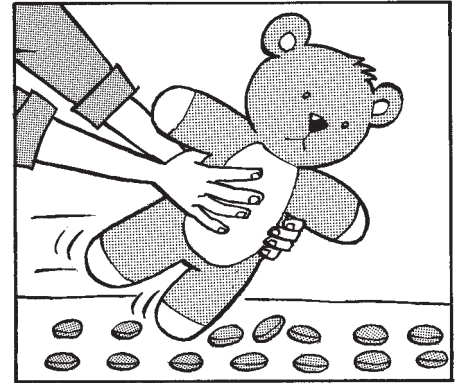
Piaget’s study on conservation of quantity. (a) Children agreed that I and II both contained the same quantity of liquid, but when I’s liquid was poured into a taller, thinner glass (b and c), the pre-operational children argued that the quantities differed.

KEY TERM

Reversibility: the ability to undo mentally (reverse) some operation that has been carried out.



One of the tasks used to test conservation of number. Children are asked if there are the same number of beads in the two rows before and after they are rearranged.

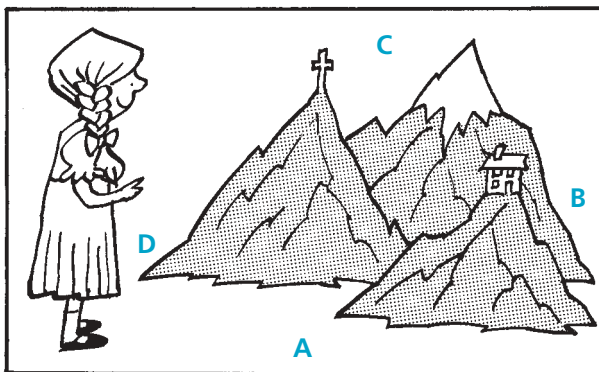


McGarrigle and Donaldson found that when an experimenter rearranged one of a pair of rows of counters, relatively few 6-year-old children thought that the two rows still contained the same number of counters. However, when “naughty teddy” appeared to mess up the counters accidentally, most children said that the number in the rows were still the same.

year-old children were presented with two rows of counters, and all agreed there were equal numbers of counters in each row. Then the experimenter either deliberately messed up one of the rows, or a “naughty” teddy bear messed up one of the rows in an apparently accidental way. Only 16% of the children showed conservation (arguing that there the same number of counters in each row) when the experimenters moved the counters. In contrast, 62% showed conservation when the counters were moved by naughty teddy. Thus, children’s ability to show conservation can be greatly reduced when the experimenter is seen to change the situation in a deliberate or planned way. However, there are still age differences in performance.

KEY TERM

Egocentrism: an assumption made by young children that their ways of seeing or thinking are the same as those of other people.



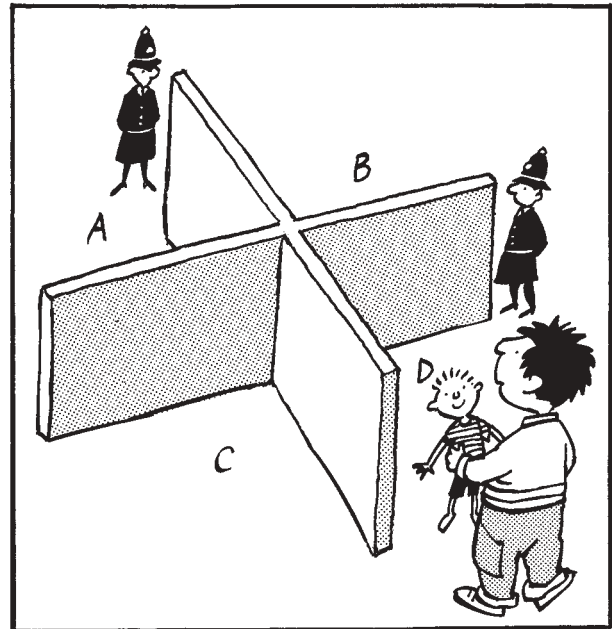
The three mountains task, which was used by Piaget to illustrate egocentrism in children.

Apart from too much reliance on perception, pre-operational children also show **egocentrism**. Egocentrism involves children assuming that their way of thinking about things is the only way. One of Piaget’s tasks to study egocentrism was the three mountains task. Children were presented with a three-dimensional model of an imaginary scene containing three mountains. They looked at the scene from one angle (e.g., from position A), and a doll was placed at a different location. Then the children were shown a series of pictures of the three mountains (e.g., from positions B, C, or D), and were asked to choose the one showing the scene as it appeared to the doll.

What did Piaget find? Four-year-old children chose the picture that was the same as their own view of the scene. The child’s assumption that what the doll can see is exactly the same as what

he or she can see is an example of egocentrism. Piaget found that it was only when children reached the age of 7 or 8 that they could select the picture showing the scene as it appeared from the doll's position.

It has been argued that the three mountains task does not make much sense to young children, because it does not relate well to their own experience. Donaldson (1984) discussed a study by Hughes using a simpler situation. It is often described as being more realistic, but this is somewhat debatable (Diana Dwyer, personal communication). There were two walls in the shape of a cross, two policemen dolls, and a boy doll. Children between the ages of 3½ and 5 tried to hide the boy doll so that neither of the policemen could see him. About 90% of the children succeeded, even though they themselves could still see the boy doll. In other words, they managed to avoid egocentrism at a very young age.



An experimental situation used to show how Piaget overstated the amount of egocentrism shown by young children.

3. Concrete operations stage

According to Piaget, this stage lasts between the ages of about 7 and 11 or 12. The main advance shown by children in the concrete operations stage over pre-operational children is that thinking becomes much less dependent on perception. Underlying this advance is the development of various logico-mathematical operations. These operations include the actions indicated by common symbols such as $+$, $-$, \div , \times , $>$ (more than), $<$ (less than), and $=$. The most important aspect of such operations is reversibility, in which the effects of a change can be cancelled out by imagining the reverse change. Thus, for example, we can turn 9 into 14 by adding 5, and we can return to 9 by subtracting 5 from 14.

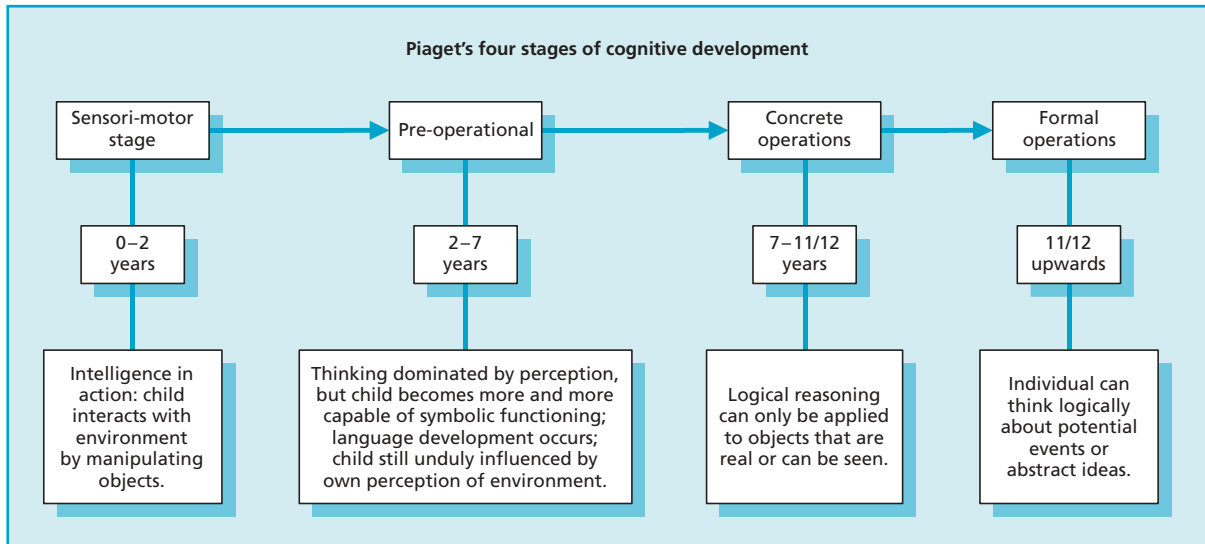
Piaget stressed that cognitive operations are usually organised into a system or structure (termed a **group** by Piaget). For example, an operation such as “greater than” should be considered together with “less than”. A child has not grasped the meaning of “A is greater than B” unless he or she realises that this statement means the same as “B is less than A”. The main limitation of children in the concrete operations stage is that their thinking is limited to concrete situations. The ability to escape from the limitations of immediate reality into the realm of abstract ideas is one that is found only in the fourth (and final) stage of cognitive development.

4. Formal operations stage

Children from the age of 11 or 12 enter the stage of formal operations. In this stage, they develop the ability to think in terms of possible (rather than simply actual) stages of the world. Thus, individuals in the stage of formal operations can manipulate ideas to a far greater extent than those in the concrete operations stage.

KEY TERM

Group: the organisation of various cognitive operations into a system or structure.



Dworetzky (1981) showed some of the differences between the concrete operations and formal operations stages. He asked several individuals to indicate what it would be like if people had tails. Some concrete operations children said that it was a silly question, whereas others indicated where the tail might be on the human body. In contrast, those in the formal operations stage were more willing to consider the possibilities (e.g., people would get out of lifts rapidly; dogs would know when people are happy).

Describe children in the stage of formal operations.

Evaluation

- ⊕ Piaget's theory was an ambitious attempt to explain how children move from being irrational and illogical to being rational and logical.
- ⊕ Piaget provided the first detailed account of the ways in which children's thinking changes during childhood, and he remains the most important theorist on cognitive development.
- ⊕ The notions that children learn certain basic operations (e.g., reversibility), and that these operations then allow them to solve numerous problems, are valuable ones.
- ⊖ Stage theories such as that of Piaget *overestimate* the differences between stages and *underestimate* the differences within stages. For example, children in the concrete operations stage show conservation of quantity for familiar materials some time before they show it for unfamiliar materials (see Durkin, 1995). This indicates that successful performance depends on *specific* learning experiences as well as on the *general* cognitive operations emphasised by Piaget. Thus, cognitive development proceeds much less systematically than Piaget assumed.
- ⊖ Piaget underestimated the cognitive skills of young children. He often used tasks which were rather abstract and lacking in meaning for children, and which made great demands on their language abilities. Children performed much worse on such tasks than on similar ones that were more meaningful