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ABSTRACT

Research indicates that young children seem to have considerable difficulty in discrimination between the letters b, c, p, and q. Also, 4-year-olds appear to commonly make rotation and reversal errors with letter-like forms. Whether young children will perform significantly better or not in deciding whether two shapes are called same or different after a brief training period was investigated. The subjects were 20 nursery-school children randomly selected from approximately 100 children enrolled at a nursery school supported by the Syracuse branch of the National Laboratory for Early Childhood Development. They were randomly assigned to two groups; the experimental group received an initial training period, and the control group did not. The results showed that the subjects in the experimental condition in which the experimenter's definition of same and different was made explicit performed significantly better than the control group. Figures, tables, and references are given. (DE)

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Analysis of Young Ss Performance on a Matching Task

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Research Report

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ANALYSIS OF YOUNG Ss PERFORMANCE

ON A MATCHING TASK

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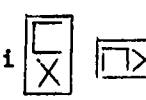
Many studies have reported that young children have considerable difficulty discriminating between the letters b, d, p, and q. Studies by Gibson et.al. further indicate that rotation and reversal errors with letter like forms are common in four-year-olds. Rudel and Teuber (1956) have indicated that such errors are a function of the plane in which the figure varies. For instance and were easier than and . Huttenlocher (1967) had demonstrated that more than just the plane is important. She found that when presented with  ,  ,  , and  "the up-down discriminations were actually somewhat more difficult than the left-right discrimination." She argues "A possible explanation for these findings is that the two figures the child must discriminate between look alike to him when their relative position is such that one may be rotated about the axis of separation so as to produce the other."

Huttenlocher's remarks reflect the general tenor of the studies cited above, namely the child is unable to discriminate when it comes to rotations and reversals; he cannot tell that they are different until more "mature."

Other studies such as Jeffrey (1966) have demonstrated that when given appropriate training young children can discriminate between rotations and reversals. These latter studies have in general stressed the importance of attention as a factor in discrimination tasks. As the present Es have indicated previously (Caldwell & Hall, 1969), while attention is a necessary condition for discrimination tasks, it is not a sufficient condition. An

analysis of the criterion task in these discrimination studies often shows that an appropriate concept of same and different is essential. No amount of attention to the stimuli will produce a correct response in a discrimination task unless the subject holds the same concept of same and different (which is relatively arbitrary) which is that demanded by the experimental situation.

In previous studies (Hall and Caldwell, 1968; Caldwell and Hall, 1969) the importance of an "adequate" concept of same and different in a letter discrimination task was empirically demonstrated. The present study, the third in a series, was designed to explain the results obtained by Huttenlocher by a more adequate analysis of the criterion task.

To be able to copy what Huttenlocher calls aligned stimuli  the subject need only be certain that the end of the horseshoe is inserted in the frame in line with the end of the Es horseshoe. Also in Figure 1, lines one and two do not line up with each other and hence are different. Likewise lines three and four (Figure 1) obviously do not line up and hence S can determine these are different. Thus if S has a "primitive" concept of same meaning "things that line up with each other" he would not confuse the aligned stimuli. However with this same concept of same, one would have difficulty with the mirror image stimuli. Thus with stimuli 5 and 6 (Figure 1) there are no lines that are not lined up. Hence if S considers these to be different it must be on the basis of a more complex concept of same and different (i.e., more information is needed). Lines 1 and 2 must be considered as different because one is at the top and one at the bottom (i.e., are on opposite ends). Likewise lines 7 and 8 must be different because one is left and one is right. Another factor involved obviously concerns the plane of difference, up and down vs. left and right. Since

children typically are taught very early the difference between up and down (get up and sit down) one would expect these to become part of the definition of same and different earlier than right and left which are learned somewhat later.

The purpose of the present study was to show that when young Ss are shown through a brief training period that orientation is important in deciding whether two shapes are called same or different, these Ss will perform significantly better than Ss not given the training period.

Subjects

Subjects were 20 nursery school children randomly selected from approximately 100 children enrolled at a nursery school supported by the Syracuse branch of the National Laboratory for Early Childhood Development.

Methods and Procedures

The children were randomly assigned to two groups. The first group received an initial training period with an overlay training procedure discussed in Caldwell and Hall (in press). For this overlay procedure standard 1 and 2 in Figure 2 were reproduced on 2 x 2 inch 3M Projection Transparencies Type 127 by use of a Thermofax Copier. The standards were mounted in 2 x 2 inch Super Easymount slide holders for ease of handling. Each set of standards and transformations was duplicated, cut into 1-11/16 inch squares, mounted on 7 x 14 inch pieces of red poster board in a layout similar to Figure 1 and coated with plastic. The subject was seated at a table with the board before him and instructed to find in the group of transformations those that were exactly like the standard. The experimenter noted that the overlay should be used to make certain that the ones selected

were the same as the standard. It was also pointed out that the overlay could not be rotated to help line it up.

After this task the Ss in group 1 were given a matching task using the identical directions and procedures she described in her original article.

Results and Discussion

The results are displayed in Table 1. It is clear that the Ss in the condition in which the Es definition of same and different was made explicit performed significantly better than the replication group ($t = 1.95$, 1/9df, $p < .05$). The Es would strongly suggest that once again (e.g. see Caldwell and Hall, 1968) failure of the E to properly analyze the experimental demands in a particular task has led to an incorrect inference concerning young Ss ability to perform relatively simple tasks.

Figure 1

Types of Alignment Used by Huttenlocher

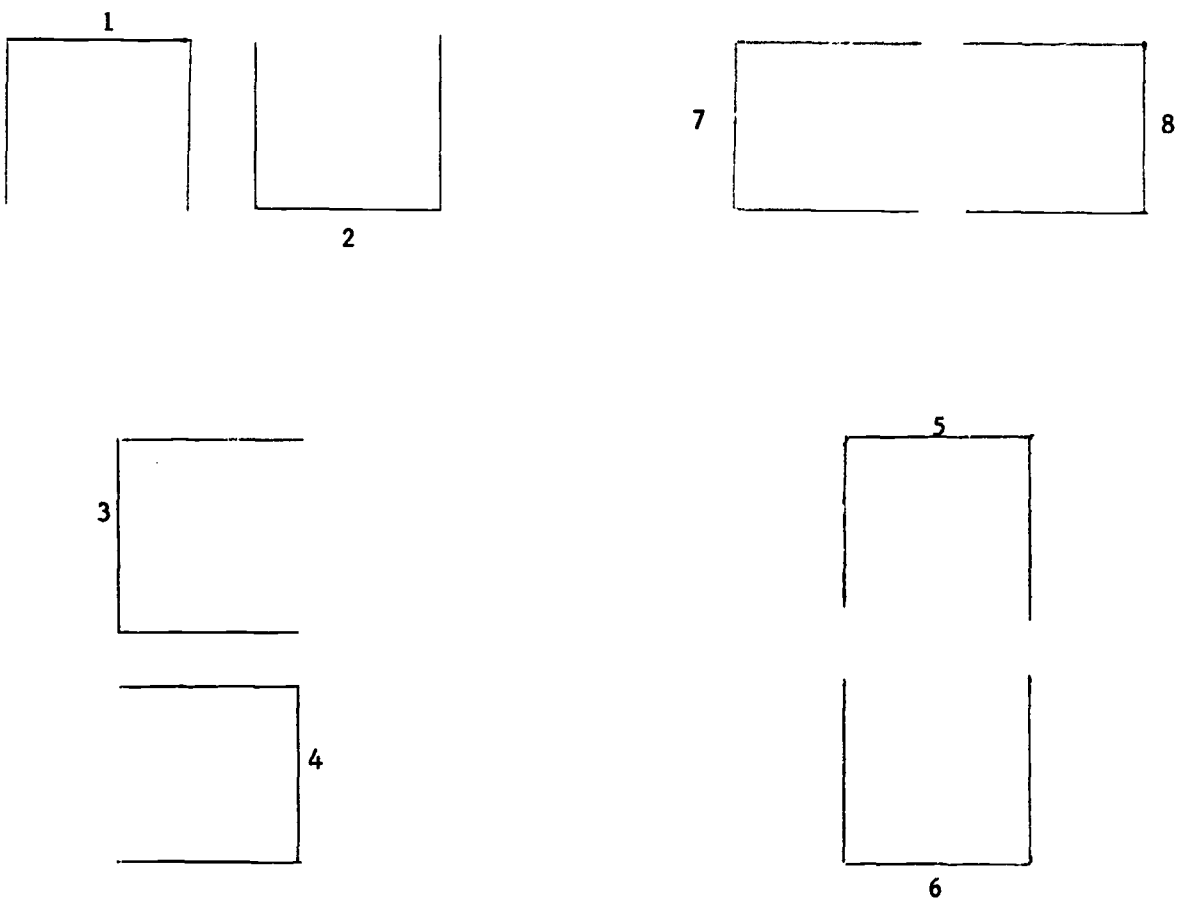


Table 1

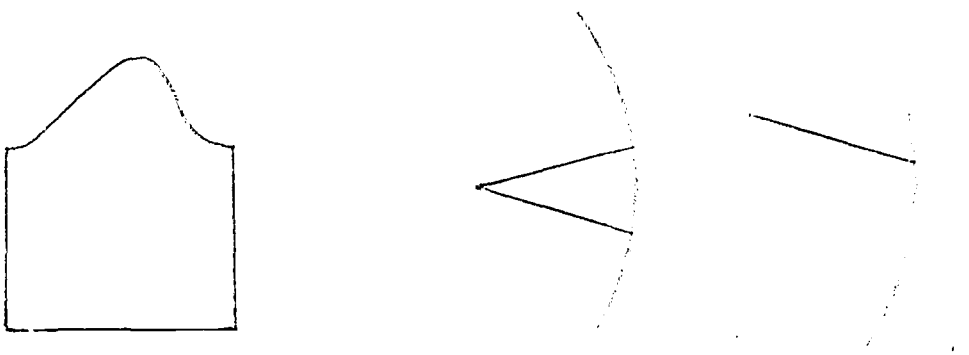
Means and Standard Deviations of the

Pretraining and Control groups

Group 1		Group 2
$\bar{X}$	1.40	3.90
S. D.	1.83	3.35

Figure 2

Standards Used in the Training Procedure



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