DOCUMENT RESUME

ED 088 594 PS 007 168

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TITLE Preschoolers Learn Cognitive Tasks in Groups.
PUB DATE [72]
NOTE 11p.

EDRS PRICE MF-$0.75 HC-$1.50
DESCRIPTORS Cognitive Ability; *Cognitive Development; *Conservation (Concept); *Group Activities; Middle Class; *Preschool Children; *Preschool Curriculum

ABSTRACT

The present study was designed to assess the effectiveness of certain cognitive training tasks on children in group settings under natural preschool conditions. Thirty-five children, aged 47-63 months, were divided into six experimental groups and received various cognitive tasks. Results indicated that most children experienced at least moderate gains in all areas. (SBT)

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# POLICY ISSUES IN EARLY CHILDHOOD EDUCATION

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Paper to be presented at the
American Educational Research Association Meeting
New Orleans February 28, 1973

# PRESCHOOLERS LEARN COGNITIVE TASKS IN GROUPS

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Recently there has been a new emphasis placed on fostering or accelerating intellectual growth and an interest in including cognitive elements in the curriculum for programs of young children. Although children's thinking, perception and other intellectual and cognitive behaviors have been a topic of investigation by childhood educators for many years, there now seems to be a compulsion to make preschool programs reflect the present concern with cognitive growth.

Surveys of early childhood education during the latter half of the 1960's and early part of the 1970's show a considerable increase in the numbers of preschool programs. There is sure to be an increase during this decade. Brazziel (1967) suggested that it would be sensible to plan for nearly 2,000,000 children and 70,000 teachers by 1980. In order to provide meaningful preschool experiences for even larger numbers of preschool children, the nature and quality of preschool education is a question far more important than ever before. Programs will have to be functional and utilitarian, for constant improvisation and experimentation can lead to public disenchantment and professional chaos.

An evaluation of Project Head Start, a federally sponsored program from the Office of Economic Opportunity aimed at helping economically deprived children supplies evidence that existing programs for preschool children display varying emphases on spontaneous play, physical activities, socialization, and freedom to explore and manipulate an "enriched environment." Lavatelli (1966), arguing that Head Start programs based

upon enrichment principles alone are not acceptable, notes that ". . . the traditional nursery school, even with enrichment experience, by virtue of its unplanned nature, leaves too much to chance." She is of the opinion that compensatory programs are needed, the degree and kind of intervention varying considerably to meet the special situation. Biber (1969) suggested that stimulation of cognitive growth is an important responsibility of schooling at all stages. She feels that it is important to foster cognitive skills in the "context of the other developmental processes for which school is equally responsible."

It has often been stressed that nursery schools should provide something more than a play environment away from home. More recently, due largely to the influence of the cognitive theorists, Piaget and Bruner, the change has explicitly been to include elements which are expected to nurture specific cognitive skills. Almy (1967) urged that preschool teachers should analyze and diagnose cognitive functioning revealed in play, and in light of that analysis, make provisions for the children's development both in their play and in other aspects of the curriculum. Additionally, Kohlberg emphasizes the need to recognize sequential or developmental learning at the preschool level:

> What seems required is a new approach which would take into account the fact that the preschooler's orientation to reality is a developmental stage which should be integrated into later stages of development. To put off "reality" until elementary school is only to divorce the child's preschool world of the subjective from the elementary school world of the objective (Kohlberg, 1966, p. 17).

Although the need for the inclusion of cognitive elements in preschool programs has been recognized and materials for "spontaneous" cognitive growth are certainly present in any typical nursery school,

few early childhood education programs have specific planned cognitive elements in their organized curricula. Bereiter and Engelmann (1966) have identified two possibilities for acceleration of cognitive development: (1) selecting experiences that produce more learning, and (2) compressing more experience into the time available. Such possibilities imply the necessity for selection and exclusion in the program, focusing upon academic objectives and relegating all non-academic objects to a secondary position.

As innovative programs and "catch-up" academically-oriented programs have appeared, many traditional preschool groups have attempted to incorporate cognitive elements into their already functional curriculum. These efforts have not been altogether successful. Cognitive materials may be improperly designed or haphazardly presented resulting in less than anticipated beneficial intellectual growth. A genuine rejection of "stock" Piagetian problems by the children has often been reported. In fact most schools who presume to provide units in cognition do so in individual sessions, more resembling psychological experimentation than preschool education. Children are taken from a group setting and tested, trained and retested individually. The experimenter typically seats the child at a table while he manipulates the training objects and instructs the child to respond verbally to questions. The child is a passive observer and commenter. One to five training sessions of anywhere from 15 to 60 minutes long are spread over a period of a few days. Often the pretest, the training sessions, and the posttest are identical, all being virtually no more than "coaching" on the task items.

There is some hazard in depending upon such individual experimentation to foster cognitive growth and change. Taking a child from the "natural" preschool environment to an experience where he may feel estranged and insecure often leads to emotional distress. Most nursery school teachers dread having their students removed for experimentation, since too many experimenters "know about" children but do not "know" them. It would seem that movement from unorganized free play to somewhat organized cognitive experience could most usefully be provided in the classroom situation.

The researchers who have used individual cognitive training settings have largely ignored Piaget's (1964) own advice. He was concerned that cognitive growth occurs not only because of presence of physical objects but because of the social structure. Children grow best when they do things "in social colloboration, in a group effort. This leads to a critical frame of mind, where children must communicate with each other. This is an essential factor in intellectual development. Cooperation is indeed co-operation" (Piaget, 1964, p. 4).

In order to integrate cognitive development into the preschool setting and practice, a better match between the child's cognitive organization pattern and the situational setting of the preschool must be developed. The question seems urgent: Why cannot planned cognitive experiences be administered in "group settings" under natural preschool conditions. To attempt an answer, a research study involving cognitive training tasks similar to those found in experimental studies of cognitive development but designed to be presented to children in group training sessions was conducted.

The study attempted to determine whether a group training program utilizing conservation tasks was suitable and applicable to preschool programs and would evidence increased scores on typical tests of cognition.

Thirty-five middle-class nursery school children, ranging in age from 47 to 63 months, were pretested, trained and posttested on cognitive tasks of Substance, Class-Inclusion, Seriation, Length, Number, and Weight. Four trained testers gave identical pretests and posttests but did not participate in the day-to-day classes; both testers and children were unchanged on the second test.

After pretesting, the children, randomly assigned to six training groups, underwent a three-week training program directed by the experimenter. Each group received training on four assigned tasks and served as control subjects on two additional tasks for which training was withheld. There were three sessions of 30 minutes devoted to training on each experimental task. Training consisted of presenting conservation materials which were of a similar type but in no way identical to the test items, and as usual, asking questions and discussing the various manipulations of the materials. All were designed to use large muscles or a situation where manipulation of the materials could be done by several persons.

An example of some of the training tasks used in the study follow:

Substance. Various sized square cloths (napkin, 12 inches square; red linen table cloth, three feet square; blue canvas tarp, six feet square; green canvas tarp, 12 feet square) were used for teaching Substance. Each item was manipulated by folding sequentially into fourths, eighths, and sixteenths. Questions were asked whether there was still the same amount of cloth after it had been folded into a different shape. The children's responses were encouraged and corrected during the discussion.

The children participated in folding and unfolding.

Class-Inclusion. Various shaped and colored blocks were the materials used here. Included in the assortment were four yellow and four blue blocks, triangular in shape; four red and four green blocks, square in shape; four orange and four purple blocks of diamond shape; and four two-inch high wooden figures of people, one red, one green, one blue, and one orange. The children were informed that there were similarities and differences among the pile of blocks on the floor. They were encouraged to point out the similarities and group the blocks accordingly. Each child was assigned a specific color and asked to remove all the blocks of his color from the central pile. After sorting blocks by color, the children were asked to find other similarities or ways the blocks could be grouped. Through discussion it was established that the blocks were alike in colors, shapes, and that all were made of wood. Similar activities and discussions were conducted dealing with differences among the blocks.

Seriation. Each child was given a set of nesting barrels the largest being about three inches tall. The teacher directed the children's manipulations by disassembling his own set of barrels into seven individual barrels. After each child had taken his barrels apart and reassembled them, they were told to stack the barrels beginning with the largest sized barrel on the bottom and proceeding until all barrels were stacked. Other manipulations consisted of placing the barrels end-to-end graduating from smallest to largest. The barrels were also taken apart and various manipulations were made using half-barrels. The final manipulation was to reassemble all barrels inside one another starting with the smallest in size and continuing until the barrels were together and in the same condition as when the task began. All manipulations were accompanied by discussion and explanation of each ongoing activity.

Length. Each child was given a four-foot length of string. The children were informed that the string would be used to measure various things around the room. A child was chosen to be measured. Measurements were taken by other children to see if the child would measure the same length when his body was in different positions, i.e. sitting, standing, bending down, and lying flat on the floor. The children were asked whether they thought the same length of string would be needed for measurements during all position changes. It was explained that the string followed the lines of the body and that the body length remained the same throughout all position changes. Various objects in the room were measured, such as windows, doors, chairs, table, bulletin board, etc. Measurements using the strings were taken for width, distance from the floor, circumference, height, and around the corner to aid the children's concept of continuous length.

Number. Eight cupcakes and eight empty juice glasses were used.

A line of masking tape divided a small table into two equal halves. The cupcakes were placed on one side of the line and the empty juice glasses were placed in a one-to-one correspondence across the line from the cupcakes. Manipulations consisted of extending the line of cupcakes while leaving the juice glasses in position. The children were asked questions as to whether the number of cupcakes was still the same as the juice glasses when the cupcakes were longer or looked different. Counting was used to establish that the number remained the same unless some were removed. Part of the juice glasses were filled and the question was asked as to whether there were more glasses filled with juice or more glasses which were empty. Again counting was used to establish the correct answer. Other manipulations consisted of removing one or two cupcakes and/or juice glasses and then having the children count the number remaining to see whether the number of cupcakes and/or juice glasses was the same. Discussions and corrections of misconceptions were made for each manipulation. At the conclusion of the task, the children were given the juice and cupcakes for a snack.

Weight. A red wooden balance scale was used as the basic tool. Items to be weighed were marbles, wooden blocks, and metal plates. The teacher explained that a balance scale could be used to weigh objects to see which of two compared objects was heavier or which was lighter. As each previously selected pair of objects were presented, a child was chosen to handle them and guess which was heavier. The child was instructed to find out whether his answer was right by placing his objects on the balance scale. After weighing the objects, the child was directed to change the weight by adding something or taking something away from one side or the other. Various manipulations were performed accompanied by explanations and discussion about the weight of objects.

As seen in these task examples, some tasks required children to use whole body activity or cooperation and working together of several children in order to accomplish directed manipulations; and other tasks required observation and directed participation according to the experimenter's instructions.

There was evidence from the study that the mechanics of presenting conventional cognitive materials in forms which are palatable additions to the nursery school routine can be mastered. The training sessions were looked forward to by all of the study children. Interest and enthusiasm were maintained throughout the training sessions and there

were none of the signs of boredom and refusals to participate often found in individual training sessions.

Most children experienced at least modest gains in several areas. Considering the total test battery in which there was a possible 90 points, only two children showed lower performance on posttest and one child remained constant. The others (32 children) increased from 25 to 30 points; the highest gained 60 points. Some, if not all of such gain could be attributed to the group training procedures involved.

More recently Sheffield (1972) partially replicated Cahoon's study. She pretested, trained, and retested 109 children, ranging in age from 48 months to 67 months. Her subjects were middle-class children from eight different nursery school classes. Her results showed significant gains in five of the six conservation tasks on which the children were tested: Substance, Class-Inclusion, Length, Number, and Weight. Results of the Seriation tasks did not reach significance. She did not find significant task transfer from tasks on which children had been trained to others in the test battery.

In order to meet and assist the intellectual needs of each child in any type of preschool program, planned cognitive elements administered to groups of children in a natural setting seems to be possible, warranted and effective. Cognitive programs which do not arouse interest and show beneficial results in increased understanding and abilities in cognitive task performance have no place in the preschool. On the other hand, the teacher should feel as much at ease in and as firmly dedicated to making a helpful environment cognitively as is typical for social or educational objectives.

At the present time the writer is in the process of putting the cognitive training tasks used in his study along with other cognitive materials into a book for use by preschool educators. The materials will be designed to be administered to groups of children and there will be instruments to evaluate the progress of preschool children.

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