

EXTENDED DISCUSSION MODES OF REPRESENTATION AND COGNITIVE GROWTH: BRUNER'S VIEW

Bruner has developed a view of the development of representation which is heavily indebted to Piaget's work. Bruner (1964, 1966) suggests that human beings represent the world in three modes: the enactive, the iconic, and the symbolic. The enactive mode involves representation through action. When Lucienne opened and closed her mouth to signify her desire to open and close the box (see p. 183), she used the enactive mode of representation. The iconic mode is representation using visual images, seeing in your mind's eye something that in reality is not in view. The symbolic mode is representation using language. Bruner's use of the term "symbol" coincides with Piaget's use of the term "sign." The earliest mode used by the infant is the enactive mode. At about 1½ or 2 years of age the iconic mode emerges, and after that the symbolic mode appears.

A provocative experiment by Bruner and Kenney (1966) illustrates the difference between iconic and symbolic representation, and also directly supports the claim that iconic representation emerges before symbolic. Bruner and Kenney arranged a set of nine plastic glasses in a three-by-three matrix, displayed in Figure 7-7. Along the vertical edge the glasses increased in height, while along the horizontal edge they increased in width. After acquainting children with the display, the experimenters scrambled the glasses and asked the children to reconstruct or reproduce the array exactly as it had been originally. Then the glasses were scrambled once more, but this time the glass that was formerly in the southwest corner of the grid (the shortest and thinnest glass) was placed in the southeast corner. Children were then asked to build an array like the original around the newly relocated glass. In short, they were asked to transpose the matrix. Although children ranging in age from three to seven years were tested, it is most interesting to focus on the performance of the five-, six-, and seven-

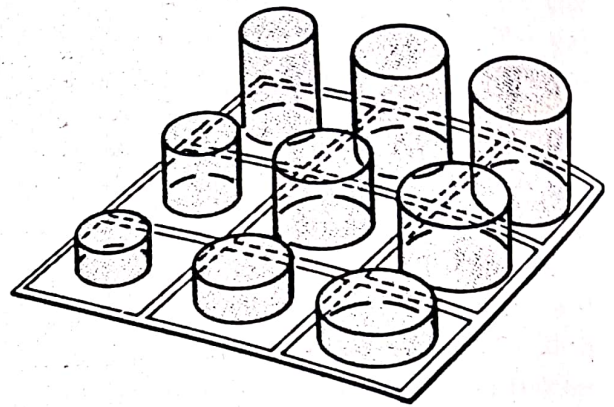
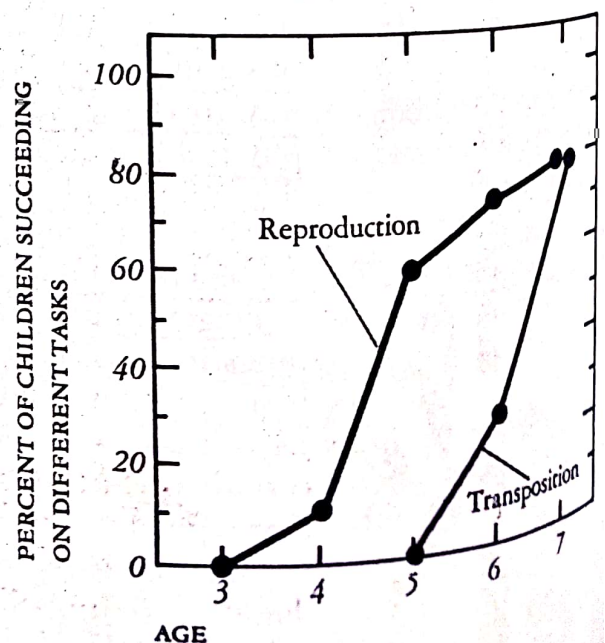


FIGURE 7-7
The matrix presented to children by Bruner and Kenney (1966). Seven-year-olds can usually reproduce the matrix around one glass that has been transposed by the experimenter (as if the board had been turned), but five-year-olds cannot because they are unable to use the symbolic mode of representation.

FIGURE 7-8
Percent of children of various ages who succeeded in reproducing and in transposing the matrix presented in Bruner and Kenney's (1966) experiment. Adapted from J. S. Bruner and H. J. Kenney, On multiple ordering. In J. S. Bruner, R. R. Olver, and P. M. Greenfield, eds., *Studies in Cognitive Growth*. Copyright 1966. Reproduced by permission of John Wiley & Sons, Inc.



year-olds. On the reproduction task a majority of the five-, six-, and seven-year-olds responded correctly. On the transposition task however, none of the five-year-olds and only a small fraction of the six-year-olds succeeded. Not until the seventh year did the task become performable (see Figure 7-8).

Bruner and Kenney suggested that five-year-olds, not old enough to have mastered the symbolic representation required for this task, had to rely on the iconic mode. These children had a visual image of the original array in memory, a sort of picture taken at the time the array was seen and then stored away. They responded to the problem by reading this image and making a copy of it for the experimenter. However, children cannot copy an image of the original as a means of solving the

transposition task because they cannot get any match between the transposed glass the experimenter has placed on the board and the picture they have in their heads. Thus, five-year-olds fail at the transposition task because they are being asked to reproduce something they have never seen before. But many of the seven-year-olds succeeded, and we must ask why.

The older children, according to Bruner, had translated their information about the array into the symbolic mode. In short, they used a set of verbal rules to guide them, such as "It gets fatter going one way and taller going the other." Being able to render the matrix into a verbal or symbolic formula allowed the child to preserve and recognize the basic structure of the matrix despite rotation.