

# The Effects of Preschool Experiences on Culturally Deprived Children

*The advent of Head Start programs for preschool disadvantaged children has focused nationwide attention on preschool practices for such children. In this article, an attempt is made to describe some of the intervention programs which are relevant to the organization, content, and effectiveness of future Head Start programs.*

Although nursery school education was conceived by Froebel over 150 years ago, the history of preschool education in the United States is less than 50 years old. Adding to the apparent lack of interest in nursery education in this country has been the lack of agreement among professional groups as to what should constitute the major emphasis of such programs. The most evident difference has occurred between those early childhood educators who emphasize personal-social adjustment through group games, free play, unstructured field trips, and similar activities, and those child development specialists who emphasize cognitive development through structured lessons and activities which attempt to develop language, fine motor skills, conceptual thinking, and positive learning sets. Obviously both sides have their share of eclectics and heretics. It is not our intent to increase the ideological rift in preschool education, but rather to evaluate present intervention programs in light of these differences in emphasis.

Until the last decade, it mattered little that professionals disagreed about the goals and objectives for teaching preschool children. As pointed out by Sears & Dowley (1963), the purpose for establishing preschools in this country has been largely adult- rather than child-centered. For example, the preschool programs of the 1920s were established primarily to instruct parents about child care; the programs of the 1930s to provide teacher employment during the depression; and the programs of the 1940s and 1950s to provide day care for the children of working mothers. In fact, not until the advent of Sputnik with its emphasis on the need for educating gifted

children, and then Head Start with its emphasis on the needs of disadvantaged children, has nursery education been forced to focus on the needs of children rather than on the needs of adults.

The preschool education surge produced by Sputnik required little retooling of traditional practices because bright, highly motivated, middle-class children, as a group, seldom exhibited cognitive and affective deficits or inadequate learning styles which interfered with school progress. On the other hand, the progressive achievement decrement of lower-class children resulting from cognitive and affective deficits (Jensen, 1966) required extensive retooling of objectives, curricula, and teaching strategies before adequate school progress could be made by these children.

It is the purpose of this paper to sensitize preschool educators to the needs of disadvantaged children and to review the effectiveness of some of the experimental programs that have been developed to meet the needs of these particular children.

#### **Characteristics of Severely Disadvantaged Preschool Children**

According to Office of Economic Opportunity criteria any child is eligible to

**Dr. Walter L. Hodges** is Associate Professor of Educational Psychology and Director of the Institute for Child Study at Indiana University in Bloomington. At present he is on leave of absence from Indiana University serving as Director of the Governor's Council on Childhood Development for the State of Arkansas. He is also a consultant for Project Head Start.

**Dr. Howard H. Spicker** is an associate professor of education and chairman of the Department of Special Education at Indiana University. In addition to his present duties, he serves as a national consultant for Project Head Start.

participate in Project Head Start if he comes from a family whose total annual earnings do not exceed \$3,000.<sup>1</sup> Although such economically deprived families produce three to five times as many children with intellectual subnormalities, social and emotional disturbances, and/or school achievement problems than their more economically advantaged counterparts, they by no means form a homogeneous group. In fact, the majority of these families are industrious, family oriented, and middle-class striving. These are the families that welfare workers describe as the "deserving poor." Quite often the children from these families graduate from high school or even college and successfully become a part of the American middle-class melting pot. As shown by Kirk (1958), such children make dramatic intellectual gains once they enter school even when they have not been exposed to a preschool program. Unfortunately, not all economically deprived children develop intellectually without specific preschool intervention programs. One such group of children is known as the "hard core poor" or "psychosocially deprived." Whether found in Northern inner-city slums, rural Southern farms, semi-rural and urban Appalachia, or on Western orchards and truck farms, these children tend to have major cognitive and affective deficits requiring an intensive preschool intervention program.

Authorities report that severely disadvantaged preschoolers, when compared to middle-class preschoolers, are more likely to exhibit deficits in general intelligence, language development, fine motor coordination, time concepts, self-

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<sup>1</sup> This figure is based on a family of four. The annual income of larger families can exceed \$3,000.

concept, and motivation. Upon school entrance it is further hypothesized that these deficits will produce subsequent scholastic achievement failure culminating in early school drop out. How successful have preschool intervention programs been in ameliorating these deficits? The remaining portion of this paper will attempt to answer this question with pertinent selected research.

### **The Effects of Intervention on Intellectual Performance**

The negative effects of psychosocial deprivation on intellectual development are well documented in the literature (Kennedy *et al.*, 1963; Jensen, 1966). In general, the mean IQ of children from socio-economically deprived areas is approximately 10 points below that of middle-class children. Furthermore, these poverty areas, which generally contain 10% of the community's school age population, often contribute up to 50% of the children enrolled in special education programs for the educable mentally retarded. It is important to point out that this symptom of intellectual subnormality merely represents manifest capacity (intellectual functioning at the present time). It is quite possible, and highly probable, that the optimum intellectual potential (basic capacity) of these children is considerably higher than their present intellectual functioning. Since it is assumed that the home environment of disadvantaged children provides inadequate stimuli for optimum intellectual development, intervention programs have been designed to compensate for these inadequacies. In general, these have included home interventions, school curriculum interventions, or combinations of both.

### *Home intervention*

The classic study on the effects of a home intervention program was conducted by Skeels & Dye (1939). Thirteen children below the age of three who had been diagnosed as mentally retarded were transferred from a highly overcrowded and unstimulating orphanage to an institution for the mentally retarded. At the institution, these children received intensive "mothering" from older mentally retarded girls, as well as special favors in the form of toys from ward attendants. After one and one-half years, the children had made an average gain of 27.5 points in IQ and were then placed in foster or adoptive homes. A contrast group of 12 children who had tested in the normal range of intelligence upon admission to the orphanage showed an average decrease of 26 points in IQ after remaining in the orphanage for approximately two years. A 30-year follow-up study of the 13 experimental and 12 contrast children was recently reported by Skeels (1966). On all criterion measures (e.g., social adequacy, economic self-sufficiency, and schooling) the experimental subjects were significantly superior to the contrast subjects. While all the experimental subjects were functioning as typical middle-class adults, the contrast group had long histories of enrollment in institutions for the mentally retarded and/or mentally ill, poor employment habits, and poor social adjustment records. The spectacular initial cognitive gains and the ensuing lasting effects of a early home intervention program are especially dramatic when one considers that no structured home intervention techniques or guidelines were provided the retarded surrogate mothers.

Whereas a home intervention consisting of removing the child from his natural parents for purposes of receiving a more stimulating home environment is the exception rather than the rule, it would be extremely useful to determine whether the natural parents can be taught to provide the child with the stimulation he needs for adequate cognitive development. Although there are a number of studies that include a home intervention program concurrent with a school intervention program, there appear to be no investigations of the effectiveness of a structured home intervention program per se.

#### *Curriculum intervention*

Even prior to the advent of Head Start programs, a number of investigators had attempted to increase the intellectual functioning of disadvantaged children by means of a preschool intervention program. The first major study along these lines was conducted by Kirk (1958). Although the study sample included both organic and cultural familial educable mentally retarded preschoolers, sufficient data were presented for each group to make it possible to draw some tentative inferences as to the effectiveness of the curriculum intervention for the disadvantaged subgroups. The intervention consisted of approximately two years of a general nursery curriculum tailored to the mental level of the children and "clinical individual tutoring in areas of specific mental disabilities revealed by the diagnostic study of those children who needed such attention" (p. 15). In addition, during the course of the study four of the experimental children had been placed in foster homes by the Division of Child Welfare because of neglect

and/or inadequate environment.

Immediately following the preschool intervention period, Kirk reported that the 28 community experimental children had made a mean gain of 11.2 points on the 1937 Stanford-Binet (72.5 to 83.7) and a mean gain of 7.8 points on the Kuhlmann (72.2 to 80.0). A contrast group of 26, community children who remained at home during the preschool period had lost .6 of a point on the Binet (75.8 to 75.2) and gained 2.2 points on the Kuhlmann (72.4 to 74.6). The IQ gains made by the experimental group were significantly greater than those made by the control group on both measures. However, after the contrast group had attended special or regular classes for one year, their mean IQs had increased near those obtained by the experimental group (Contrast: Binet 82.7, Kuhlmann 80.8; Experimental: Binet 84.2, Kuhlmann 81.7). A breakdown of these findings by case study analyses seemed to indicate that the major gains had been made by contrast children without organic etiologies who had come from adequate homes in which the parents were cooperative and interested in the welfare of their children. Children with organic involvements and those who had come from psychologically as well as economically inadequate homes had not made significant IQ gains when school experiences were begun *after* CA 6. It appears, therefore, that community preschool education experiences, although desirable for all culturally deprived educable mentally retarded children, are essential only for those children who are also psychosocially deprived. Furthermore, as pointed out by Kirk, the four severely disadvantaged children who had been given a preschool experience and a

change from an inadequate true home to an adequate foster home had made more progress than any other group.

Since but a small number of children constituted Kirk's psychosocially deprived subgroup, further research with a larger sample of these children was indicated before specific intervention procedures could be recommended for them. It is for this reason that Spicker, Hodges, & McCandless (1966) concentrated their research efforts on that particular subgroup of disadvantaged children. Now in its third and final year, the Indiana Project included only 5-year-old children who scored between 50-85 on the 1960 *Stanford-Binet L-M Intelligence Scale* and came from families of the lowest socio-economic class as determined by the Warner-Meeker-Eels Index of Status Characteristics (1949). Children with organic pathologies, gross sensory impairments, and serious emotional problems were excluded from the study. The study was conducted in small communities (population 10,000-40,000) in southern Indiana, where the population meeting the criteria for inclusion in the project consisted primarily of Caucasian Appalachian children. In the first year of the study, children meeting the selection criteria were placed in one of four groups with approximately 15 children to each. An experimental group received a structured curriculum designed to remedy specific diagnosed deficits of individual children in areas of language development, fine motor coordination, concept formation, and socialization. The diagnoses were made on the basis of standardized tests and direct observations by the teachers and project staff. For a more elaborate description of the curriculum see Spicker, Hodges, &

McCandless (1966). A kindergarten contrast group received a traditional kindergarten curriculum. A contrast group located in the community in which the experimental class was located remained home and received only the pre- and post-testing. A contrast group located in communities other than the one in which the experimental children resided was used as a control for diffusion effects. This group also remained at home and received only the pre-and post-testing.

The intellectual gains of the four first-year groups as measured by the 1960 Stanford-Binet L-M over a two-year period are shown in Table 1.

Although all four groups had made reliable gains from pre- to post-testing, those made by the Experimental and Kindergarten contrast groups were significantly greater than those made by the diffusion and regular contrast groups. While the mean post-test IQ of the experimental group was relatively greater than that of the kindergarten contrast group, the difference was not statistically significant.

After one year of regular first grade experiences, the two at-home contrast groups made intellectual gains of sufficient magnitude to wash out the significant differences which had formerly existed between these groups and the experimental group. These findings are consistent with the overall statistical findings reported by Kirk but are inconsistent with his case study analyses which lead him to conclude that psychosocially disadvantaged children, deprived of a preschool program, make only minimal intellectual gains following first-grade experiences. According to the Indiana Project, even psychosocially deprived children will make significant

TABLE 1

Indiana Project First Year Stanford-Binet IQ Means						
Group	Kinder- garten Pre-test		Kinder- garten Post-test		First-Grade Follow-up Test	
	N	$\bar{X}$	N	$\bar{X}$	N	$\bar{X}$
Experimental Preschool (EPS)	12	74.5	12	93.8	11	97.4
Kindergarten Contrast (KC)	13	72.7	13	87.5	11	83.2
Regular Contrast (RC)	13	74.5	13	80.9	13	91.7
Diffusion Contrast (DC)	13	72.5	13	81.3	13	84.8

IQ gains once exposed to a formal school program. Specifying whether these gains are the result of statistical regression and "Hawthorne" effects or whether they will hold up in later grades after the initial novelty of school entrance wears off must await the results of further follow-up testing. However, it should be noted that the IQ losses by the group which had received a traditional kindergarten program were sufficiently large to place this group significantly below the other three groups in intellectual level by the end of the first grade. It is possible that the novelty of school had worn off during kindergarten and the first grade teachers and/or the first grade curriculum to which the kindergarten contrast children had been exposed were inadequate for maintaining the interest of the children.

The greater effectiveness of a specialized curriculum over a traditional one for disadvantaged children was even more dramatically demonstrated by Sprigle, Van de Riet, & Van de Riet (1967). The experimental curriculum developed for their study was based on Piaget's theory that mental development proceeds along an orderly sequence of motor-perceptual-symbolic

phases. Thus the curriculum included "a series of developmental tasks that would emphasize manipulating, organizing, classifying, and ordering things that lead to internalized thought and effective verbal expression." For a more detailed description of the curriculum, see Sprigle (1967). The subjects used in their study consisted of 72 culturally deprived (according to OEO income criteria) Southern Negro, 5-year-old children. The children were assigned to one of three groups of 24, matched by socio-economic level, age, sex, school readiness skills, and intelligence. The experimental group received one school year of the sequential learning curriculum; a kindergarten control group received a traditional nursery-kindergarten curriculum; and an at-home control group received only the pre- and post-testing.

Although all three groups were comparable on Stanford-Binet IQ prior to treatment (the mean IQ for all groups was approximately 90), the post-test results indicated that the mean IQ for the experimental group had risen approximately 14 points, that of the kindergarten group had remained unchanged, while the mean IQ of the home control

group had decreased by approximately seven points. All differences between groups were highly significant. Since the magnitude of the differences among groups was greater than any reported in the literature, the investigators hypothesized that a further contributing factor to the success of the intervention program might have been a difference in teacher effectiveness in favor of the experimental treatment group. The investigators described this factor as follows:

The experimental program was run by the author (Sprigle) of the sequential program. The examiners observed that there was a great deal of involvement during the school year on the part of the director of the program and the classroom teacher to do their very best with the experimental children. Observation of the program indicates to the authors that the teachers worked extremely hard with the children, that they had had a lot of experience, and were very effective in working with preschool children. Since the teacher in the "traditionally" trained group, although experienced, did not have this level of investment in her program, in all probability she did not put as much effort into the general development of her students. How much of an advantage this would provide in the experimental program is impossible to say but it seems certain that it would have some effect (Sprigle *et al.*, 1967, p. 8).

#### *Multiple intervention programs*

Only two research programs which intervene with both preschool children and their parents (particularly mothers) will be considered. These particular multiple intervention programs were selected from among several possible ones because they provide data on school achievement following treatment and represent educable retarded and non-retarded Negro groups residing in the South and the North. Neither proj-

ect is complete, however, and any conclusions drawn at this time must be considered tentative. The two programs to which we refer are the Early Training Project conducted by Gray & Klaus (1965, 1966a, 1966b) and the Perry Preschool Project conducted by Weikart (1967a, b, c).

The Enrichment Program for Disadvantaged Children conducted by the staff of the Institute for Developmental Studies in New York City is a third major series of studies designed to develop and evaluate preschool, kindergarten, and early elementary programs, as well as to design and evaluate programs for parents of the study children. The data on these studies are not yet generally available, however, and, therefore, will not be reported here (Deutsch, 1965).

The available literature on the Early Training Project (Gray & Klaus, 1965, 1966a, 1966b; Gray, 1962; Klaus & Gray, 1962, 1963, 1965, 1967; and Gray, Klaus, Miller, & Forrester, 1966) provides a comprehensive picture of the rationale, design, objectives, treatment, and presently available results of this program. The program was derived from certain assumptions based on the available literature concerning variables which contribute to the progressive achievement decrement (PAD) of culturally disadvantaged children as they enter and progress through the school (Jensen, 1966). Culturally deprived children are thought to have deficiencies in aptitudes for achievement and attitudes toward achievement which exist because of differences in stimulus and reinforcement conditions among lower-class families when compared to middle-class families. Therefore, the program was directed toward the enhancement

TABLE 2

Early Training Project Stanford-Binet IQ Means							
<i>N</i>	<i>May 62</i>	<i>Aug. 62</i>	<i>May 63</i>	<i>Aug. 63</i>	<i>Aug. 64</i>	<i>Aug. 65</i>	<i>Aug. 66</i>
T <sub>1</sub> (19)	87.6	102.0	96.4	97.1	95.8	98.1	91.2
T <sub>2</sub> (19)	92.5	92.3	94.5	97.5	96.6	99.7	96.0
T <sub>3</sub> (18)	85.4	88.2	89.6	87.6	82.9	91.4	87.9
T <sub>4</sub> (24)	86.9	88.2	87.4	85.8	80.8	89.4	84.8

of: a) aptitudes for achievement, such as perceptual, cognitive, and language development; and b) attitudes toward achievement, such as achievement motivation, persistence, ability to delay gratification, and interest in school-type activities and materials.

In 1962, 60 Negro children scheduled to enroll in school in 1964 were selected from among families who were considered disadvantaged on the basis of income, occupation, education, and housing. These 60 children were all located in one southern city. Each child was randomly assigned to one of three possible groups of 20 children each. One group (T<sub>1</sub>) received three 10-week training experiences in the summers of 1962, 1963, and 1964; a second group (T<sub>2</sub>) received two 10-week training experiences in the summer of 1963 and 1964; the third group (T<sub>3</sub>) received no summer training experiences. In addition to the summer training sessions the mothers and children of groups T<sub>1</sub> and T<sub>2</sub> received weekly home visits during three and two school years respectively (until the end of grade one). A fourth group (T<sub>4</sub>) of 27 children located in another city were also studied but no program was provided for them prior to school entrance. In summary, the project provided a treatment of three sum-

mer sessions and three years of home visitation for one group (T<sub>1</sub>), two summer sessions and two years of home visitation for a second group (T<sub>2</sub>), and no intervention for the local (T<sub>3</sub>) and distal (T<sub>4</sub>) control groups.

The longitudinal data on the *Stanford-Binet Intelligence Scale* for the four groups in the Early Training Project are shown in Table 2. The experimental groups (T<sub>1</sub> and T<sub>2</sub>) demonstrated increases in IQ after their initial 10-week summer sessions while the two control groups for the most part maintained their initial IQ status up to the year prior to school entrance. Between August 1963 and August 1964, however, the control groups dropped in mean IQ while the experimental groups remained superior to the control groups but equivalent to one another. By the end of first grade the mean IQs of the control groups had increased significantly. However, by the end of second grade the mean IQs of all four groups had decreased somewhat. At initial testing (May, 1962) there were no significant IQ differences among the four groups. Yet, by the end of second grade<sup>2</sup> the mean IQ of the two experimental

<sup>2</sup> The initial mean IQ of T<sub>2</sub> (the second experimental group) was relatively higher than the other three groups.



groups combined was significantly greater than the two control groups combined. In general, it appears that the experimental treatment produced small, but fairly consistent, long-term gains in intelligence for the experimental children, while the intelligence of those children who did not experience the experimental treatment remained relatively constant.

The second "multiple impact" program designed to provide data on the effectiveness of preschool intervention on the intellectual development of culturally disadvantaged children is the Perry Preschool Project directed by Weikart (1967a, b, c) at Ypsilanti, Michigan. The Perry Preschool Project has provided a cognitively oriented preschool curriculum for intellectually subnormal, disadvantaged Negro children during the morning and a home intervention program with their mothers during the afternoon. The emphasis of the morning school program was placed on structured group teaching, organized area teaching, and field trips. Group teaching refers to dividing the larger group of children into two groups with two teachers for each group. (Both the Early Training Project and the Perry Preschool Project provided a high adult-pupil ratio.) During group teaching, the activities were structured around a particular skill deficit or on pre-academic concepts which were thought to be important for later development. Area teaching refers to a large period of each morning in which a child could select any one of four activity centers or could work with available toys and equipment which interested him. The activity centers included a housekeeping area, a block area, an art area, and a pre-academic area.

The home-based afternoon program was used to involve the mother in the process of educating her child, to demonstrate teaching procedures, and to tutor the child. The home instruction was carried out by one of the teachers. Two types of afternoon activities were used: cognitive skill training (including visual training, fine-motor training, auditory training, pre-math training, and general science) and individual field trips for the child (and mother when possible).

Monthly group meetings for the parents were designed to provide an opportunity for the mothers and fathers to exchange views, to let enthusiastic parents "sell" the more reluctant, and to deepen the relationship between teacher and parent. Meeting topics included making toys and equipment for the children, visiting the local library, and viewing appropriate films (Radin & Weikart, 1967). A helpful summary of the entire treatment program is provided in Weikart, Kamii, & Radin (1964). It should be noted that later groups entering the project will be exposed to a somewhat different preschool program based on the theories set forth by Piaget (Weikart, 1967a).

Criteria for selection of the children included: a) residence within the attendance area of an all-Negro school; b) date of birth; c) cultural deprivation according to a formula which includes parents' education and occupation and degree of crowding in the home; and d) IQs between 50 and 85 on the *Stanford-Binet Intelligence Scale*. Children who met these criteria were randomly assigned to an experimental and control group. New groups were constituted each year from 1962 through 1966 by the same selection procedure. These

TABLE 3

The Perry Preschool Project Stanford-Binet Intelligence Scale Wave 0 Data			
<i>Time of Comparison</i>	<i>Experi- mental N = 13</i>	<i>Control N = 15</i>	<i>Differ- ences</i>
Fall, 1962—Entrance into preschool	78.4	75.0	3.4
Spring, 1963—Completion of one year of preschool	91.1	82.2	8.9 <sup>a</sup>
Spring, 1964—Completion of kindergarten	88.9	84.6	4.3
Spring, 1965—Completion of first grade	90.7	84.6	6.1
Spring, 1966—Completion of second grade	85.5	83.9	1.6

<sup>a</sup>Significant difference at the .01 level. All other comparisons were non-significant.

groups are referred to as Waves 1 through 5. Each of the five experimental groups received, or will receive, two years of nursery school prior to entering kindergarten. None of the control groups received nursery school treatment, but participated in the same testing program as the experimental children. In addition to the above five waves, Wave 0 was selected in 1962 from among the available 4-year-olds. The experimental half of Wave 0 received one year of special preschool before entering kindergarten while the remaining one-half remained at home as a control group. Each wave has consisted of approximately 12 experimental and 12 control children.

Data on intelligence for Wave 0 children who have completed second grade and are now in the third grade are shown in Table 3. These experimental children had one year of nursery school and one year of kindergarten prior to completing grades one and two. As can be seen in Table 3, there was no significant difference on Stanford-Binet IQ scores between experimental and control children as they entered preschool, a significant difference at the end of preschool,

and no significant differences at the end of kindergarten, grade one, or grade two. Weikart (1967a) reported that similar patterns have held for succeeding waves of children in the study.

It should be noted that the preschool intervention program for the experimental group produced a significant gain in intellectual level which was maintained until the end of the first grade. The relative drop in IQ at the end of second grade is consistent with the findings of the Early Training Project and may be a function of the changing content of the Stanford-Binet at the 7-year-old level (greater emphasis on verbal content). It is also possible that the curriculum or teaching strategies used at the second-grade level were less appropriate for these children. Even more interesting is the pattern of intellectual performance of the at-home control group at various stages of testing. Since the major intellectual gains made by this group were from pre- to post-testing with no intervening treatment, it seems reasonable to conclude that the gains were the result of increased test sophistication, test-taking skills, and/or regression effects. Following the post-test-

ing, the intellectual level of the at-home control group remained relatively constant even after the children had been exposed to a traditional kindergarten program as their first school experience. This finding is contrary to that of the Indiana Project in which exposure to a traditional kindergarten as a first school experience for the KC group produced significant IQ gains. It is possible that these differences occurred because the traditional kindergarten class in the Indiana Project was specifically established as a contrast group for the study whereas the traditional kindergartens in the Perry Project were part of the regular school program rather than part of the study. Therefore, it is highly probable that a Hawthorne effect coupled with increased test sophistication and regression produced the difference in favor of the Indiana Project kindergarten group.

#### Summary

The above studies by no means exhaust the literature reporting the effects of intervention programs on the intellectual functioning of preschool disadvantaged children. However, they illustrate quite adequately that the intellectual functioning of disadvantaged children can be substantially raised by home intervention, preschool curriculum intervention, or a combination of both. No one approach, at this time, appears to be more effective than any other.

Whereas traditional preschool programs produce slight intellectual improvements, those programs designed specifically for meeting the needs of disadvantaged children appear to produce even greater intellectual gains. Bereiter & Englemann (1966) summar-

ized the findings of experimental preschool classes for the disadvantaged using traditional approaches as follows:

. . . on the average, disadvantaged children who have gone through a preschool will progress half the way from their initial IQ level to the normal level of 100. . . . Those few cases where disadvantaged groups have risen to an IQ level of 100 or above through preschool training have all involved radical departure from the traditional preschool model (p. 16).

#### The Effects of Intervention on Language Development

One of the major cognitive deficits accounting for the below-average general intellectual functioning of disadvantaged children is in the area of language behavior. It is, therefore, not surprising that all preschool projects reviewed in this paper have emphasized language development as a major curriculum goal. Although the need for improving the language functioning of disadvantaged children is well recognized, specific intervention strategies and measurement tools for assessing language changes are only beginning to emerge. Some of these emerging language intervention strategies include verbal bombardment (Weikart, 1967c), pattern drill (Bereiter & Englemann, 1966), diagnostic teaching (Spicker, Hodges, & McCandless, 1966), and programmed instruction (Keislar & Stern, 1966). Techniques for assessing language changes have included the use of such standardized instruments as the *Peabody Picture Vocabulary Test* (PPVT) and the *Illinois Test of Psycholinguistic Abilities* (ITPA), as well as the application of various linguistic approaches for analyzing the language samples of children.

Although the language approaches developed by Bereiter and those being

developed by Keislar & Stern appear to be quite promising, data as to their effectiveness are not yet available. Therefore, these approaches will not be discussed in this paper.

During the first year of the Indiana Project, described earlier, Stearns (1966) developed 67 diagnostically derived language lessons which were implemented by the experimental-class teacher during the second half of the year. During the first half of the year, the teacher had been given no explicit directions concerning language development so that a baseline rate of language change without a specific treatment could be determined. The purpose of the lessons was to remedy the observed linguistic deficits of individual children as assessed by the ITPA and by daily teacher evaluations of the language performance of the children during the structured language period. The techniques used to remedy these language deficits included response elaboration, verbal definition, and verbal feedback.

Two methods were used to develop response elaboration. The first consisted of three steps. Step one required the child to label or name an object. Step two required him to improve the quality of his response by identifying salient features of the object he was labeling. Step three required him to discriminate verbally between similar objects on the basis of their structural (size, shape, color, texture, etc.) or functional characteristics and to categorize apparently dissimilar objects based on some common elements.

The second method for developing response elaboration consisted of procedures for lengthening and completing verbal responses. Through feedback, direct questions, and providing model

responses, the teacher attempted to move the child from one-word responses to sentence fragments and finally to complete sentences. Verbal definition was incorporated in all lessons by having the teacher verbalize each action she performed and label each object she used.

Two forms of verbal feedback were employed. One was for the teacher to give the child a modified restatement of his response. The other was to give the child a corrective response in the presence of an incorrect one. For example, if the child labeled a cow as a *moo-moo*, the teacher responded with, "Yes, this is a cow, and cows say moo-moo," rather than, "No, it's a cow."

The effectiveness of Stearns' language lessons was assessed by administering the ITPA to the experimental group, a kindergarten group receiving a traditional preschool curriculum, and an out-of-school contrast group. The test was administered at the beginning of the school year, at midyear prior to the implementation of the language lessons, and at the end of the year. The results obtained during the kindergarten year as well as at the conclusion of first grade are shown in Table 4.

During the treatment period (midyear to end of year) the mean total language age scores of all three groups had increased. The experimental groups (EPS) had gained 9.6 months, the kindergarten contrast group (KC) 6.3 months, and the at-home regular contrast group (RC) 5.4 months. The differences were not statistically significant. However, analysis of the language gains of the three groups for the entire year indicated that the 19.4 months gain made by the EPS groups was significantly greater than the 12.6 and 12.2 months gains made by the KC and RC groups

TABLE 4

Indiana Project				
First Year ITPA Total Score Language Age in Months				
	<i>Kinder- garten Pre-test</i>	<i>Kinder- garten Mid-year</i>	<i>Kinder- garten Post-test</i>	<i>First Grade Follow-up</i>
Experimental Preschool (EPS)	47.8	57.7	67.2	72.8
Kindergarten Contrast (KC)	52.7	58.9	65.2	69.0
Regular Contrast (RC)	51.0	57.8	63.2	69.6

respectively. The failure of the kindergarten contrast group, which was receiving a traditional middle-class oriented preschool curriculum, to make significantly greater gains than the at-home contrast group once again raises the question as to the adequacy of the traditional curriculum for meeting the language needs of disadvantaged children.

Extended statistical analyses of the ITPA subtest scores were not performed, but some hypotheses from these data are worthy of consideration for curriculum refinement and further exploration. Differential gains in excess of the standard error of measurement and in favor of the experimental preschool group were noted on subtests assessing concept formation and expressive language processes (Visual-Motor Association, Vocal Encoding, and Auditory-Vocal Association). The smallest differential gains were produced at the non-meaningful level on subtests which assess visual and auditory memory functions [Auditory-Vocal Sequencing (Digit Span) and Visual-Motor Sequencing]. No differential gains were noted on those subtests which required the subject to interpret visual and auditory stimuli (Auditory Decoding, i.e., the ability to comprehend what is heard, and Visual Decoding, i.e., the ability to comprehend what is seen). These results are in gen-

eral agreement with those reported by Weaver (1963) from the Early Training Project of Gray & Klaus (1965).

Examination of the subtest data from the Indiana Project and the data reported by Weaver (1963) tends to indicate that even following the preschool experience culturally deprived children retain a relative deficiency in their ability to use the auditory-vocal channels for such tasks as auditory memory and efficient handling of syntactical aspects of language. For example, in the Indiana Project the post-test digit span age for both the experimental preschool group and the kindergarten contrast group was markedly below their post-test total language age scores. The same trend, although not as definite, was noted for the grammar subtest (Auditory-Vocal-Automatic). These results tend to indicate that a significant portion of the language curriculum for similar preschool programs should provide additional training in auditory discrimination. It is important to note that the ITPA subtests provide a restricted assessment of auditory memory and discrimination ability (Auditory-Vocal Sequencing and Auditory-Vocal-Automatic). Therefore, it is possible that gains in these skills may have occurred without showing up on the ITPA.

Turning to the follow-up data collect-

TABLE 5

Indiana Project First Year Peabody Picture Vocabulary Test IQ Means				
<i>Group</i>	<i>N</i>	<i>Kindergarten Pre-test <math>\bar{X}</math></i>	<i>Kindergarten Post-test <math>\bar{X}</math></i>	<i>First-Grade Follow-up Test <math>\bar{X}</math></i>
Experimental Preschool (EPS)	13	66.6	95.5	90.4
Kindergarten Contrast (KC)	13	64.9	80.5	81.8
Regular at-home Contrast (RC)	13	66.2	81.2	89.1
Diffusion at-home Contrast (DC)	13	74.4	81.5	88.3

ed at the end of first grade, it is readily apparent that the rate of language development for all groups during first grade is less than one-half that made during the previous year. This seems to indicate that language development occurs more readily during the preschool years and also implies a need for a continued oral language development program during the early school years.

In addition to the ITPA, the groups were also administered the *Peabody Picture Vocabulary Test* (PPVT) which appears to assess experiential or recognition vocabulary. The results shown in Table 5 indicate that although the scores of the four groups were not reliably different from one another on the pre-test administered at the beginning of kindergarten, the PPVT scores of the experimental group were significantly greater than all contrast groups by the end of kindergarten.

The PPVT first-grade follow-up data are quite similar to the Binet IQ follow-up data. Again the at-home contrast groups made significant IQ gains during their first grade experiences while the kindergarten contrast group remained relatively unchanged. The five-point re-

gression by the EPS group, although not significant, further points out the need for continued stress on language development in the elementary grades.

Both the ITPA and PPVT results indicate that factors other than the language lessons were producing increased language performance of the experimental children over the year. At least two explanations seem feasible at this time. The first is the teacher variable. The experimental class teacher spent a considerable amount of time eliciting language from the children whenever the opportunity presented itself. On the other hand, the kindergarten class contrast teacher tended to "talk at" the children, giving them little opportunity to express themselves. The second factor which may account for the differences is the manner in which language was brought into every aspect of the experimental curriculum. Whereas snack time, lunch periods, art, music, physical education, structured field trips, and story telling were used as vehicles for eliciting and developing language in the experimental class, these activities were used as ends in themselves in the kindergarten contrast class. For example, in the

experimental class a wooden puzzle of a farm scene would be used to teach the concepts of color, position, size, shape, quantity, texture, and function. In the kindergarten class, the same puzzle would be used to teach the child to put the correct pieces together.

The approach used to develop language in the Perry Preschool Project, termed "verbal bombardment," was described by Weikart (1967c) as follows:

In this method, the teacher maintains a steady stream of questions and comments to draw the child's attention to critical aspects of his environment. This *bombardment* does not necessarily demand answers from the child. It is continued when rewarding a child for a good performance, when disciplining him, and when presenting academic material. The complexity of the language is increased as the child's verbal ability develops (p. 173).

Every activity in the curriculum was used as an opportunity to develop language by the "verbal bombardment" technique.

ITPA data were reported by Weikart *et al.*, (1964) for Wave 0 at the completion of kindergarten and for Wave 1 at completion of two years of preschool. In neither wave was the difference in mean total language age between the experimental and control groups statistically significant. Since no pre-test or yearly ITPA tests were administered to the Perry groups, it is impossible to compare the language gain rates of the Perry Project children with those of the Indiana Project children.

Analysis of the Perry Project PPVT data indicated that the initial mean PPVT IQ score of 70.2 for the Wave 0 experimental group was relatively higher than the initial mean IQ of 66.6 obtained by the first-year experimental group from the Indiana Project. Al-

though no definitive statement can be made about the comparability of the Perry and Indiana groups with regard to their initial total language abilities, it appears that the groups were at least comparable in initial experiential vocabulary. However, the mean Perry Project PPVT IQ was 74.7 for Wave 0 experimental children after one year of preschool plus one year of traditional kindergarten and was 84.6 for Wave 1 experimental children after two years of preschool. The mean Indiana Project IQ was 95.5 after one year of experimental kindergarten. These data indicate that the language strategies used in the Indiana Project were more successful in increasing experiential or recognition vocabulary than were the strategies employed in the Perry Project.

#### **The Effects of Intervention on Motor Skills**

A survey of the literature indicates that the motor skills of culturally disadvantaged children functioning at the upper range of intellectual subnormality (IQ 65-85) are significantly less well developed than those of middle-class children of normal intelligence (Francis & Rarick, 1959; Malpass, 1960, 1963; Sloan, 1951). There appear to be no studies in the literature on the motor characteristics of disadvantaged children across the entire range of intelligence. It is, therefore, impossible at this time to determine whether poorly developed motor skills are a function of intellectual subnormality, cultural impoverishment, or some combination of both. However, since much of the traditional nursery school curriculum is already devoted to activities which attempt to develop motor and manipulatory skills (e.g., climbing, running, jumping, cut-

ting, pasting, coloring), it would appear fruitful to investigate the effectiveness of a motor training program for disadvantaged preschool children.

One of the few attempts to study the effects of a sequential motor development program on disadvantaged preschool children was made by Lillie (1966) as a sub-study of the Indiana Project (Spicker, Hodges, & McCandless, 1966). To determine the exact nature of the motor deficits exhibited by the children so that a structured motor program could be developed to remediate these deficits, it was first necessary for Lillie to determine the specific factors that make up motor proficiency. Guilford (1958) had successfully accomplished this by factor analyzing existing motor proficiency tests. His analysis revealed that motor skills consist of two factors—fine and gross. The fine motor factor includes finger speed, arm steadiness, arm and hand precision, and hand and finger dexterity; included in the gross motor factor are static balance, dynamic precision, gross body coordination, and flexibility. Lillie applied these findings to the *Lincoln-Oseretsky Motor Development Scale* (Sloan, 1955) and classified each item as either fine or gross motor. The scale was then used to divide his subjects into two instructional groups of approximately eight children each on the basis of whether they scored high or low on the fine or gross motor portion of the scale.

The treatment for the experimental group consisted of 65 diagnostic motor lessons. Although many of the lessons included the kinds of activities found in good preschool and kindergarten classes, specific attention in lesson construction was given to the fine and gross motor

proficiency levels of the children, the interest level of the lesson, and the sequential position of the motor experience (Lillie, 1966). The effectiveness of the motor development program was determined by comparing the motor proficiencies of the experimental group after treatment with contrast groups of similar children who had received either traditional preschool curriculum or had remained at home.

The post-test results indicated that although all three groups had made significant gains in the gross motor items of the *Lincoln-Oseretsky Motor Development Scale*, the differences among the three groups were not statistically significant. This finding is especially interesting because the two school groups had been exposed to a regularly scheduled physical education period each day. It appears that the running, jumping, balancing, and climbing opportunities available in the home and neighborhood are sufficient for developing gross motor skills. However, the post-test results indicated that only the experimental and kindergarten contrast groups had made significant gains in fine motor development, with the experimental group significantly superior to the kindergarten contrast group. It appears, therefore, that a traditional preschool program is effective in improving the fine motor proficiency of disadvantaged children, but even more effective results can be obtained by using techniques similar to those developed by Lillie.

#### The Effects of Intervention on Academic Achievement

The previous sections have dealt with the effects of intervention on intelligence, language, and motor skills.



TABLE 6

Perry Preschool Project California Achievement Test Wave 0 Percentile Ranks				
	<i>End of First Grade</i>		<i>End of Second Grade</i>	
	<i>Experimental</i>	<i>Control</i>	<i>Experimental</i>	<i>Control</i>
Reading	30	8 <sup>a</sup>	23	4 <sup>a</sup>
Arithmetic	10	3 <sup>a</sup>	17	5 <sup>a</sup>
Language Skills	39	16 <sup>a</sup>	20	3
Total	22	5 <sup>a</sup>	18	3 <sup>a</sup>

<sup>a</sup>These differences between Experimental and Control Mean Percentile Ranks were significant at the .05 level.

While the effects on these variables are certainly important in their own right, the major purpose of most intervention projects has been to offset the progressive achievement decrement so often noted for the disadvantaged child after school entrance. Have the programs succeeded in doing this? If so, to what degree and on what criteria has success been evaluated?

Data on the academic achievement of children who have been the subjects in experimental intervention projects described in this paper are just becoming available. Weikart (1967a) reported *California Achievement Test* mean percentile ranks and comparisons of the control and experimental children of Wave 0 through the completion of second grade (see Table 6).

In evaluating these results it is important to remember that the mean IQs of the experimental and control children just prior to school entrance were 88.9 and 84.6 respectively. The differences between these mean IQs were not statistically significant, but the differences between achievement test mean percentiles were statistically significant, as can be seen in Table 6. It appears that the

experimental children were, at least, able to profit from the first two years of school, whereas the control children who had not been exposed to the special preschool did not appear to profit from school at all. As a matter of fact, the consistently low mean percentiles of the control group are indicative of minimal performance on these achievement tests. It is also important to remember that the experimental children in Wave 0 receive only one year of preschool and a traditional kindergarten experience. Later waves of the Perry Project will have had two years of preschool before entering kindergarten. One may conjecture that the earlier and longer intervention programs for subsequent waves of children will produce more adequate school achievement than that demonstrated by this first experimental group. It is also apparent that the achievement of Wave 0 experimental children is indicative of a group of children who will continue to have trouble with traditional curricula and teaching strategies.

Klaus & Gray (1967) also report the results of achievement testing at the end of first and second grade for the Early Training Project children. At the end of

TABLE 7

The Early Training Project Metropolitan Achievement Test Means End of Second Grade (Norm 2.8)					
	<i>Word Knowledge</i>	<i>Word Discrimination</i>	<i>Reading</i>	<i>Spelling</i>	<i>Arithmetic</i>
T <sub>1</sub> (Exp.)	2.32	2.64	2.52	2.42	2.41
T <sub>2</sub> (Exp.)	2.47	2.73	2.75	2.85	2.55
T <sub>3</sub> (Cont.)	2.29	2.65	2.56	2.60	2.49
T <sub>4</sub> (Cont.)	1.98	2.20	2.11	1.99	2.05

TABLE 8

The Early Training Project Stanford Achievement Test Means End of Second Grade (Norm 2.8)						
	<i>Word Readiness</i>	<i>Paragraph Meaning</i>	<i>Spelling</i>	<i>Work Study Skills</i>	<i>Arithmetic</i>	<i>Vocabulary</i>
T <sub>1</sub> (Exp.)	2.19	2.38	2.22	2.02	1.93	1.92
T <sub>2</sub> (Exp.)	2.16	2.36	1.90	2.24	2.17	1.88
T <sub>3</sub> (Cont.)	2.14	2.16	2.22	2.29	2.08	1.89
T <sub>4</sub> (Cont.)	1.67	1.74	2.01	1.64	1.68	1.70

second grade, the two combined experimental groups were significantly better than the two combined control groups on the *Metropolitan Achievement Test* subtests of Word Knowledge, Reading, and Arithmetic (Table 7) and on the *Stanford Achievement Test* subtests of Word Reading, Paragraph Meaning, Work Study Skills, and Arithmetic (Table 8).

It should be recalled that at the beginning of second grade, the mean IQs of the experimental groups were 98.1 and 99.7 while those of the control groups were 91.4 and 89.4. Even though the control groups were similar on IQ at this point (and had been throughout the previous five Binet test administrations) and significantly below the IQ level of the experimental group, there are a number of achievement differences which favor the local control group.

The local control group performed significantly better than the distal control group on the Arithmetic subtest of the *Metropolitan Achievement Test* and on Word Reading, Paragraph Meaning, Work Study Skills, and Arithmetic of the *Stanford Achievement Tests*. In all other subtest comparisons at the end of second grade the local controls performed relatively (but not significantly) higher than the distal controls. In other words, the local control group was performing more like an experimental group than like a control group. It has been hypothesized by Gray (1966) that this unusual finding may have resulted from a horizontal diffusion effect among the experimental and control groups. This is a distinct possibility because the families and children of all three groups were located in the same community and within a relatively circumscribed

area within that community. As pointed out by Gray (1966), these results may also be a function of the differences in the adequacy of the schools in the two communities.

At the end of second grade, neither the Perry Preschool Project nor the Early Training Project experimental children were performing as well as advocates of preschool training for culturally deprived children might have hoped. On the other hand, none of the experimental groups, or the local control group of the Early Training Project, were performing as poorly as might have been predicted without intervention.

A comparison of the Early Training Project with the Perry Project raises the following questions. Why is it that the local control group in the Early Training Project performed so well while a similar group of controls in the Perry Preschool Project performed so poorly, especially when both of these groups were local controls from areas in the two cities from which both experimental and control children were selected?

A second question that may well be raised at this point is whether these reported achievement gains will be maintained past the end of the second grade. The Perry Preschool Project experimental group's mean percentile achievement rankings at the end of the second grade do not appear to be as substantial as those obtained at the end of the first grade. Will these children demonstrate a progressive achievement decrement through the next few years in school? The Early Training Project experimental children appear to be maintaining their relatively good standing at the end of second grade. It should be remembered that these two studies

started with groups of children from different segments of the IQ range. The Early Training Project did not select children on the basis of IQ, whereas the Perry Preschool Project selected children who had been diagnosed as educable mentally retarded.

Although the major long-term goal of preschool intervention programs has been to alleviate the progressive achievement decrements of disadvantaged children, one might justifiably ask whether such cognitively oriented programs have succeeded at the expense of adequate social development. Few investigators have addressed themselves to this question. As part of the first-grade follow-up of the Indiana Project all first-grade teachers having experimental or contrast children in their classrooms were asked to rate the social adjustment of all the children in their rooms. This was accomplished by comparing each child with every other child in the class on the basis of whether he was equal to, better than, or worse than that child on personal-social adjustment. An analysis of the paired comparisons indicated that the personal-social adjustment of the experimental children, as judged by their teachers, was significantly better than that of any of the three contrast groups.

Similar teacher ratings in favor of the Perry Project experimental children were obtained by Weikart (1967a) using the *Pupil Behavior Inventory* and the *Ypsilanti Rating Scale* for Wave 0 during kindergarten and grades one and two. These findings seem to indicate that cognitively oriented intervention programs enhance, rather than deter, good social adjustment.

Intervention programs especially designed to remedy cognitive deficits during the preschool years and to prevent

progressive school failures during the later school years have been relatively effective to date. There still remains, however, the annoying question of whether or not the children have benefited to the greatest extent possible. Intervention produces certain gains which are evident after the first period of a special program with little evidence that there is an increase in the rate of growth after the cessation of intervention. Are there strategies for modifying traditional school programs which will enhance the preschool gains of children

who have benefited from an intervention program? Or, on the other hand, are we creating a new discontinuity for the children between preschool intervention programs with highly individualized instruction and high teacher-pupil ratios, and regular public school programs with much less individualized instruction and low teacher-pupil ratios? If so, such a discontinuity should not be seen as a fault of preschool intervention programs, but should be viewed as an argument for modifying traditional kindergarten and primary school programs.

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