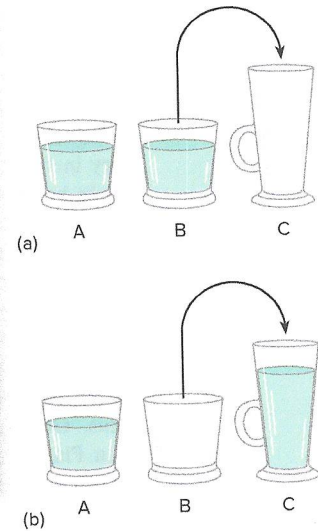
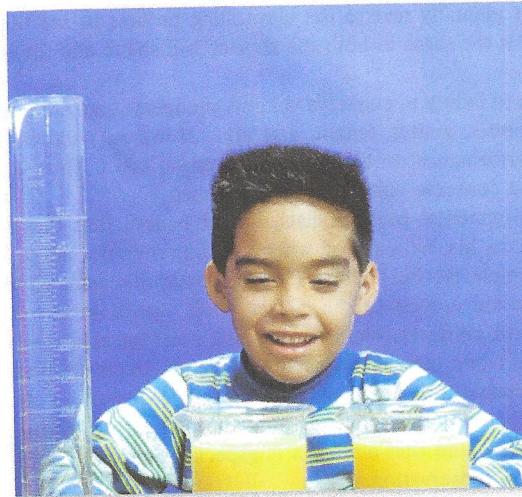


Figure 4 Piaget's Conservation Task

The beaker test is a well-known Piagetian test to determine whether a child can think operationally—that is, can mentally reverse actions and show conservation of the substance. (a) Two identical beakers, A and B, are presented to the child. Then the experimenter pours the liquid from B into C, which is taller and thinner than A or B. (b) The child is asked if these beakers (A and C) have the same amount of liquid. The preoperational child says “no.” When asked to point to the beaker that has more liquid, the preoperational child points to the tall, thin beaker.

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amount of liquid remains the same when it is poured from one container to another, regardless of the containers' shapes. But this is not at all obvious to young children.

The situation that Piaget devised to study conservation is his most famous task. In the conservation task, children are presented with two identical beakers, each filled to the same level with liquid (see Figure 4). They are asked if these beakers contain the same amount of liquid, and they usually say yes. Then the liquid from one beaker is poured into a third beaker, which is taller and thinner than the first two. The children are then asked if the amount of liquid in the tall, thin beaker is equal to that which remains in one of the original beakers. Children who are less than 7 or 8 years old usually say no and justify their answers in terms of the differing height or width of the two beakers. They are typically struck by the height of the liquid in a tall, narrow container and focus on that characteristic to the exclusion of others. Older children usually answer yes and justify their answer appropriately (“If you poured the water back, the amount would still be the same”).

In Piaget's theory, failing the conservation of liquid task is a sign that children are at the preoperational stage of cognitive development. The failure demonstrates not only centration but also inability to mentally reverse actions. For example, in the conservation of matter example shown in Figure 5, preoperational children say that the longer shape contains more clay because they assume that “longer is more.” Preoperational

Type of Conservation	Initial Presentation	Manipulation	Preoperational Child's Answer
Number	Two identical rows of objects are shown to the child, who agrees they have the same number. 	One row is lengthened and the child is asked whether one row now has more objects. 	Yes, the longer row.
Matter	Two identical balls of clay are shown to the child. The child agrees that they are equal. 	The experimenter changes the shape of one of the balls and asks the child whether they still contain equal amounts of clay. 	No, the longer one has more.
Length	Two sticks are aligned in front of the child. The child agrees that they are the same length. 	The experimenter moves one stick to the right, then asks the child if they are equal in length. 	No, the one on the top is longer.

Figure 5 Some Dimensions of Conservation: Number, Matter, and Length

What characteristics of preoperational thought do children demonstrate when they fail these conservation tasks?