

Piagetian Tasks Conservation of Number, Mass and Weight

General Instructions

In this observation you will be assessing two children between ages 5 and 10 for three kinds of conservation: number, mass, and weight. Recall that the concept of conservation involves the understanding that some features of objects remain invariant despite changes in other features. The weight of an object remains the same regardless of how the shape is changed; the number of objects in a row remains the same regardless of how widely spaced the objects are. Typically, number and mass conservation are learned (or discovered) at about age 5 or 6, while conservation of weight is learned later; at perhaps age 8 or 9. So if you are able to find a child between 5 and 8 you may find that he/she can manage the first two conservation tasks but not the last.

The assessment can ordinarily be done most easily in the child's home although other settings are okay if they can be arranged. In any case, you must of course obtain the parent's permission, following whatever procedure your instructor specifics. Present the child with the three tasks and in the order given here, following instructions precisely.

A. Conservation of Mass

You will need two equal balls of clay or play dough, each a size that can readily be handled by a child's palm. Handle them yourself, rounding them into a ball, and then hand them to the child, asking:

*Is there the same amount of clay in each of these balls?
Are they the same?*

If the child agrees that they are the same, proceed. If not, say to the child: *make them the same*. The child may want to squish them a little or may actually shift some away from one ball to the other. That's quite all right. When he's done, ask him again:

*Is there the same amount of clay in each of these balls?
Are they the same?*

Once he has agreed that they are the same, say to the child:

Now I'm going to squish this on into a pancake.

Squash one of the two balls into a pancake and place the two objects - the remaining ball and the pancake - in front of the child. Read the following questions exactly as written and record precisely what the child says:

1. *Is there the same amount of clay in this one (pointing to the ball) as there is in this one (pointing to the pancake)?*
2. Depending on the child's answer to the first question, follow up by asking, *Why is there more here? Or why are they the same?*

Mold the pancake back into a ball and set the two balls aside for the moment.

B. Conservation of Number

For this part of the process you will need 14 pennies or identical buttons. Start with 10 items and place them between yourself and the child (preferably on a table, but the floor will do), spaced equally in two rows of five, as follows:

X X X X X
X X X X X

Ask the child:

Are there the same number of pennies (buttons) in this row as there are in this row, or are there more here (pointing to the child's row) or more here (pointing to your row)?

The child may want to move the objects around a bit before he agrees the two rows are the same, which is fine. Once the child has agreed they are the same, spread the object in your row so that it is now noticeably longer than the child's row but still contains only 5 objects, like the following:

X X X X X
X X X X X

Now ask the following questions, and record the child's exact answer:

3. *Are there the same number of pennies in this row as there are in this row, or are there more here, or more here?*

4. Depending on the child's answer to question 3, ask either *Why are they the same?* Or *Why are they different?*

Now spread out the child's row and add two objects to each row, so that your row and the child's row are again exactly matched, with seven items equally spaced in each. Ask question three and four as previously listed and record the child's answer precisely.

Now move the object in your row closer together so that the child's row is now longer. Ask questions three and four again, and record the answers.

C. Conservation of Weight

Put away the pennies (or give them to the child), and bring out the two balls of clay again, **saying**, "*Now we're going to play with the clay again.*" Hand the balls to the child and ask:

Do these two balls weight the same? Do they have the same amount of weight?

If the child agrees that they weight the same, proceed. If not, say *make them the same* and let him manipulate the balls till he agrees. Once he has agreed say,

Now I am going to make this one into a hot dog.

Roll one of the two balls into a hot dog shape. When you have completed the transformation, put the two pieces of clay in front of the child and ask:

5. *Does this one* (pointing to the hot dog) *weight the same as this one* (pointing to the ball) *or does this one weigh more, or does this one weigh more?*
6. Depending on the child's answer to question five, ask either *Why do they weigh the same?* Or *Why does this one weigh more?*

Record the answers carefully. You MUST record your observation in detail describing EXCATELY what you did and said, and EXACTLY how the child responded and what they said. Describe all actions a third party reading your observation can visualize exactly what is happening. Also use quotes for all conversation. DO NOT SUMMARIZE this is an OBSERVATION.

This ends the procedure, so you should acknowledge and thank the child. You might also want to play a bit with the child with some other toy of the child's choosing, to make sure that the whole process is pleasant to the child.

Scoring

For **each** of the crucial questions decide whether or not the child "conserved." To be judged as having conserved, the child must not only have said the two objects or sets are the same after transformation, he must also give a valid reason, such as the following:

You haven't added any or taken any away so they have to be the same.

OR

One is longer but it is also skinnier so it is still the same.

OR

If I made it back into a ball it would be the same.

Analysis

Compare the child's performance on the three types of conservation. (1) Did the child conserve on all three? (2) If not, was the child's performance consistent with the typically observed sequence of acquisition? (3) What else, other than the child's basic comprehension of conservation, might affect the child's answers in an assessment of this kind? (4) Was the child interested or bored? (5) Were there distractions in the environment? (6) Might the sequence in which the items were given have any effect? (7) Do you think it would have mattered, for example, if conservation of weight had been tested before conservation of mass? (8) If one were designing a study to examine that acquisition of these conservations, would one want to have all children give the items in the same order or should the order be randomized?