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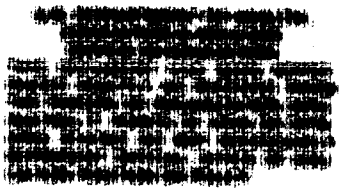
This final report of the Early Childhood Intervention Program for the Disadvantaged, begun in October 1967 at the Learning Research Center of West Chester State College, West Chester, Pennsylvania, contains the evaluative results of 60 children enrolled since 1967. The aim of this compensatory program was to develop an infant education curriculum with a strong cognitive emphasis, but based in the initial building of a firm foundation of sensory-perceptual abilities as a prerequisite step. The early childhood intervention program attempted to reconstruct an environment of stimulation for culturally disadvantaged children which educationally impoverished them before they entered school. This attempt was significant in that it tried to start such compensatory training in a structured manner at ages younger than generally thought practical. Covered in this report are: (1) a review of related research; (2) the rationale of the program (3) program activities; and, (4) an evaluation, including subjective and objective results as well as conclusions. (Author/SB)

THE EARLY CHILDHOOD DEMONSTRATION PROGRAM FOR THE DISADVANTAGED

A Final Report Submitted to the Dubloux-McMahon Foundation



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September, 1971
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The Borough of West Chester, in particular, has been the focus of an influx of lower socioeconomic families presenting the problems of educating children from backgrounds of both urban and rural poverty. The composition of this influx has included both poor white and black families from larger urban areas and a concentration of Puerto Rican migrant families of rural origin. With approximately one-third of the low income families in the county, the concentration of low income families in the borough approximates seven per cent. Over the past fiscal year (1970-71) the borough witnessed an increase of about 30 per cent in its total public assistance rolls, while at the same time evidencing a conservatively estimated 25 per cent increase in families on Aid to Dependent Children.

For children from these families, their environment presents a poor medium for acquiring the type of educational development so essential for school achievement. Early childhood intervention is at the very heart of the effort to reconstruct this environment which educationally incapacitates disadvantaged children before they enter school. Comprehensive preschool programs are essential for the alleviation of the early language deprivation and conceptual disabilities of such children (National Advisory Commission on Civil Disorders, 1968). Although existing programs had offered support for the hypothesis that appropriate supplementary experiences prior to entering school can and do sometimes result in rapid increases

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The National Council of Teachers of English Task Force (NCTE, 1965) recommends that, in teaching English to the disadvantaged, the development of skill in language and concept formation be the overriding concern of preschools. The council has summarized the educational outlook for the disadvantaged child as follows:

1. The average disadvantaged child is probably doomed to failure in present elementary and secondary schools if efforts are not made to overcome the results of his home and neighborhood environments.

2. The disadvantaged child, if he is to be competitive when he enters school, must have developed to the highest level possible the basic skills of communication.

3. The greatest deficit and threat to academic achievement of the disadvantaged child is the retardation in the development of language and conceptual skills.

4. Preschool curricula designed for average and gifted children are often too broad in range of situations and need to be modified for a greater concentration on the essential skills of language and conceptualization.

5. Preschool programs must offer disadvantaged children cultural experiences which the low socioeconomic environment of the children cannot provide. Such experiences must offer practice in perceptual discrimination, conceptualization, and expression.

6. Preschools must provide direct instruction for disadvantaged children to bring them to the level of average middle class children in a very short time.

7. Unstructured experiences provide practice in existing skills. Direct instruction introduces and provides practice in new skills.

Finally, Bloom (1964) encourages the initiation of programs for disadvantaged children as early as possible. At no other time is the IQ more variable than in the preschool years. His studies indicate that early environment can alter the IQ of identical twins by as much as twenty points. During the first years of life, the IQ is susceptible to marked change, up to two and one-half points per year. The need for such intervention at an early age is, therefore, of primary importance in the development of the disadvantaged.

Cumulative Deficiency Phenomenon

Recent and exhaustive reviews of the research pertaining to the education of the disadvantaged indicate that such disadvantaged children spend less time in direct interaction with their parents, score lower than more fortunate groups on intelligence and achievement tests, and are more likely than other groups to have a negative self-image and to lack self-confidence. In addition, patterns of future time orientation and striving for delayed, often symbolic, gratification are much more common among middle class students than among disadvantaged students, and these patterns are seen as necessary for successful academic performance. On the average, by sixth grade disadvantaged children are about two years behind grade norms in reading and arithmetic as well as in most other subjects. One of the consequences of this deficit is that dropping out of school is much more frequent, and this in turn leads to less mobility and opportunity in the occupational sphere. The achievement deficits of these children are cumulative, and this increase over time seems to reflect some basic weaknesses in both curriculum and school practices for these children.

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Gordon and Guinagh (1966) designed an intensive and highly structured preschool program for 15 children from low socioeconomic environments. The curriculum was oriented around basic language skills. The core of the program was the remediation of inadequate language functioning and increase in conceptual mastery. Emphasis was placed upon getting these children to use language for obtaining and transmitting information rather than for satisfying social and material needs. As a result, the children were able to gain an average of seven IQ points on the Binet. They also scored at near normal levels of achievement on the ITPA.

Spicker, Hodges and McCandless (1966) investigated the effects of a five-year early intervention program on low income children scoring between 50 and 85 on the Binet. Four groups of 15 children each were selected: an experimental preschool group; a traditional kindergarten group; a regular control group in the same town as the previous two groups; and a diffused control group composed of children from various surrounding towns. By the end of the first year of the program an average gain of 18 IQ points was evidenced in the experimental group, which was a significant increase when

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RATIONALE OF THE PROGRAM

Considerable speculation remains as to how early in the child's life such early intervention should take place. As the purpose is to maximize the effectiveness of the intervention, the answer must depend upon how early in the child's life some benefit could be derived from it.

Ling (1941) found that children as young as six months of age are able to discriminate forms and manifest a primitive type of abstraction. Fantz (1958) demonstrated the ability of infants to discriminate form in visual pattern differentiation of horizontal stripes from concentric circles. He further showed that pattern preferences for complexity exist in infants as young as three weeks of age. In another study, Munn and Steinung (1931) reported that a child can learn the concept of form by as early as the first six months of life. By 15 months he can learn to differentiate a cross from a square even when the position and color of the object and its surroundings are varied.

According to Whorf (1956), children show the beginnings of the abilities of generalization and differentiation during the preverbal period of development as well as in the subsequent early years. The addition of language greatly enhances the child's ability for categorization as well as influencing kinds of dimensions according to which such categorization is made.

From Piaget's work in particular, it appears that young children have the ability to deal on the intuitive level with many kinds of problems and to solve them without being able to verbalize them. Thus, children are able to learn to conceptualize at a very early age, possibly too early an age to be significantly aided or in most respects affected by our traditional preschool and kindergarten programs. It was the purpose of the present project to demonstrate that significant cognitive gains could be achieved by focusing our preschool efforts upon children younger than those now being serviced by traditional programs.

Demonstration Program Approach

The chief approach of the program was to accelerate the cognitive development of the participating children through initial reinforcement of perceptual skills and later emphasis upon conceptual and language abilities. Cognitive development was here viewed as the progressive sophistication of the internal information processing system of the child. It is the gradual organization of the neurological components of this system which ultimately, and at various stages, determines the operational level of the child's cognitive ability. From this perspective, cognitive development is seen to originate in the more fundamental development of sensory receptive, perceptual, and discriminative abilities.

What was needed in this program was a set of teaching techniques which would allow children at the early stages of their development to work on certain problems and undergo effective learning experiences to progress along this developmental continuum without necessarily having to provide verbal explanations or exchanges. This is an especially important consideration in the early education of disadvantaged children, where verbal facility often lags considerably behind intellectual potential. It was with this purpose in mind that preliminary work in the form of a small pilot project was undertaken at West Chester State College in the Spring of 1969.

Pilot Project

This pilot project (Dusewicz, 1970) involved 10 disadvantaged children (4 boys and 6 girls) from families whose income placed them below the poverty line. The children ranged in age from 19 to 28 months with a mean of 24 months at the start of the investigation. One child was dropped from the program due to relocation of the family. The children were exposed to an academic preschool enrichment program, conducted each weekday morning for two and one-half hours. The mean duration of the program, averaged across subjects, was 32 days. A teacher and several aides were available for specifying the learning tasks for each of the children, for organizing their experiences, providing a feedback on performance, and encouraging abstraction of performance into language. At some times the group of children were exposed to activities as a whole, while at other times exposure was specialized and on an individual basis, with the balance of the group interacting with segments of the structured learning space environment in a free-play situation. As a measure of the effectiveness of the program with respect to cognitive development, the Slosson Intelligence Test was administered on a pre- and posttest basis. All subjects were additionally tested on the Vineland Social Maturity Scale as a means of assessing any changes in social development. With respect to cognitive ability, as measured by the Slosson, over an average period of 1.56 months the group exhibited a mean gain in mental age of 6.94 months (SD=2.62). This represents a net M.A. gain of 5.38 months or 3.45 times the normal rate of growth expected over this period of time. This corresponds to an IQ increase of approximately 21 points. On the Vineland Social Maturity Scale, the group as a whole exhibited a mean gain of 2.88 months (SD=1.70) during the experimental period, for a mean growth rate of 1.85 times the normal.

The results, therefore, indicated rather considerable gains in both mental age and social development over the period of time that the pilot early childhood project was in operation. Such gains suggested that initiation of preschool programs with children as young as two years of age or less might indeed be effective and practical if they were designed in a developmental and programmed manner, emphasizing cognitive activities based on a firm foundation of perceptual skills.

Program Objectives

It was apparent from the pilot program conducted over the brief one

and a half month period, that such an approach to the problems of the disadvantaged seemed to offer considerable promise. To adequately demonstrate the effectiveness of the approach, however, the development of a full year's program based on extensions of the principles and procedures employed during the brief pilot project was required.

The purposes of the present demonstration project were, therefore, to develop, from the preliminary ideas and procedures employed in the pilot project approach, a comprehensive early childhood curriculum for children between the ages of 15 and 28 months. Specific attention was given to the following objectives:

1. Establishment of developmental behavioral hierarchies emanating from a firm foundation in perceptual and discriminative skills and directed toward the improvement of communicative abilities.

2. Establishment of a meaningful program for assessing the progress of children undergoing such developmental experiences at this age level.

3. Assessment of gains in the cognitive and social areas of development (and in other areas which may during the course of the program be deemed appropriate) evidenced in children experiencing this program as compared with similar children not participating in such a program.

PROGRAM ACTIVITIES

Each weekday morning the children were picked up at their homes between 7:30 and 8:30 and were transported to the Learning Research Center, where they spent a four-hour developmental session with a teacher and a number of aides attached to the program. They were returned home between 12:00 and 1:00 each day.

The developmental sessions were housed in a large learning space which was divided into two rooms, a group instruction room and an individual instruction room. The group room contained three carpeted toy areas with different types of play materials. Children having difficulty with the performance of certain tasks had their play structured in the direction of practice on these tasks by assignment to a certain toy area.

Curriculum activities were developed for both small group and individual participation. One of the central ideas was to structure the child's environment so that he would experience meaningful interactions with it throughout each morning session. In accord with this, specific parts of the learning space were set aside for particular ongoing functions and were physically divided into different curricular areas, e.g., a block area or a toy area. By altering the elemental composition of such areas, as well as their size and shape, the amount of attention directed to and spent in any one section could be controlled.

The program attempted to provide opportunities for the children to learn, to play cooperatively with others, to discriminate themselves from their environment effectively and build a healthy self-concept, to expect positive reinforcement for conformity to social expectations, and to become familiar with grammatically correct and effective verbal expression. The teacher and aides during each session attempted to carry out preplanned curricular activities. These individually prescribed learning tasks were designed to organize the experiences of each child, to provide feedback on performance, and to encourage abstraction of performance into language wherever possible.

Typical Program Day

The typical day for any particular child in the program varied according to his interest, his ability to learn and his rate of progress with respect to the curriculum. In the center program, individualized instruction or interaction took place in the individual rooms and interactions involving more than one child were confined to the large group room. Activities in both rooms were conducted simultaneously and continuously throughout the four-hour morning session. Thus, the typical day for any child, while not the same for other children nor for the same child from day to day, might have proceeded as follows:

8:30 ----------	Arrive at project center.
8:30 - 8:50 ----------	Take off and hang up coat; sit down to brief breakfast.
8:50 - 9:00 ----------	An aide works with child on the level I group of puzzles. He had been having difficulty with this first level and has not progressed as far as some children. The aide checks with the teacher on this, and both observe the child's coping behavior with the level I puzzles. The teacher then prescribes some pegboard work for him to help increase his eye-hand and fine motor coordination.
9:00 - 9:15 ----------	Child works diligently at the pegboards, placing the small colored pegs in notches on the board, while another aide tries to teach him to name the colors of the pegs and to place the same colored pegs in similar locations on the board. As his interest in the pegboard activity wanes, he leaves his present play area and proceeds to one of the other areas which attracts his attention.
9:15 - 9:35 ----------	Child interacts with another aide as he plays with various different three-dimensional shapes, attempting to push them through various differently shaped holes into boxes where they are collected. He learns to arrange similarly shaped objects in order of size, to sort by color and to differentiate both visually and tactually between the various shapes themselves, with the help of the aide and using other similar toys.
9:35 - 9:55 ----------	An aide brings the child over to a set of materials with various smells and tastes. Here he works at discriminating between them by smelling and tasting. He also learns to remember different smells and tastes and to be able to match them correctly with a group which he has never previously experienced.

9:55 - 10:10 ----------	Child walks with an aide over to various pictures on the walls and learns what they are and how they relate to one another. He also is able to point out and name many of the facial features on the large pictures of faces and to match them with like features on a large poster board. He learns through this and mirror play to identify body parts for the first steps in self-concept development. He also learns standard facial expressions indicative of the various human emotions.
10:10 - 10:40 ----------	Child is taken into the individualized room where he is exposed to various different pictures of objects arranged in order of difficulty, and he discriminates between them visually in response to his auditory perception of the choice required. He is rewarded for correct choices. Next, he is presented with a series of word symbols for discrimination, many of which correspond to the objects which are presented.
10:40 - 10:50 ----------	Child is given a mid-morning snack and during this snack, with one or two other children, is taught the names and uses of utensils, foods and acceptable eating behavior.
10:50 - 11:30 ----------	Supervised physical activity in the gymnasium, ocular pursuit training, and eye-hand physical coordination are also included. The child's program is determined according to physical development needs.
11:30 - 11:55 ----------	An aide works with child on tactile discrimination ability through use of the Feely Box which contains a variety of objects with different tactile sensations.
11:55 - 12:10 ----------	Child works on identification and discrimination of colors through placing small colored discs in pockets with the words of the colors printed on them just below a set of large colored discs attached to posterboards. He proceeds from two-element to six-element discrimination problems.

12:10 - 12:30 ---------- An aide works with child on the language and picture lotto games involving the matching of pictures to pictures, words to words, pictures to words, and words to pictures.

12:30 ---------- Child is taken home.

In order to teach children to play cooperatively with others, teacher aides in the group instruction room often work with the children in groups of two and three to develop sharing behaviors. The individual instruction room, on the other hand, is dedicated to those developmental activities which require a greater degree of concentration and intellectual effort. This arrangement seems to have been effective.

Sensory Perception and Discrimination

The basic approach has been to build a curriculum which develops the individual senses and also focuses upon behavioral task hierarchies which require combinations of the various senses for successful completion. In this way, the child may proceed from simple to complex discriminate learning within each of his senses, and then continue from the simple to the complex in the area of tasks requiring the integration of information from two or more senses.

With respect to work on basic perceptual and discriminative skills, sets of materials have been developed for training in the olfactory, gustatory, auditory, tactile, and visual senses. Although all these senses have been included to some extent, most of the headway in this area was made on methods and materials for training in the tactile and visual sensory areas. Here, methods have been developed for training from gross to fine tactile discrimination and work begun on establishing some tentative norms for the discriminate behaviors involved. In the visual area, for example, a series of picture identifications, arranged hierarchically according to difficulty level, was used.

In an effort to enable these children to discriminate themselves from their environment effectively and build a healthy self-concept, teacher aides taught the identification of body parts to the children with the assistance of mirrors, magazine pictures, and actual photographs of the children. This proved to be highly successful, with all of the children being able to identify their facial features and recognize photographs of themselves and friends.

Progress in all areas of the emerging curriculum was charted for each child. Children moved from one step to another on the behaviorally organized progress charts by successfully demonstrating the required behaviors and repeating them on two other occasions. In addition, the amount of time spent by children on any one particular task or area of tasks was monitored through periodic time study records, which contained observations of each child and his activity at intervals of 15 minutes throughout each morning session.

In the assessment of visual perception and discrimination among the children tested for the ability to recognize and the ability to name objects and actions depicted in various sets of pictures, sample results are shown in Table 1. The proportions of children able to verbalize and correctly name a picture presented to them, correctly recognize but not name a picture presented among two other pictures, and neither name nor recognize correctly are indicated by percentages for "V", "R", and "X", respectively.

In the assessment of auditory perception and discrimination, among the children tested for the ability to recognize and the ability to name objects and actions depicted by the sounds recorded on sound-effect tapes, sample results are given in Table 2. The proportions of children able to verbalize and correctly name a sound presented to them (V), correctly recognize but not name a sound presented to them (R), and neither name nor recognize such a sound correctly (X), are indicated.

Table 1. Visual Perception and Discrimination

Stimulus Category	Visual Stimulus	Per Cent V	Per Cent R	Per Cent X
HOUSEHOLD	Bath Tub	85	15	0
	Broom	85	15	0
	Comb	92	0	8
	Iron	46	46	8
	Mop	38	54	8
	Towel	62	38	0
	Bed	92	8	0
	Chair	100	0	0
	Crib	46	46	8
	Fan	38	46	15
	Lamp	62	38	0
	Radio	31	70	0
	Sink	54	31	15
	Sofa	31	62	8
	Stove	62	31	8
	Table	100	0	0
	Phone	100	0	0
	TV	100	0	0
	Bowl	70	15	15
	Fork	77	23	0
	Glass	77	23	0
	Knife	92	8	0
	Napkin	8	77	15
	Spoon	100	0	0
FOOD	Bacon	77	23	0
	Cereal	70	31	0
	Eggs	70	31	0
	Milk	92	8	0
	Orange Juice	54	23	31
	Toast	38	38	23
	Bread	54	38	8
	Cake	62	38	0
	Corn	62	38	0
	Jello	62	31	8
	Pie	70	31	0
	Cookies	100	0	0
	Hot Dog	85	15	0
	Sandwich	54	31	15
	Ice Cream	100	0	0
TRANSPORTATION	Plane	92	8	0
	Bike	100	0	0
	Bus	62	31	8
	Train	100	0	0
PEOPLE	Doctor	15	70	15
	Fireman	8	54	38
	Mailman	15	70	15
	Policeman	15	54	31
	Clown	46	46	8
	Indian	54	54	38
	Cowboy	8	8	38
CLOTHING	Coat	100	0	0
	Gloves	92	8	0
	Hat	100	0	0
	Raincoat	8	77	15
	Shirt	31	54	15
	Shoes	100	0	0
	Glasses	92	8	0
	Ring	77	23	0
	Umbrella	85	15	0
	Watch	46	23	31
TOYS	Football	38	54	8
	Balloon	54	46	0
	Bat	15	46	38
	Drum	70	23	8
	Gun	92	8	0
	Kite	8	85	8
	Rifle	0	85	15
	Wagon	100	0	0
	Whistle	38	54	8

Table 1. Visual Perception and Discrimination

Stimulus Category	Visual Stimulus	Per Cent V	Per Cent R	Per Cent X
FRUITS AND VEGETABLES	Apple	100	0	0
	Banana	85	15	0
	Grapes	23	62	15
	Lemon	31	54	15
	Oranges	92	8	0
	Peach	0	70	31
	Tomato	8	54	38
	Watermelon	8	54	38
	Carrot	23	54	23
	Corn	38	54	8
	Lettuce	8	46	46
	Onion	0	38	62
	Potato	31	62	8
	Pumpkin	54	38	8
	Pear	54	46	0
ANIMALS	Cat	100	0	0
	Dog	92	8	0
	Bee	8	70	23
	Cow	46	54	0
	Duck	70	31	0
	Goat	23	54	23
	Hen	0	62	38
	Horse	92	8	0
	Lamb	38	31	31
	Pig	77	23	0
	Rooster	15	54	31
	Sheep	0	62	38
	Turkey	8	70	23
	Bear	38	54	8
	Bird	100	0	0
	Butterfly	38	54	8
	Deer	23	54	23
	Fish	85	8	8
	Fox	8	38	54
	Frog	38	38	23
	Mouse	23	46	31
	Owl	38	38	23
	Rabbit	77	15	8
	Snake	46	38	15
	Spider	8	70	23
	Squirrel	31	31	38
	Turtle	54	38	8
	Elephant	85	0	15
	Giraffe	31	46	23
	Lion	46	23	31
	Monkey	77	23	0
	Tiger	62	38	0
MISCELLANEOUS	Hammer	77	23	0
	Ladder	15	62	23
	Rake	8	38	54
	Shovel	15	54	31
	Circle	8	77	15
Cross	O	15	85	
	Diamond	0	8	92
	Oval	0	8	92
	Rectangle	0	0	100
	Square	0	62	38
	Triangle	8	46	46
	Barn	8	54	38
	Bridge	0	38	62
	Feather	0	70	31
	Flag	15	62	23
	Road	8	77	15
	Star	8	70	23
	Tree	85	8	8
	Wheel	62	23	15
COLORS	Black	8	54	38
	Blue	46	38	15
	Brown	15	23	62
	Green	31	38	31
	Orange	54	31	15
	Purple	23	15	62
	Red	70	31	0
	White	23	62	15
	Yellow	31	46	23

Table 2. Auditory Perception and Discrimination

Auditory Stimulus	Per Cent V	Per Cent R	Per Cent X
Bell	18	55	27
Breaking Dish	55	36	10
Harmonica	0	45	55
Cow	80	20	0
Running	10	40	50
Horn	30	50	20
Horse	60	30	10
Snore	40	40	20
Playing	20	50	30
Concert	10	50	40

Extensive use of a tape-recorder and rhythm instruments for the purpose of auditory perception and discrimination was also characteristic of this period. The children were asked to duplicate rhythms and sounds with the instruments, identify instrument playing on tape, and describe situations or actions heard on the recorder's sound track.

Typical of the hierarchical organization of activities for the children is the behavioral hierarchy relating to work with colors. The color charts consist of large colored paper discs mounted on sheets of white paper, with paper pockets attached below the discs. On the face of these pockets, the name of the color is written in black or red on all charts. Accompanying these charts are small discs made of colored paper which match those on the charts. The child is started out on the three primary color charts and then later moves on to a six-chart combination of additional colors. The child is moved through a hierarchically arranged task sequence using these charts. In accordance with the 14-step list presented below, the child must successfully demonstrate performance of each task on three successive and independent occasions before moving on to the next level.

1. Upon removing single colored disc from primary color pocket, child is able to replace it upon command in only available open pocket (three-color task).

2. Upon removing any two colored discs from primary color pockets, child is able to replace them upon command in their appropriate pockets (three-color task).

3. Upon removing all three colored discs from primary color pockets, child is able to replace them upon command in their appropriate pockets (three-color task).

4. Child is able to perform step 3 when positions of charts are varied.

5. Child is able to perform step 1 with six-color task.

6. Child is able to perform step 2 with six-color task.

7. Child is able to perform step 3 with six-color task.

8. Child is able to perform step 7 when positions of charts varied.

9. Child is able to replace all six colors in appropriate pockets upon command.

10. Child is able to perform step 8 with one-color symbol above pocket covered.

11. Child is able to perform step 8 with two-color symbols above pockets covered.

12. Child is able to perform step 8 with three-color symbols above pockets covered.

13. Child is able to perform step 8 with four-color symbols above pockets covered.

14. Child is able to perform step 8 with all six-color symbols above pockets covered.

Conceptual and Language Activities

Proceeding from the development of a firm foundation of sensory perceptual and discriminative skills, emphasis is placed upon utilizing these skills within the various sensory modes to master various activities and tasks designed to develop conceptual and language abilities. In this way, the more basic sensory skills are applied toward the building of higher order cognitive abilities.

Teacher aides are encouraged to continue talking with the children even when the children do not respond verbally. Thus, there is a great deal of verbal interaction which takes place between aides and children during the four-hour morning session. The significant improvement in verbal expression of children in the program can be partially attributed to this emphasis. Children who initially enter the program in a non-verbal or single word stage of oral language development rapidly progress to multiple word phrases and sentences.

The continued emphasis on verbal understanding and verbal expression accelerates the child's progression from a predominantly noun oriented hearing and speaking vocabulary to a mixed noun and verb oriented vocabulary. In addition, children are later introduced, in the group room, to a type of creative dramatics which allows them to assume family roles such as mother, father, son or daughter, and occupational roles such as taxi driver, shopkeeper or soda man. This not only provides another means of teaching new vocabulary, role expectations and role behaviors, but also enhances the cooperative play abilities of the children.

Emphasis in the verbal area later progressed to include the learning of generalized categories such as "fruits" and "colors". The emphasis upon expansion of vocabulary was extended to such comparative terms as "more or less", "big or little", "up or down" and others. It also included the teaching of such abstract conceptual language such as "if" and "or" and "then".

Slides and filmstrips were presented to children individually and in groups. They were encouraged to compose their own stories from the pictures that they observed. These visual stimuli often took the form of sequences displaying interactions between or among persons and things which the children had learned separately during visual and auditory perception-discrimination training. The children were, therefore, called upon to combine their knowledge of the particulars in the interactive sequence in order to relate a creative description of the interaction itself as visually displayed.

During teaching in the conceptual and language areas, attention spans were seen to increase markedly to the point where children could be called together into groups of six or seven and participate without undue disturbance in cooperative learning sessions centered around, for example, vocabulary development or color learning.

Sample Program Activities

Given below are samples of selected program activities, illustrating the wide variety of areas upon which the curriculum touches. These samples include sensory perception, discrimination and integration tasks as well as games designed to foster conceptual and language development. For each of the activities included here, a brief description, the behaviors it is designed to elicit, and the purposes for which it is utilized are explained. In addition, the progression of activity types from unimodal sensory involvement to multimodal and cognitive involvement should be apparent.

1. Activity: Feelie Box

Description: This was a cardboard box with a hole in one end large enough for various objects to fit through. Two box sizes were used. From the larger box the child learned gross tactile discrimination among shapes. The smaller one, involving finer tactile discrimination, was about 10 inches square. Common objects such as a candle, a fork, a toy block and a battery were included.

Behaviors: The various objects were placed in the box. The child was then given an object, such as a battery, allowed to feel it and then told to find it in the feelie box. The child placed his hand and arm into the hole in the box and, without looking attempted to locate the desired object by feel. The object taken out by the child was then returned to the box and another was requested.

Purposes:

1. To stimulate the child's tactile sense.
2. To increase the child's ability to discriminate objects by the sense of touch alone.

2. Activity: Tastes and Smells

Description: The materials for this activity consisted of small plastic pill containers filled with peanut butter, jelly, coffee, tea, catsup, mustard, syrup, sugar, salt, cinnamon or tomato juice. The container tops were difficult for the children to take off but were easily removed by an adult.

Behavior: The top of one of the small containers was opened and the child was asked to smell the substance inside. The container was held in such a way that the child could not see the substance. If the child could not identify the substance by smell, he was allowed to taste a small bit and asked to identify it. The substances were easily recognized by the children with practice. Once the originals were familiar to the child, new substances were introduced to expose him to a wide variety of smells and tastes.

Purposes:

1. To increase the child's ability to recognize substances by their smell.
2. To increase the child's ability to recognize substances by their taste.
3. To increase the child's ability to discriminate via his senses of taste and smell.

3. Activity: Familiar Sounds Tape

Description: This was a tape containing 50 familiar sounds such as different voices, a barking dog, and a ringing bell. There were also 50 flash cards to accompany this tape.

Behaviors: The tape was played so that the child could listen to and identify the sounds. Flash cards were often introduced so that the child could make auditory identifications through visually mediated responses.

Purposes:

1. To increase auditory perceptual skills.
2. To enhance auditory-visual integration abilities.

4. Activity: Matching Lotto

Description: This game consisted of pictures cut out of magazines and pasted on a large sheet of cardboard. The pictures were mainly of heads of men and women, and there were also pictures of family situations. Another copy of the picture was pasted to a piece of cardboard which was cut out so that it could be placed on its matching picture.

A more advanced version of this game consisted of labels naming the picture. Each label was stapled on the sides and bottom of the cardboard sheet to form a pocket into which the smaller matching picture could be slipped. Most of these pictures showed common objects such as an apple, an airplane or a man.

Behaviors: The child played this game by matching pictures which were the same. In the first type of lotto game, the child placed a picture on the one it matched. In the second type he had to slip the picture into the pocket beneath the matching picture.

Purposes:

1. To increase language development by repeating the names of the pictured objects.
2. To sharpen visual association by discriminating between pictures and matching similar ones.
3. To increase the matching skill of the child.

5. Activity: Donut Stack

Description: The stack was made of heavy white plastic with a square rocking base and pole about 12 inches high. Ten rings of donuts of various colors and graduated sizes fit on the pole forming a sort of pyramid.

Behaviors: The child was to empty the donuts off the stack and then rebuild it, starting with the largest. Each donut was then one step smaller than the donut directly underneath it. After one or two assisted trials, the child was expected to work the stack alone, realizing his correct responses by the shape of the donut stack.

Purposes:

1. To give the child increased practice in manual manipulation.
2. To increase the child's perceptual discrimination of size.
3. To enhance eye-hand perceptual-motor coordination.

6. Activity: Sorting Box

Description: This was a sturdy seven inch square, wooden box with a hinged lid. Cut into the lid were five different shapes - circle, square, triangle, rectangle and irregular. With this were two wooden blocks of each shape. Each shape was also color coded.

Behaviors: The child was to push the blocks through the correct shape. Each block fit through its own shape only.

Purposes:

1. To increase the child's visual and tactile discrimination between various shapes.
2. To increase the child's color discrimination.
3. With some assistance, to learn the names of the shapes.

7. Activity: Jigsaw Cone

Description: This was a stacking toy with square shapes being used instead of round ones. Each square was cut into two pieces, and each piece was a different color. There were six layers of these cut squares and a cube which screwed on the top--14 pieces in all. The colors were bright--red, yellow, blue and green. The entire toy was wooden.

Behaviors: The children were required to interlock the two parts of each square which fit together and then stack the squares according to size with the largest first. Children generally needed a greater degree of assistance because of the difficulty of the toy.

Purposes:

1. To increase ability for manual manipulation.
2. To develop size discrimination ability.
3. To increase eye-hand coordination.
4. To enhance visual discrimination with respect to color.

8. Activity: Association Lotto

Description: This lotto game consisted of six cardboard cards with six colorful pictures on each. To match with these were smaller cards, each containing one picture. Each of the smaller pictures could be associated with one of the pictures on the larger card such as farmer--barn, bird--cage.

Behaviors: The child was expected to match the pictures on the smaller cards with the corresponding ones on the larger cards. He was also encouraged to say the names of the objects.

Purposes:

1. To increase language development by pronouncing names of the pictured objects.
2. To sharpen visual association in observing pictures and their correspondences.
3. To increase the child's language development in the area of categorization of things which belong together.

EVALUATION

The evaluation study covers a two-year period and includes two program years, each lasting about 7 months. A demonstration group and a control group to which disadvantaged children were randomly assigned, proportionately by sex, were in operation during both program years. It should be noted that the control group in this evaluation was not a traditional nontreatment control, but was actually a home program of a compensatory nature. This comparison between the demonstration and control groups in the present situation presents a much more rigorous test of Demonstration Program effectiveness.

In the first year of the project, the participants were 36 low income children, ranging in age from 19 to 28 months, with a mean of 24 months at the start of the investigation. The second year included 44 children, 15 to 28 months of age.

The two-step evaluation process consisted of (1) informal parental interviews and (2) administration of standardized tests.

Subjective Results

Below are presented representative excerpts from some of the parental interview evaluations. As these evaluations seem to indicate, the parents were overwhelmingly positive in their assessment of the program and the progress their children were making, especially in the language areas.

"Leah's speech has benefitted from the program. It has just done wonders. She does not need a bottle anymore."

"Gloria sings songs and says poems that she has learned in school."

"He has learned a lot. Scotty can express himself more. He talks in sentences more than he did before. His sentences are longer."

"I really like the program. Andrea didn't use to talk, but now she knows how to say a lot of words and talks. She says so much. It's hard to remember exactly what. She learned her colors and different shapes of things."

"Artie talks more. He sings and counts some. He plays better now with the children in the Court."

"Vernon talks so much. He says everything I don't even know. He tells you what he wants sometimes. Now he wants to go in a helicopter."

"Julie learned how to jump on the trampoline. And also her sentence structures. She uses five or six words where she used to use one word or point."

"Dawn says a whole lot of words for two years old. She is running off at the mouth."

"Jennifer is so grown-up. She talks so well now. She talks more in detail. Jennifer talks better than some of the older children around the neighborhood."

"Richard benefitted from the program in a lot of ways. He counts, plays with puzzles, and looks at books."

Objective Results

Tests used to evaluate the program included: the Bayley Scales of Infant Development (BSID); the Peabody Picture Vocabulary Test (PPVT); the Slosson Intelligence Test (SIT); the Stanford-Binet Intelligence Test (SB); the Verbal Language Development Scale (VLDS). All measures were administered on a pre- and posttest basis with the exception of BSID and SB which were coupled as a pre- and posttest respectively.

Table 3 shows the results of the evaluative testing, and illustrates the appreciable gains scored by the demonstration group in comparison to the control group. A more rigorous study of the differences between these two groups was effected through use of the statistical technique of analysis of covariance.

Analyses of covariance were performed on all posttest scores on each of the assessment measures, using pre-test scores as the respective covariates. This enabled comparison of the demonstration group and the control group with respect to cognitive, language and social development, revealing any gains attributable specifically to the demonstration program itself. The results of this evaluative assessment of the program over the first two years of its operation are shown in Table 4.

In Year 1 of the study, the PPVT, SIT and VSMS were administered, and analyses of covariance across groups on posttest scores with pre-measures as the covariates yielded significant differences favoring the demonstration group on PPVT raw scores and SIT mental age scores.

In Year 2 of the study, the B/SB, SIT, VLDS, and VSMS were administered, with analyses of covariance across groups yielding significant differences on all measures favoring the demonstration group

In all cases, correlating age of subjects with the test gains yielded nonsignificant values, indicating comparable outreach of the program across a wide range of age levels.

Table 3. Mean Gain Scores on Evaluation Measures

Evaluation Measure	Year 1 Mean Gain		Year 2 Mean Gain	
	Demonstration	Control	Demonstration	Control
BSID/SB (M.A.)	--	--	18.32	11.83
PPVT (R.S.)	9.81	4.53	--	--
SIT (M.A.)	13.91	10.47	13.87	8.41
VLDS (R.S.)	--	--	7.67	4.58
VSMS (R.S.)	12.44	7.54	6.56	3.29
IQ**	20	12	35	14

* Mean Scores on evaluation measures are expressed either in terms of mental age (M.A.) or raw score (R.S.).

** Represents mean IQ based on SIT for Year 1 and an average of the mean IQ gain indicated from the BSID/SB and the SIT for Year 2.

Table 4. Adjusted Mean Scores on Evaluation Measures*

Evaluation Measure	Year 1 Adjusted Means		Year 2 Adjusted Means	
	Demonstration	Control	Demonstration	Control
BSID/SB** (M.A.)	-----	-----	35.04	30.65
PPVT** (R.S.)	17.34	11.95	-----	-----
SIT** (M.A.)	38.09	34.13	36.22	31.67
VLDS** (R.S.)	-----	-----	19.60	16.59
VSMS*** (R.S.)	48.78	44.31	34.65	31.61

* Mean scores on evaluation measures are expressed either in terms of mental age (M.A.) or raw score (R.S.).

** Statistical significance in favor of the demonstration group was achieved for both years.

*** Statistical significance in favor of the demonstration group was achieved only for Year 2.

Conclusions

Over the two-year period the results indicate rather considerable gains for the demonstration group. On both the BSID/SB and the SIT, measuring general cognitive development, and the PPVT and VLDS, measuring development in hearing and speaking vocabulary, the demonstration children were shown to gain significantly more than the comparison children. On the VSMS, however, while significance was evidenced in Year 2, no significant differences in gains in social maturity were found between the two groups in Year 1, although the demonstration group improved more than the control group on this measure.

This latter finding of nonsignificance in the area of social maturity during Year 1 was deemed suspect on several accounts especially in view of the significant results in Year 2 and of the fact that evaluations based upon subjective observations found the demonstration children overwhelmingly superior in social development in Year 1 to the control group. Moreover, where gains are exhibited in any type of program, posttest scores are generally found to correlate positively with such gain scores. In this case however, the Vineland posttest score-gain score correlation for both groups combined in Year 1 produced an r of .59, whereas posttest score-gain score correlation for the demonstration children alone was a puzzling negative r of -.50. Such a result might occur if, during the posttesting on the VSMS, a "ceiling effect" was evidenced in that no subject could score above a certain level regardless of his social development or gain in such development. Assuming that such a "ceiling effect" was in operation, then it would be expected also that there would be much greater disparity between the lower scores of the two groups than between the higher scores. Indeed, when the highest two scores from each group were averaged, the disparity between the means was only one point. The disparity between the averages of the lower two scores from each group, however, was found to be 10 points. Both differences were in favor of the demonstration group, lending support to this explanation of the artifactual nature of the nonsignificant social maturity results for Year 1.

The rather considerable and significant advances in cognitive, language and social development in this project serve to indicate overall the effectiveness of a perceptual-integration-based cognitive program for infants and also the potential learning capacities of very young children in a structured educational setting.

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