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AN EVALUATION OF THE EFFECTS OF A UNIQUE SEQUENTIAL LEARNING PROGRAM ON CULTURALLY DEPRIVED PRESCHOOL CHILDREN. FINAL REPORT.

-- VAN DE RIET, VERNON VAN DE RIET, HANI
FLORIDA UNIV., GAINESVILLE, COLL.HEALTH REL.PROF.

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TO IMPROVE THE DEVELOPMENTAL RATE OF CULTURALLY DEPRIVED CHILDREN, A PRESCHOOL PROGRAM WAS OFFERED WHICH CONSISTED OF A PLANNED SEQUENCE OF ENVIRONMENTAL STIMULATION BASED ON THE THEORY THAT COGNITIVE DEVELOPMENT PROCEEDS THROUGH MOTOR-PERCEPTUAL-SYMBOLIC PHASES. SEVENTY-TWO DISADVANTAGED CHILDREN WERE DIVIDED INTO THREE MATCHED GROUPS. GROUP A WAS EXPOSED TO AN EXPERIMENTAL "LEARNING TO LEARN" PROGRAM DEVELOPED BY HERBERT SPRIGLE WHICH CONCENTRATED ON MANIPULATING, ORGANIZING, CLASSIFYING, AND ORDERING MATERIALS DESIGNED TO LEAD TO INTERNALIZED THOUGHT AND EFFECTIVE VERBAL EXPRESSION. GROUP B ATTENDED TRADITIONAL PRESCHOOL. GROUP C HAD NO PRESCHOOL EXPERIENCE. NINETEEN DEVELOPMENTAL MEASURES WERE TAKEN FOR EACH CHILD AT THE END OF THE 9-MONTH EXPERIMENTAL PERIOD. RESULTS SHOWED THAT GROUP A CHILDREN WERE SUPERIOR ON ALL MEASURES. GROUP B WAS SUPERIOR TO GROUP C ON ONE-HALF OF THE MEASURES. IN A FOLLOWUP STUDY AT THE END OF THE FIRST GRADE, THE CHILDREN WERE GIVEN ADDITIONAL STANDARDIZED TESTS WHICH WERE SUPPLEMENTED BY TEACHERS' RATINGS. ANALYSIS OF THE DATA INDICATED THAT THE EXPERIMENTAL PRESCHOOL PROGRAM HAD BEEN EFFECTIVE, SINCE GROUP A CHILDREN WERE STILL SUPERIOR IN MEASURES OF INTELLECTUAL FUNCTIONING EVEN THOUGH DIFFERENCES BETWEEN THE THREE GROUPS HAD BEGUN TO DISAPPEAR BECAUSE THE NONPRESCHOOL GROUP HAD IMPROVED. ONE-HALF OF THIS REPORT IS A DETAILED ACCOUNT OF SPRIGLE'S PROGRAM PLUS FOLLOWUP STUDY DATA. (MS)

EVALUATION REPORT

Submitted to the Office of Economic Opportunity
Contracts Division

Final Report

An Evaluation of the Effects of an Unique Sequential Learning Program on Culturally Deprived Preschool Children

Contract Number: OEO 1389

Investigators: Vernon Van De Riet, Assistant Professor of Clinical Psychology

Hani Van De Riet, Assistant Professor of Psychology

Submitted by: College of Health Related Professions, University of Florida, Gainesville, Florida.

Telephone: Area code 904 - 376 - 3211, Extension 5637

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AN EVALUATION OF THE EFFECTS OF A UNIQUE SEQUENTIAL LEARNING PROGRAM ON CULTURALLY DEPRIVED PRESCHOOL CHILDREN

Final Report

Vernon and Hani Van De Riet

Introduction and Purpose:

Developmental psychologists have long maintained that intellectual, psychological, and social development proceed along an orderly sequence of motor-perceptual-symbolic phases with transitional periods in the developmental pattern. Gesell (1948), Hurlock (1959), Havighurst (1953), Piaget (1962, 1962, 1965), Prescott (1957), Breckenridge and Vincent (1955), and others have written about this sequential development. In order for the child to successfully deal with each of these phases, the proper tools and stimulation must be available to him in his environment. Concomitantly, the absence of the necessary tools and stimulation will bring about the absence of the necessary tools and stimulation will bring about the incomplete mastery of these phases.

This poses an interesting and challenging problem which needed to be studied. Can the slow rate of development manifested by culturally deprived children be corrected under a program making use of a planned sequence of environmental stimulation which is based on a knowledge of these phases? This study compared a group of culturally deprived preschool children who were exposed to such a planned sequence of experiences (Group A) with two matched control groups. One of the control groups (Group B) was exposed to a "traditional" preschool program which did not

use the planned sequence of experiences. The second control group (Group C) consisted of children who were not exposed to any formal preschool program.

The purpose of this study, therefore, was to evaluate the differential development of the children in these groups. It was hypothesized that Group A would be superior to Group B and that Group B would be superior to Group C in all developmental measures which were taken. Developmental measures were obtained at the end of the preschool program (Phase I) and again at the end of the first grade in the Jacksonville Public Schools (Phase II).

Research Background of the Study:

Experimental evidence supporting the hypothesis that cultural deprivation or an impoverished environmental background leads to slow intellectual development has been mounting since the early 1930's. Sherman and Key (1932), and Asher (1935) conducted longitudinal developmental studies of culturally deprived children. They found a progressive decrease in intelligence with increasing age. The studies of Crissey (1937), Gordon (1924), Skeels and Fillmore (1937), Skeels, Updegraff, Wellman and Williams (1938), and Wheeler (1942), resulted in similar findings.

Wellman (1932) became interested in how this slow development of culturally deprived children might be modified. She showed that preschool attendance helped lower socio-economic class retarded children in their intellectual development. Thirteen years later Wellman (1945) reviewed fifty studies of the effects of preschool group learning

experience on I.Q. Her review indicated that preschool attendance increased the I.Q. of children by about five or six points when compared to children who did not have this experience. Shodak and Skeels (1949) studying children who were adopted from culturally deprived homes into middle-class homes, found that I.Q. increased with this kind of environmental change.

A large number of studies has been made of the intelligence of culturally deprived Negro children. Three recent reviews (Dreger and Miller, 1960; Kennedy, Van De Riet, and White, 1963; Shuey, 1966) indicate that over one hundred studies have been published dealing with the intellectual development of culturally deprived American Negroes. These studies support the hypotheses that cultural deprivation leads to intellectual inferiority, that intelligence can be increased by introducing environmental enrichment, and that exposure to a more middle-class environment improves intellectual development.

This body of research along with findings of Head Start projects gives ample research support to indicate the preschool learning programs improve intellectual development. We are now at a point where it is important to study the kind of preschool learning programs that will be the most effective in improving the development of the child. This study compared the developmental effects of a sequential, structured, learning program, a "traditional" program, and a no treatment program.

Description of the Experimental Program:

The experimental learning program (Sprigle, in press) has three basic aims: 1. To help the child learn to learn; 2. To expose the

child to a curriculum based on a continuity of learning experiences and developmental tasks and, 3. To provide the tools and techniques with which to stimulate movement from one phase of development into another. The developmental model of the program is that cognitive development proceeds through motor-perceptual-symbolic phases.

In conceiving and formulating the curriculum, the first order of business was to decide what was to be taught, when and how. It was here that this program departed from "traditional" preschool programs which put a major emphasis on emotional-social development and readiness skills in preparation for first grade. The major purpose in shaping this curriculum was to prepare the child not for first grade, but for learning. The content was designed to be worth knowing later on in school, at home, or on the playground. To accomplish this end, it was decided that the curriculum should be built on a series of developmental tasks that would emphasize manipulating, organizing, classifying, and ordering things that lead to internalized thought and effective verbal expression.

As a guide to the question of when each task should be taught, the authors turned to the research that points out that a child goes through stages of development and at each stage he has characteristic ways of looking at and explaining the world to himself and others. The content became a carefully planned sequence of experiences that followed this course of development. The sequence was made to meet another criterion of great importance. Each part of the program was to have some continuity with the learning that was to follow. The developmental tasks were ordered to lead the child to an understanding and mastery of new information

and situations as a result of what had been learned previously.

The question of now to teach was especially challenging in view of our goals to successfully develop a foundation on which to build more complex learning. The tasks were reduced to the child's level of understanding, and made use of games and a play orientation which gave the child an opportunity to try things out on his own. The children were neither pressured to learn nor flooded with information in an attempt to overcome their handicaps, but rather were given a minimum of information to use in a variety of ways. Basic ideas were repeated each time extending and expanding the uses to which they could be put and the child was encouraged to verbalize his knowledge.

The newly developed materials for the experimental program were made to meet the following criteria: 1. They had to appeal to the child to evoke some curiosity to get him to try them, 2. They had to be interesting enough to the child to keep him playing, 3. The child had to understand the material so that he could feel sure of what he was doing and working toward and, 4. The goal that the child was working to reach had to be clear to him and he had to know when and if he were making progress toward it.

The organization of the experimental program was built on the assumption that cognitive growth and development proceed in an orderly sequence with periods of transition. It was assumed, on the basis of past research, that the sequence proceeds from motor to perceptual to symbolic aspects of cognitive functioning. In the motor stage the child's

first cognitive working concern is in manipulating the world through actions. By establishing a relationship between experience and action, the child becomes aware of certain surface features by which he can identify the objects with which he works and the world around him. Through the perception of the world around him he learns the relationships between the various things he observes. He must be taught to perceive, recognize, catagorize and discover relationships. This leads to the stage of symbolic formation which enables the child to talk about and deal with things and ideas in the abstract, or in the absence of any observable concrete objects or relationships.

These stages of development provide the structure for the planned sequential learning program wherein each activity builds upon the vocabulary and experiences of the previous activities. The curriculum progresses through a planned sequence of tasks designed to move the child from a stage of dependency on actual manipulation of concrete objects to the point where he can internalize and manipulate without the presence of concrete materials.

The program required that the methods employed to teach the young child must be flexible, play oriented and adaptable to different developmental and learning levels. The materials are flexible enough to be used by slow children as well as very bright ones. They can be made simple or complex and challenging.

The teachers in this program are child-oriented rather than subject-matter oriented. Their major purposes are to pose problems for the children, ask questions, and to stimulate interest and curiosity. The

aim of the program is to get the child to become active in the learning process and to make his own discoveries, formulate his own questions, and learn from his own activities, observations, and formulations. The teacher, therefore, must be perceptive and sensitive to how the child works with and uses the materials.

Two teachers, as well as two classroom areas, are necessary. One room must be large enough to accommodate a class engaged in a variety of activities. A smaller room is used by one teacher for short sessions devoted to the planned sequential activities. Here the size of the group is limited to four children who are homogeneous with respect to level and rate of learning.

A complete description of the program and materials is contained in the publication Inquisitive Games (Sprigle, in press).

Method:

Subjects: The subjects consisted of 72 culturally deprived Negro five-year-olds from Jacksonville, Florida. The children were divided into three groups matched on the basis of socio-economic level and cultural background, age, sex, school readiness skills, and intelligence.

Matching on socio-economic level and cultural background was accomplished by selecting all subjects from homes in deprived neighborhoods of Jacksonville, Florida, who came from families with incomes below $3,000 - nually. None of the parents were employed at an occupational level above unskilled laborer. To control for intelligence and school readiness skills the three groups were matched on scores obtained on the Stanford-Binet Intelligence Scale and the Sprigle School Readiness Screening Test.

Instruments: The instruments which were used to measure the developmental characteristics at the end of the preschool (Phase I) program were as follows:

Developmental Characteristics	Instruments
(1) General Intelligence	Stanford-Binet Intelligence Scale, Form L-M (Terman and Merrill, 1960)
	Human Figure Drawings (Harris, 1963)
	Peabody Picture Vocabulary Test (Dunn, 1959)
(2) Perceptual-motor skills	Bender Motor Gestalt Test (Koppitz, 1964)
(3) Vocabulary development	Vocabulary subtests of the Stanford-Binet
(4) School readiness skills	Metropolitan Readiness Test (Hildreth and Griffiths, 1949)
	School Readiness Screening Test (Sprigle, 1966)
(5) The ability to express ideas	The Illinois Test of Psycho-linguistic Abilities (McCarthy and Kirk, 1961) Vocal encoding subtest
(6) Language comprehension	The Illinois Test of Psycho-linguistic Abilities (McCarthy and Kirk, 1961) Visual decoding subtest
(7) Verbal reasoning ability	The Illinois Test of Psycho-linguistic Abilities (McCarthy and Kirk, 1961) Auditory-vocal association subtest
(8) Social maturity	Modification of Long Beach Social Maturity Scale
(9) Spatial abilities	Seguin Form Board - Arthur Revision (Arthur, 1947)
(10) Gross motor coordination	Rail Walking Test
(11) Concept formation	The Illinois Test of Psycho-linguistic Abilities (McCarthy and Kirk, 1961) The Visual-motor association subtest

At the end of the first grade (Phase II) the measures were the same except for the following changes: 1. the Wechsler Intelligence Scale for children was also used to measure general intelligence; 2. instead of measuring school readiness skills the Stanford Achievement test was given to each child; 3. the rail walking test was not used; 4. ratings, on a ten point scale, were obtained by the examiners from each child's teacher on the following characteristics:

a. Leadership
b. Effort
c. Interest in school work
d. Ability in writing
e. Ability in reading
f. Ability in numbers and arithmetic concepts
g. Ability to get along with classmates socially and interpersonally
h. Overall discipline
i. Overall adaptation to the first grade
j. Various intellectual and social-emotional characteristics

Procedure: From September, 1965 to May, 1966, Group A was brought into the experimental sequential program of planned and guided learning experiences described above.

Group B was exposed to "traditional" methods of teaching preschool children during the same time. They attended established church-run kindergarten classes in Jacksonville, Florida. Their program consisted of group activities designed to expose the children to a large variety of stimulation, but was not based on the developmental sequential program

nor was it designed to teach these children how to learn.

Group C received no formal preschool program. These children remained at home throughout the year.

The evaluation data for Phase I were collected during the last part of April and the months of May and June, 1966, following the completion of most of the training programs for Groups A and B. The testing was done in individual rooms at the Learning to Learn School. Before the testing was begun, some time was spent in acclimating all of the children to the school setting, testing rooms, and examiners. This was done so that adequate rapport could be gained with the children in all three groups.

The evaluation data for Phase II were collected in April and May, 1967. This testing was done in rooms within the school setting.

The Metropolitan Readiness Test and the Stanford Achievement Test were administered by a trained teacher in the classroom. The other data were collected in individual testing sessions by trained examiners.

Results - Phase I

The means and levels of significance of the 19 developmental test measures taken by all three groups of children at the completion of Phase I are given in Table 1. The performance of the three groups was compared by means of a simple analysis of variance for each variable. The F values which resulted from these tests are shown in Column 4 and the probabilities of obtaining mean scores this disparate by chance alone are shown in Column 5. It is apparent that on 18 of 19 measures the

difference between the groups is so great that the confidence level exceeds .999 (On the remaining measure the confidence level exceeds .995). The differences between the three groups were so large that one was justified in determining the locus of the difference. In other words, it needed to be determined if the difference was primarily between the experimental group and the "traditional" group or whether the major difference was between the " traditional" group and the no training group. This was determined by t tests which are listed in Columns 6, 7, and 8 of Table 1.

It should be noted that scores on four of the measures (Information and Matching subtests of the Metropolitan Readiness Test; Seguin Form Board; and Rail Walking) did not possess homogeneity of variance according to Bartlett's test. Therefore, t tests were employed for these measures which estimate the standard error of mean difference from the size of the samples (Walker and Lev, 1953, p. 157). An inspection of the data reveals that the no training group is inclined to have much greater variability than the other groups. The individual test scores for all subjects are presented in Appendix B. It may be important to study the reasons for this greater variability.

The t tests indicate that the experimental group was always significantly superior to the "traditionally" trained group and to the no treatment group. The "traditionally" trained group was superior to the no treatment group in nine of twenty comparisons. Thus, the major part of the differences among the three groups was contributed by the

Table 1

The Means, F Values and p Values of all of the Developmental Measures for Groups A, B, and C and the t Values of the Between Group Differences

Variables	Experimental training $\bar{X}_A$	Traditional training $\bar{X}_B$	No training $\bar{X}_C$	F ratio*	p value	$t_{A \cdot B}$**	$t_{B \cdot C}$**	$t_{A \cdot C}$**
Binet I.Q.	104.12	90.33	83.29	33.24	<.001	5.36	2.89	7.50
Human Figure Drawings	16.33	10.04	7.08	24.25	<.001	4.47	2.14	7.26
Peabody Picture Vocabulary	54.50	38.54	35.83	38.33	<.001	7.62	1.11	7.90
Bender-Gestalt (error scores)	11.96	15.46	17.33	17.16	<.001	-3.67	-2.28	-5.33
Binet Vocabulary	5.62	3.71	2.71	19.19	<.001	4.40	1.97	5.95
Metro. Readiness Test-Word meaning	14.04	11.25	10.79	13.87	<.001	4.55	.62	5.02
Metro. Readiness Test-Sentences	9.21	7.21	7.21	8.06	<.001	3.45	0	3.58
Metro. Readiness Test-Information	10.96	8.83	8.08	9.34	<.001	3.74	.98	4.00
Metro. Readiness Test-Matching	12.04	8.75	8.54	8.70	<.001	3.25	.20	4.58
Metro. Readiness Test-Numbers	14.25	6.50	4.67	68.91	<.001	8.10	2.21	11.87
Metro. Readiness Test-Copying	5.96	2.17	1.50	42.70	<.001	6.91	1.31	8.89
Metro. Readiness Test-Total	66.46	44.71	40.79	43.46	<.001	7.14	1.25	9.52
SSRS T	20.08	13.79	13.21	26.22	<.001	5.78	.59	6.37
ITPA Vocal Encoding	20.21	10.79	10.58	77.75	<.001	10.60	.26	10.26
ITPA Visual Decoding	13.04	10.12	8.67	17.52	<.001	4.07	2.01	5.40

Table 1 -- cont.

Variables	Experimental training $\bar{X}_A$	Traditional training $\bar{X}_B$	No training $\bar{X}_C$	F ratio*	p value	$t_{A \cdot B}$**	$t_{B \cdot C}$**	$t_{A \cdot C}$**
ITPA Auditory-vocal Association	15.42	11.42	9.08	27.60	<.001	4.63	2.76	7.23
ITPA Visual motor Association	16.58	11.42	9.92	32.80	<.001	6.00	1.72	7.80
Seguin Form Board (time score)	23.46	31.46	33.08	6.34	<.005	-3.92	-1.37	-2.93
Rail Walking (error score)	10.92	31.83	28.21	28.08	<.001	-7.99	1.04	-6.23

*The F values for the various probability levels when $m_1 = 2$ and $m_2 = 60$ are as follows:

$F_{.95} = 3.15$ $\quad F_{.995} = 5.79$

$F_{.99} = 4.98$ $\quad F_{.999} = 7.76$

**The t values for the various probability levels when n = 40 are as follows:

$t_{.95} = 1.68$ $\quad t_{.995} = 2.70$

$t_{.99} = 2.42$ $\quad t_{.9995} = 3.55$

superior scores of the experimental group over the two control groups. The "traditionally" trained group showed higher performance than the no treatment group but the differences were not nearly as great as between the experimental and "traditional" groups.

The discrepancies in developmental test scores between the experimental and control groups were not only statistically significant, but were practically significant. For example, the experimental group had an average I.Q. which was nearly 21 points above the no training group. Notice that the no training group actually decreased during the school year in I.Q. while the experimental group increased and the "traditional" group remained constant. (All groups had I.Q.'s between 89.6 and 90.6 at the beginning of the school year). As can be seen from Table 1, the other measures showed similar differences.

The results, therefore, strongly supported the hypothesis that the experimental group would be superior to the control groups on the various developmental measures. The hypothesis that the traditionally trained group would be superior to the no treatment group was also supported but not as conclusively.

Additional Analyses - Phase I:

The Harris DAP Test and the Koppitz Bender-Gestalt Test are both measures which require a large number of scoring decisions which are not always clear-cut. Therefore, it seemed necessary to assess the reliability of the scoring by having all measures scored by two different persons and to calculate a Pearson r between the two scorers. The correlation between the two scorers on the Harris DAP Test was equal to .96 for the 72 paired

subjects. The correlation between the scorers on the Koppitz Bender-Gestalt Test was .86 for the 72 paired subjects. These results indicate that both measures can be reliably scored.

A correlation matrix was run deriving the correlation of each measure with every other measure. This was done to learn how the various measures were related, and particularly to learn which of the measures were highly correlated. These data for Groups A, B, and C are presented in Tables 2, 3, and 4 respectively. None of the measures show such a high correlation that one could assume they were measuring the same aspects of development. The tests showing the highest correlations (above .70 in each group) were the Stanford-Binet and the total score of the Metropolitan Readiness Test; the Sprigle School Readiness Screening Test and the Metropolitan Readiness Tests. Several of the subtests within the Metropolitan Readiness Test also correlated highly with the total score for that test as would be expected.

The analysis of the social maturity data indicated that two of the items, participation in group responsibility and emotional adjustment, resulted in the greatest discrimination of the groups. On these items Group A was rated as showing more cooperation and leadership in group activities than Group B. They were also judged to be more emotionally stable. Social maturity data was not obtained for Group C because not enough time could be spent with them to make accurate ratings. A sample of the social maturity scale is presented in Appendix C.

Table 2

Intercorrelations of the Post Measures for Group A*

	1	2	3	4	5	6	7	8	9	10
1		.3690	.4319	.4520	.3077	.5406	.4547	.6313	.5359	.2781
2	.3690		.8968	.2243	.4695	.3368	.2934	.2085	.0564	.2628
3	.4319	.8968		.1885	.5765	.3714	.2592	.2692	.1243	.0861
4	.4520	.2243	.1885		.1368	.6657	.4790	.4456	.1399	.3848
5	.3077	.4695	.5765	.1368		.4777	.2194	.5693	.2010	-.1093
6	.5406	.3368	.3714	.6657	.4777		.7332	.5372	.2015	.0599
7	.4547	.2934	.2592	.4790	.2194	.7332		.4759	.3292	.2015
8	.6313	.2085	.2692	.4456	.5693	.5372	.4759		.4233	.1102
9	.5359	.0564	.1243	.1399	.2010	.2015	.3292	.4233		.4549
10	.2781	.2628	.0861	.3848	-.1093	.0599	.2015	.1102	.4549	
11	.5919	.4910	.3616	.2947	.2194	.3351	.2936	.3608	.3818	.5799
12	.7045	.3825	.3223	.5589	.3141	.6041	.6775	.6375	.7274	.6924
13	.6495	.5346	.5514	.4766	.1840	.5927	.6416	.3589	.4338	.5025
14	.4008	.0807	.1535	.3657	.0771	.5619	.6871	.4421	.1331	.0530
15	.3375	.2252	.1136	.3795	.2873	.2621	.2280	.4077	.3658	.2836
16	.3769	.2989	.3172	.5719	.3983	.5489	.4484	.5476	.3692	.4743
17	-.4698	-.3209	-.3320	-.3991	-.2786	-.3356	-.3032	-.4177	-.2807	-.2603
18	-.1430	-.5745	-.7202	-.0881	-.4023	-.2279	-.1503	-.1681	.0528	-.1006
19	.1980	-.0181	.413	.0985	.0233	.0638	.1332	.1685	.3446	.0941

Table 2 - cont.

	11	12	13	14	15	16	17	18	19
1	.3919	.7045	.6495	.4008	.3375	.3769	-.4698	-.1430	.1980
2	.4910	.3825	.5346	.0807	.2252	.2989	-.3209	-.5745	-.0181
3	.3616	.3223	.5514	.1535	.1136	.3172	-.3320	-77202	.0143
4	.2947	.5589	.4766	.3657	.3795	.5719	-.3991	-.0881	.0985
5	.2194	.3141	.1840	.0771	.2873	.3983	-.3786	-.4023	.0233
6	.3351	.6041	.5927	.5619	.2621	.5489	-.3356	-.2279	.0638
7	.2936	.6775	.6416	.6871	.2280	.4484	-.3032	-.1503	.1332
8	.3608	.6375	.3589	.4421	.4077	.5476	-.4177	-.1681	.1685
9	.3818	.7274	.4338	.1331	.3658	.3692	-.2807	.0528	.3446
10	.5799	.6924	.5025	.0530	.2836	.4743	-.2603	-.1006	.0941
11		.7281	.5992	.2480	.3930	.5878	-.4029	-.2627	.2826
12	.7281		.7549	.4505	.4699	.7102	-.4708	-.1847	.2671
13	.5992	.7549		.4850	.1964	.5162	-.3743	-.4087	.2890
14	.2480	.4505	.4850		.2921	.3961	-.3886	-.3077	.1504
15	.3930	.4699	.1964	.2921		.2666	-.3819	.0788	.4320
16	.5878	.7102	.5162	.3961	.2666		-.2306	-.4467	-.1390
17	-.4029	-.4708	-.3743	-.3886	-.3819	-.2306		.2944	-.4225
18	-.2627	-.1847	-.4087	-.3077	.0788	-.4467	.2944		.1968
19	.2826	.2671	.2890	.1504	.4320	-.1390	-.4225	.1968	

Table 3

Intercorrelations of the Post Measures for Group B*

	1	2	3	4	5	6	7	8	9	10
1		.4822	.4463	.6034	.2621	.5182	.4315	.6154	.5493	.4832
2	.4822		.9695	.5510	.3566	.4203	.3563	.6288	.5156	.1929
3	.4463	.9695		.5015	.2873	.4030	.3235	.5392	.4736	.2603
4	.6034	.5510	.5015		.5960	.7601	.2854	.6875	.4463	.1596
5	.2621	.3566	.2873	.5960		.3124	.1372	.5428	.0670	-.2333
6	.5182	.4203	.4030	.7601	.3124		.4187	.4470	.5473	.1680
7	.4315	.3563	.3235	.2854	.1372	.4187		.3962	.5096	.2967
8	.6154	.6288	.5392	.6875	.5428	.4470	.3962		.5192	.2186
9	.5493	.5156	.4736	.4463	.0670	.5473	.5096	.5192		.4482
10	.4832	.1929	.2603	.1596	.2333	.1680	.2967	.2186	.4482	
11	.5141	.5881	.5873	.3794	.0167	.3127	.3770	.4314	.7534	.4949
12	.7097	.5966	.5749	.5970	.1482	.6533	.6605	.6602	.9003	.6487
13	.7016	.4594	.4590	.5754	.2765	.5249	.4610	.5325	.7239	.6513
14	.1603	.0952	.0801	.3929	.1217	.3871	.2052	.2067	.3446	.1598
15	.0953	-.0219	.0382	.2980	.0626	.1996	.2146	.1436	.0848	.2423
16	.4495	.4439	.3967	.8330	.5158	.6462	.4070	.4741	.3866	.1071
17	-.5115	-.5121	-.4935	-.4668	-.2555	-.2797	-.3204	-.4005	-.4907	-.5472
18	-.2182	.2887	.3383	-.2230	-.1119	-.3088	-.0712	-.0337	.0486	-.1261
19	.0835	.4728	.4413	.2656	-.0551	.3516	.2839	.2594	.4607	.3422

Table 3 - cont.

	11	12	13	14	15	16	17	18	19
1	.5141	.7097	.7016	.1603	.0953	.4495	-.5115	-.2182	.0835
2	.5881	.5966	.4594	.0952	-.0219	.4439	-.5121	.2887	.4728
3	.5873	.5749	.4590	.0801	.0382	.3967	-.4935	.3383	.4413
4	.3794	.5970	.5754	.3929	.2980	.8330	-.4668	-.2230	.2656
5	.0167	.1482	.2765	.1217	.0626	.5158	-.2555	-.1119	-.0551
6	.3127	.6533	.5249	.3871	.1996	.6472	-.2797	-.3088	.3516
7	.3770	.6605	.4601	.2052	.2146	.4070	-.3204	-.0712	.2839
8	.4314	.6602	.5325	.2067	.1436	.4741	-.4005	-.0337	.2594
9	.7534	.9003	.7239	.3446	.0848	.3866	-.4907	.0486	.4607
10	.4949	.6487	.6513	.1598	.2423	.1071	-.5472	-.1261	.3422
11		.7783	.4930	.3345	.0472	.2762	-.5756	.2223	.3578
12	.7783		.8076	.3750	.2115	.5036	-.6090	-.0649	.4877
13	.4960	.8076		.3219	.3372	.4976	-.6398	-.2281	.4342
14	.3345	.3750	.3219		.5211	.1211	-.1478	-.1323	.4140
15	.0472	.2115	.3372	.5211		.2709	-.2827	-.2454	.2434
16	.2762	.5036	.4976	.1221	.2709		-.4935	-.1866	.1670
17	-.5756	-.6090	-.6398	-.1478	-.2827	-.4935		.0708	-.5234
18	.2223	-.0649	-.2281	-.1321	-.2454	-.1866	.0708		.0804
19	.3578	.4877	.4342	.4140	.2434	.1670	-.5234	.0804	

Table 4

Interrelations of the Post Measures for Group C*

	1	2	3	4	5	6	7	8	9	10
1		.4548	.3428	.6400	.4749	.3785	.4389	.3958	.6059	.6538
2	.4548		.9268	.1426	.0798	.3764	.3065	.3221	.5255	.3206
3	.3428	.9268		.1036	-.0440	.2972	.1213	.3639	.4415	.3369
4	.6400	.1426	.1026		.6520	.3631	.3286	.6643	.4863	.3944
5	.4749	.0798	-.0440	.6520		.3712	.2135	.2849	.3856	.3272
6	.3785	.3764	.2972	.3631	.3712		.0925	.3178	.3459	.2200
7	.4389	.3065	.1213	.3286	.2135	.0925		.1421	.5487	.3216
8	.3958	.3221	.3639	.6643	.2649	.3178	.1421		.4645	.3498
9	.6059	.5255	.4415	.4863	.3856	.3459	.4387	.4645		.5972
10	.6538	.3206	.3369	.3944	.3272	.2200	.3216	.3498	.5972	
11	.4660	.5088	.4560	.1627	.1068	.2425	.1610	.3307	.4638	.7273
12	.7127	.5695	.4956	.6279	.4347	.5788	.5245	.6950	.8431	.7521
13	.6986	.5027	.4530	.4739	.4839	.2324	.4001	.4046	.5938	.6970
14	.2043	.2387	.2571	.3255	.0759	.2612	.1707	.5139	.4922	.5102
15	.4419	.2924	.1795	.7042	.4117	.4637	.3498	.4333	.5037	.2871
16	.5073	.3700	.4724	.3760	.3312	.3270	.1239	.4378	.5976	.7544
17	-.4339	-.4484	-.5216	-.3814	.0082	-.3163	.0375	-.5057	-.4061	-.3896
18	-.4151	-.2060	-.2341	-.4857	-.0463	-.1943	-.2496	-.6990	-.3343	-.4603
19	.3863	.3062	.2749	.3526	.1311	.1994	.4764	.4493	.4797	.4696

Table 4 - cont.

	11	12	13	14	15	16	17	18	19
1	.4660	.7127	.6986	.2043	.4419	.5073	-.4339	-.4151	.3869
2	.5088	.5695	.5027	.2387	.2924	.3700	-.4484	-.2060	.3062
3	.4560	.4956	.4530	.2571	.1795	.4724	-.5216	-.2341	.2749
4	.1627	.6279	.4739	.3255	.7042	.3760	-.3814	-.4857	.3526
5	.1068	.4347	.4839	.0759	.4117	.3312	.0082	-.0463	.1311
6	.2425	.5788	.2324	.2612	.4637	.3270	-.3163	-.1943	.1994
7	.1610	.5245	.4001	.1707	.3498	.1239	.0375	-.2496	.4764
8	.3307	.6950	.4046	.5139	.4333	.4378	-.5057	-.6990	.4493
9	.4638	.8431	.5938	.4922	.5037	.5976	-.4061	-.3343	.4797
10	.7273	.7521	.6970	.5102	.2871	.7544	-.3896	-.4603	.4696
11		.6641	.6506	.5647	.1640	.6254	-.4439	-.5563	.3916
12	.6641		.7046	.6151	.5669	.6956	-.5140	-.6145	.5983
13	.6506	.7046		.3419	.3014	.7225	-.3389	-.4403	.3006
14	.5647	.6151	.3419		.2989	.3004	-.2187	-.6178	.3761
15	.1640	.5669	.3014	.2989		.2658	-.3670	-.2975	.2768
16	.6254	.6956	.7225	.3004	.2658		-.5394	-.3692	.3409
17	-.4439	-.5140	-.3389	-.2187	-.3670	-.5394		.3651	-.2157
18	-.5563	-.6145	-.4403	-.6178	-.2975	-.3692	.3651		-.3659
19	.3916	.5983	.3006	.3761	.2768	.3409	-.2157	-.3659	

* The variable numbers for the intercorrelations represent the following measures:

1. Stanford-Binet Intelligence Scale
2. Human Figure Drawings, Scores I
3. Human Figure Drawings, Scores II
4. Peabody Picture Vocabulary Test
5. Binet Vocabulary Score
6. Metropolitan Readiness Test, Word Meaning
7. Metropolitan Readiness Test, Sentence
8. Metropolitan Readiness Test, Information
9. Metropolitan Readiness Test, Matching
10. Metropolitan Readiness Test, Numbers
11. Metropolitan Readiness Test, Copying
12. Metropolitan Readiness Test, Total Score
13. School Readiness Screening Test
14. Illinois Test of Psycholinguistic Abilities, Verbal Encoding
15. Illinois Test of Psycholinguistic Abilities, Visual Decoding
16. Illinois Test of Psycholinguistic Abilities, Auditory-Vocal Association
17. Seguin Form Board
18. Rail Walking Test
19. Illinois Test of Psycholinguistic Abilities, Visual-Motor Association

Results - Phase II

Developmental Measures at the Completion of First Grade

The means and levels of significance of the 17 developmental measures taken by all three groups of children at the completion of their first year in public elementary schools are given in Table 5. The performance of the three groups was again compared by means of a simple analysis of variance for each variable. The F values shown in Column 5 indicate that with the exception of the Bender-Gestalt Test and the Binet Vocabulary Subtest the differences between the three groups are highly significant. In order to determine the locus of these differences on the remaining variables t tests were employed and these are presented in Columns 6, 7, and 8. Appendix D contains the individual data for all three groups at the end of first grade.

Most follow-up studies of other preschool programs (Wolff, M. and Stein, Annie, unpublished O.E.O. report; Harding, J., unpublished O.E.O. report) have found that the advantage which their programs provide to children tends to have disappeared by the end of first grade so that children with preschool experience are not ahead of those who did not have such experience. In contrast, this experimental program results in an extremely large developmental superiority which largely remains at the end of first grade. The children in the experimental group are performing better than children without preschool experience to such a degree that the difference is generally significant at the .001 level (Column 7). Furthermore, the children in the experimental group are also performing better than the children exposed to a traditional preschool

program (Column 6). This difference is particularly large on measures of intellectual ability such as the WISC, Binet, and Peabody Picture Vocabulary Test. This difference is again large enough to be of extreme importance and practical significance.

On the other hand, the follow-up comparisons between the traditionally trained group and the group without preschool experience show that much of the difference has begun to disappear so that on some of the most important measures of intellectual functioning, (WISC Verbal I.Q., Binet I.Q., and PPVT) there is no longer any statistically significant difference between the two groups.

TABLE 5

A Comparison of Mean Scores of the Three Groups on Developmental Measures Taken at End of First Grade

Developmental Measures	Experimental Training $\bar{X}_A$	Traditional Training $\bar{X}_B$	No Training $\bar{X}_C$	F Ratio	t_{A-B}	t_{A-C}	t_{B-C}
1. WISC Full Scale I.Q.	103.00	89.70	82.15	18.96***	4.01***	5.69***	2.25*
2. WISC Verbal I.Q.	104.24	90.10	86.05	15.33***	4.19***	4.96***	1.20
3. WISC Performance I.Q.	100.86	91.20	81.20	14.68***	2.75**	5.46***	2.62**
4. Stanford-Binet I.Q.	101.10	89.30	84.40	10.40***	3.19**	4.08***	1.39
5. Human Figure Drawings	18.14	20.65	15.40	5.13**	-1.54	1.79*	3.05**
6. PPVT	61.24	52.95	51.50	11.26***	3.85***	4.24***	.65
7. Stanford Achievement Test - Word Meaning	1.95	1.72	1.30	8.94***	1.22	4.86***	2.92**

TABLE 5 - cont.

Developmental Measures	Experimental Training $\bar{X}_A$	Traditional Training $\bar{X}_B$	No Training $\bar{X}_C$	F Ratio	t_{A-B}	t_{A-C}	t_{B-C}
8. Stanford Achievement Test - Paragraph Meaning	1.75	1.68	1.42	4.58*	.46	3.44**	2.36*
9. Stanford Achievement Test - Vocabulary	2.20	1.74	1.46	5.91*	1.85*	3.21**	1.68
10. Stanford Achievement Test - Arithmetic	2.01	1.64	1.23	12.05***	1.92*	5.23***	3.13**
11. Stanford Achievement Test - Total Divide by 4	1.98	1.70	1.35	13.14***	1.93*	6.40***	2.84**
12. Bender (error score)	7.90	9.80	10.15	2.02 NS	-	-	-
13. Binet Vocabulary	6.29	5.45	5.55	1.71 NS	-	-	-
14. ITPA - Vocal Encoding	19.52	1.41	10.90	23.89**	4.93***	6.38***	2.38*
15. ITPA - Visual Decoding	13.90	11.70	10.60	5.20**	2.27*	3.06**	1.00
16. ITPA - Aud. Vocal Association	18.29	15.75	13.45	9.17**	2.78**	3.85***	1.90*
17. ITPA - Visual Motor Association	17.71	15.10	13.55	5.43**	2.22*	3.33**	1.09

* significant at .05 level

** significant at .01 level

*** significant at .001 level

$N_A = 21$

$N_B = 20$

$N_C = 20$

This finding is an expected one on the basis of Headstart research. The expectation is that the lower a child starts on the achievement scale, the more space he has in which to improve. Additional support for this view is found in these data when the three groups are compared with themselves by means of a matched t test to determine how much change in performance level occurs during first grade. Table 6 shows that in most cases the no training group made the largest gains. However, they are still far behind the other groups.

TABLE 6

A Comparison of the Three First Grade Groups with Themselves at the End of Kindergarten

Developmental Measures	Group	Kindergarten Mean	1st Grade Mean	t
1. Binet I.Q.	A	104.57	101.10	-1.89*
	B	90.95	89.30	- .83 NS
	C	82.70	84.40	1.03 NS
2. Human Figure Drawings	A	15.95	18.14	2.20*
	B	9.90	20.65	8.23**
	C	7.25	15.40	5.42**
3. PPVT	A	54.29	61.24	4.19**
	B	39.70	52.95	6.77**
	C	36.90	51.50	7.19**
4. ITPA - Vocal Encoding	A	20.29	19.52	- .82 NS
	B	10.60	14.10	4.59**
	C	10.50	10.90	0.41 NS
5. ITPA - Visual Decoding	A	12.95	13.90	1.11 NS
	B	10.45	11.70	1.83*
	C	8.95	10.60	2.12*
6. ITPA - Auditory Vocal Assoc.	A	15.19	18.29	6.77**
	B	12.05	15.75	5.92**
	C	8.90	13.45	4.72**

TABLE 6 - cont.

Developmental Measures	Group	Kindergarten Mean	1st Grade Mean	t
7. ITPA - Visual Motor Assoc.	A	16.76	17.71	1.15 NS
	B	11.30	15.10	3.43**
	C	9.90	13.55	2.76**
8. Bender (error score)	A	12.52	7.90	-6.18**
	B	15.95	9.80	-6.72**
	C	19.10	10.15	-8.21**
9. Binet Vocab.	A	5.57	6.29	1.68 NS
	B	4.00	4.95	1.77*
	C	2.85	5.55	6.90**

* significant beyond the .05 level

** significant beyond the .01 level

Teacher Ratings at the Completion of First Grade

While the objective standardized tests are the best measure of developmental achievement, another interesting approach is the use of teacher ratings.

The teacher of each child rated him on a ten point scale on a series of ten items chosen to reflect achievement related behavior. Table 7 shows the analysis of these ratings. The teachers saw these children as essentially similar in terms of their ability to get along with others and in overall discipline. However, on the more academic variables the three groups differed significantly. The teachers saw the children in both groups with preschool experience as very superior to the children without such experience. The children in the two preschool groups did not differ from each other in the ratings given by teachers.

TABLE 7

Ratings on Achievement Related Behavior made at the End of First Grade

Behavior Rated	$\bar{X}_A$	$\bar{X}_B$	$\bar{X}_C$	F Ratio	t_{A-B}	t_{A-C}	t_{B-C}
1. Leadership	7.05	7.40	4.95	4.25*	-0.40	2.32*	2.66**
2. Effort	7.38	7.80	5.30	4.85*	-0.49	2.47**	2.92**
3. Interest in School Work	7.62	8.10	5.50	5.89**	-0.61	2.55**	3.32**
4. Ability in Writing	7.90	8.30	4.55	15.63***	-0.61	4.23***	4.96***
5. Ability in Reading	7.95	7.65	4.20	17.52***	.48	5.20***	4.58***
6. Ability in Numbers & Arith. Concepts	7.76	7.55	4.25	13.74***	.32	4.61***	4.06***
7. Standing in Class	7.71	7.75	4.40	12.48***	-0.05	4.30***	4.13***
8. Ability to Get Along with Other Children	8.48	8.05	7.05	2.81 NS	-	-	-
9. Overall Discipline	7.95	8.05	7.00	1.45 NS	-	-	-
10. Overall Adaptation to 1st Grade	8.14	8.00	5.55	8.65***	.22	3.73***	3.23**

* significant at the .05 level
** significant at the .01 level
*** significant at the .001 level

Each child was also rated by his 1st grade teacher at the end of the school year on a series of items measuring a variety of intellectual and social-emotional developmental characteristics. Items on the intellectual development scale included concentration, attention span, ability to delay action in order to think, imagination, and curiosity. The items measuring social-emotional development included the child's attitude towards school, other children, adults, himself, and other children's attitudes toward him, his participation in group activities and his adaptation under stress or strain.

Analysis of these data indicated that all of the children were rated very high with the no treatment control group receiving somewhat lower scores. However, there was not a statistically significant difference in the ratings of the three groups.

A common concern about early childhood education programs that emphasize cognitive development is that the child's intellectual gains accrue at the expense of his social and emotional development. The above results indicate that this does not occur as the three groups are seen as being equal in social and emotional progress.

Discussion

The results of this study indicate that the experimental group showed an impressive advantage over the two control groups in terms of the developmental measures administered. Differences of this magnitude and consistancy are not often found in the literature pertaining to pre-school or experimental learning programs. This raises the question of determining which factors involved in this experimental program were

contributing the most to their superior performance. It was assumed that the sequential tasks used in the experimental program were a major contributing factor. There is another factor, however, which also warrants strong consideration in evaluating the results. The experimental program was run by the author 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 teachers 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. In order to determine the extent of this effect it is hoped that future studies can be carried out in which regular kindergarten teachers can be used for both experimental and control groups.

It was also noticed by the investigators that the developmental measures used did not seem to tap all of the differences that were apparent between the children from the experimental and the two control groups. Observation of the children during the testing experiences indicates that the children from the experimental group were much more free in reacting with the examiners than were the children from either

of the control groups. In turn, the children from the "traditionally" trained group were more free and verbal in the testing situation than the children from the no treatment control group.

Although adequate rapport was established with all of the children the experimental group appeared to be more eager for the testing and learning experiences. On many occasions the experimental children wanted to continue with the testing and nearly all of them seemed to find it very interesting and challenging. On the other hand, the children from the other two groups were more reticent, showed less confidence in their ability to solve the problems and were much less inquisitive about the testing procedures, materials, and the total testing situation. It was not unusual for the children from the experimental group to ask questions and to make spontaneous comments about things they observed in the testing situation. This occurred to some extent with the other children but not nearly to the same degree.

The observations of the examiners in their interaction with the children, therefore, concur with the objective results of the study. In addition they indicate that the experimental children were much more open, and free interpersonally with examiners and had a much better capacity to ask appropriate, inquisitive questions.

At the end of a year in elementary school the experimental children who attended the Learning to Learn Preschool Program were still markedly superior to the other children on a variety of development measures. This superiority was most apparent on measures of intelligence. An important question to be answered is how this higher degree of test intelligence affects their learning performance.

While there is a significant difference in achievement test scores, it may well be that learning performance in the classroom would be a better measure. It was not possible to get a good measure of learning performance in the classroom in this study. The major reason for this was that the children attended many different first grade classrooms. Because of differences from classroom to classroom and teacher to teacher it was felt that valid measures of classroom learning could not be obtained. It is hoped that this is being remedied in an ongoing study by keeping children in similar first grade programs.

Another expected finding was that the performances of all three groups moved closer together following exposure to first grade. That is, the no training group improved most in performance while the experimental group improved the least. An interesting question is whether this trend will continue as they proceed through school and whether they eventually will perform equally. A second possibility is that the differences between groups will remain relatively constant from this point on. It is hoped that the progress of the three groups can be followed through elementary school.

Conclusions

This study provides evidence for the following conclusions:

1. Culturally deprived children who attended a preschool education program showed overall development superior to those who did not attend.

2. The experimental program designed to teach children how to learn resulted in large developmental gains while those attending a

"traditional" preschool program approximately maintained their developmental level.

3. Culturally deprived children who did not attend a preschool program fell behind in their overall intellectual and cognative development in the year prior to entering first grade while those attending preschool programs did not fall behind.

4. At the end of the first grade in public schools the children who attended the Learning to Learn Program maintained their superiority to the "traditionally trained" group and the no treatment group. The differences between the groups was smaller, however, at the end of first grade than at the end of the preschool programs.

Summary

A group of 24 culturally deprived five-year-old children was brought into an experimental sequential program of planned and guided learning experiences. The aim of this program was to teach children how to learn and it took into account various learning and developmental principles from psychology. A matched control group of children was exposed to a "traditional" program and a second matched control group received no preschool program. About nine months after the experiment began nineteen different developmental measures were obtained from each child.

Analysis of the data indicated that the performance of the experimental group on all of the developmental measures was significantly superior to that of the control groups. The analysis also showed that

the "traditionally" trained group had superior performance to the no treatment group on about half of the measures. This difference, however, was much smaller than the difference between the experimental and "traditionally" trained groups.

A follow-up study with measures being taken in the public school system at the end of the first grade indicated that the children in the experimental group were still significantly superior to the other two groups on 15 of the 17 developmental measures. As in other studies of preschool programs the children without preschool experience made the largest gains in first grade.

The effects of the experimental program are most evident in measures of intellectual functioning on which the traditionally trained children and the children without preschool experience are much below the experimental group.

Appendix A

An Experimental Sequential Learning Program for Preschool Children

Herbert Sprigle, Ph. D.

Background:

A survey of the literature of the causes and results of cultural disadvantage reveals the following conclusions: (1) Culturally disadvantaged children are crippled in language development and concept formation, (2) Culturally disadvantaged children have deficient skills of listening, (3) Culturally deprived children show weaknesses in deductive reasoning, (4) The attention span is very poor in these children, (5) Culturally disadvantaged children have significant gaps in knowledge and experiences, (6) Culturally deprived children's concept of size is poorly developed.

To ameliorate these deficiencies, most programs for the culturally disadvantaged make a frontal attack on these deficiencies, using traditional approaches and techniques,,some of which amount to dull routine that is uninteresting and scarcely challenging.

There appears to be special interest in broadening these children's experiences and in development of language and concept formation. As important as these areas might be, research evidence throws into question the importance of these skills over other factors important for the learning process. Koppitz, E. M., and others have found that perceptual-motor skills seem to be more important for good school achievement than verbal skills.

The literature on the culturally disadvantaged seem to suggest that these children have undergone varying degrees of deprivation in all areas of mental development. It would appear logical then that any program of amelioration must begin at the earliest phase of deprivation, not at the advanced phase and ignore the foundation.

After locating the starting point, the problem becomes one of finding the tools and techniques to make the journey a successful one. Educators and authorities in child development are in agreement that intellectual curiosity and growth are nurtured when there is a variety of materials for exploration and manipulation, and adults who supply information, answer questions on the child's level of comprehension, and give him an opportunity to find out who he is and what he is able to do. These same authorities point out that the signs of the times are propitious for moving ahead in the field of education on all levels. New materials and new approaches are vitally needed to bring education

out of the past. Progress in the area of preschool education is especially hampered by the absence of innovations in pedagogy.

The experimental curriculum presented here incorporates new materials and approaches in a sequential program of guided learning experiences, based on a sound theoretical model, and dictated by organized goals.

The Theoretical Model:

The experimental curriculum under consideration is based upon the theoretical framework that mental development possesses an orderly sequence of motor-perceptual-symbolic phases with their periods of transition. The design of the curriculum is based on the proposition that culturally deprived children show a developmental lag in all phases of development and it just so happens that the symbolic phases is the most obvious, especially to middle class psychologists and educators. Less conspicuous than deficiencies in language and concept formation are poorly conceived body image, relationship of his own body to things in space, inability to relate one object to another object, and a failure to organize and integrate these relationships. The curriculum emphasizes not experiences per se but the making of keen observations about these experiences. It is derived from the conceptual framework that the abilities and skills the child needs, to cope with the first grade, are themselves the product of a long series of learnings that have their beginnings in the child's awareness of his own body and how it functions. From extensive experimentation with his sensory and movement patterns the child learns first about himself and then himself in relationship to objects in space. The curriculum puts special emphasis on visual, tactile, motor and verbal judgements and decision-making where the outcome is uncertain.

The uniqueness of this curriculum lies in the introduction of entirely new techniques, approaches and material which require the child to manipulate, explore, and experiment. They give the child an unprecedented opportunity to know himself, to make keen observations and organize his thoughts about them, to communicate his ideas to others effectively, and to solve problems that have real meaning to him. Through a sequence of carefully planned experiences, the curriculum moves from motor manipulation to the building of perceptual imagery to symbolic experiences through the medium of interesting and challenging games and activities. These have already undergone field tests to determine clarity of instructions, motivation and interest.

The curriculum is designed to progress from low to high in motor-perceptual-symbolic skills and also to move across these dimensions in a sequential fashion. In the beginning, the emphasis is on the development of motor and perceptual-imagery skills and processes with a minimum of verbal interaction necessary and progresses to the stage in the curriculum that is predominately verbal and stresses the understanding and use of language, auditory discrimination, and concept formation. This part of the program has many games and activities which encourage the child to generate his own ideas and ways of expressing them.

So, while preparation for what lies immediately ahead for these children -- the development of readiness skills -- is important, this experimental curriculum has the more ambitious goal of helping them learn to learn, to think, to develop

self-confidence and self-esteem through more effective and efficient coping behavior, be it of a social, personal, or academic nature.

Description of the Program:

The organization of the experimental program is built upon certain basic principles of mental growth and child development:

1. Mental development possesses an orderly sequence and periods of transition.

2. Learning is an active, on-going process that occurs when material the child uses possesses certain properties: (a) it must be appealing and attractive enough to arouse the child's curiosity; (b) it must make the child feel reasonably sure of what he is doing, (c) and it must direct the child to a goal and at the same time give him some feedback concerning where he is with respect to the goal.

3. Children of the same chronological age manifest different developmental levels and different rates of learning.

4. The methods employed to teach the young child must be flexible, play oriented, and be adaptable to different developmental and learning levels.

These principles have structured the curriculum, materials, physical arrangements, and orientation of teachers. The result has been innovations in pedagogy and the ushering in of basic changes in preschool education.

The curriculum is a sequential program of guided learning experiences that elucidates the sequence of mental development. The progression of the curriculum insures that a child understands and builds upon this understanding. It also possesses a continuity that helps a child to build upon his learning experiences. Having learned one thing helps him to learn and master something else.

The implementation of these principles necessitated the development of entirely new material in the form of games which are adaptable to different levels of mental development and rates of learning. These innovations place a major emphasis on manipulation, exploration, and experimentation which result in the stimulation of thinking, and reasoning, and in making judgements when the outcome is uncertain. Success comes from thought proceeding action, internal conversation, delay, attention, and concentration.

The program requires two classroom areas. One is a work-play area that is large enough to accommodate twenty-four children who can engage in a variety of activities without competing for space or materials. A smaller room set apart from the work-play area is used for work with groups of four children in learning activities.

This kind of physical arrangement allows for both heterogeneous and homogeneous grouping of children. It provides for all children to work and play together in activities which they define and structure. From this general

area, four children of the same developmental level are taken to engage in a planned learning experience.

Since children of the same chronological age reveal different levels of development and different rates of learning, those of the same level and rate are placed together. The child is moved to another group and new material as growth occurs. Some children are more skilled with one kind of material than with another. Continuous regrouping permits them to work on one level with one kind of material and at another level with another task. Such flexibility prevents children from stereotyping each other and helps the child to recognize that he is better in some things than in others. Most important, whatever his level, he is assured of success.

The small work area and small groups also facilitate the control of extraneous stimulation. The room is nearly barren except for the learning materials. The child's attention is drawn to the materials and the teacher rather than to distractions in the room. The floor rather than tables and chairs is the work space. This appears to be a more comfortable arrangement for the young child who has more freedom of movement than that allowed by a table and chair.

The teachers in this program are child rather than subject matter oriented. They perceive themselves as a stimulator of mental growth rather than a teacher who dispenses information which the child commits to memory. They pose problems, ask questions, and stimulate interest and curiosity. Teachers in our program must be very perceptive and sensitive to how a child works and uses material. Their observation and sensitivity to each child form the basis of grouping and regrouping.

The materials used in the program were selected on the basis of their ability to stimulate thinking and the generation and expression of ideas. Children are given the freedom to define and structure their play and are protected by certain rules from intruders who might disrupt or destroy. But at the same time the child is encouraged to externalize what was an internal process. We encourage verbal, motor and artistic expression. This is in keeping with our view that learning is an active, on-going process and is not a private affair where the child is a passive receptacle that must be filled to be ready for first grade. For example, stories, and the curiosity and interest which they arouse, are not confined to a particular time in the program and end with the start of another activity. Children are encouraged to relate the experience through a media of their choosing. One child may draw a picture of the story, another may use paints, while a third may reconstruct the story with blocks.

The story is designed to stimulate an interest in books that extends beyond the classroom. All books are accessible to children on a lending basis. The children select their books and bring them to the teacher to check out for overnight use. Parents are encouraged to read to the child each night. When this is not possible an older sibling is usually available. This is but one of several ways the program engages the parents, to point out to both parent and child that learning takes place everywhere and it is the cooperation of school and parents that stimulates and accelerates its growth.

The program has as its goal not merely the preparation of what lies immediately ahead for these children, the development of readiness skills, but a more ambitious task of helping them learn, to think, to reason, and to develop self-confidence and self-esteem through more effective and efficient coping behavior, be it of a social, personal, or academic nature.

Description of the Program - Curriculum

Motor Phase

Walking Board - Similar to railroad rail.

Objective: To develop balance, laterality (internal right and left sides of body), directionality.

Just getting to other side is not the goal. Child is shown how to walk forward, backward, sidewise, etc.

Stepping Stones - Six inch squares of cardboard or tile, ten of one color, ten of another, placed in a pattern around the room. Left foot steps on one color, right foot on the second.

Objective: To develop eye-foot coordination as well as laterality and directionality.

Balancing Board - Square platform and underneath in the middle is a balance post.

Objective: To develop balance and motor coordination.

Trampoline - Spring and mattress tied together.

Objective: To develop coordination, muscular control and body image.

Obstacle Course - Two chairs and yardstick.

Objective: To develop balance, coordination and spatial judgement.

Spatial Estimation Game - Circular and square openings to go through; sticks to step over or go under. Child must judge which of 2 choices he can master.

Objective: To develop body image and the relationship of child's body to another object.

Obstacle Course Exercises - Sequence of walking board, balance board, stepping stones, trampoline, obstacle course. Children follow each other through the sequence. Individual performance is stressed, not competition.

Objective: Balance, coordination of eye and foot, muscular control and body image. Also, to measure the degree of control under distracting conditions.

Space Localization Game - Blocks placed at varying distances. Child must decide which of two colored blocks he can reach while sitting at a chair.

Objective: To develop an understanding of spatial relationships and spatial directions and to develop kinesthetic clues to aid in estimation.

Space Localization Game 2 - See Guide.

Objective: To further develop an understanding of spatial relationship and spatial directions, and kinesthetic clues to aid in spatial estimation.

Space Structure - Same material as Space Localization 2.

Objective: To develop judgements about spatial relationships when the two objects to be judged are at points removed from the child.

Space Structure 2 - See Guide.

Objective: To develop judgements about spatial relationships when the two objects to be judged are at points removed from the child. Game will also measure degree of transfer from previous game. Just as important is developing attention and concentration and decision making where the outcome is uncertain.

Activity Record Exercise - Series of activities, walking, running, crawling, hopping, etc.

Objective: To reinforce what has been learned previously and determine the degree of transfer. Also, child is required to pay attention and follow directions.

Free Scribbling - Chalkboard or other medium like finger paints or newsprint and heavy crayons. Record is used to increase motivation, rhythm, and freedom of movement.

Objective: To experiment with basic movement patterns of the body.

Circular Movement - Same medium.

Objective: To promote free, gross movements with arm and shoulders. Also, to develop motor control and following directions when teacher instructs to change directions.

Circles - Templates and progressing to copying and reproducing from memory.

Objective: Development of tactile and kinesthetic clues of circular movement and its control.

Circles - Templates of varying sizes.

Objective: Same as above. Also development of size concept, location.

Lazy Eight - Template

Objective: Same as circle. Progressing from templates to free movements, to tracing, copying, then memory.

Plus Sign - Same sequence as Circle.

Plus Sign - Variation in size, location, concept, largest, smallest. Same sequence as Circle.

Concept Same - Circle templates, large, medium, small.

Objective: Tactile, kinesthetic, visual comparison of size.

Construction of Square - Template

Objective: Starting and stopping of movements and changing directions.

Squares - Templates of varying sizes.

Objective: Same as circle.

Concept of Same - with Square

Objective: Same as above - tactile, kinesthetic, visual comparison of sizes.

Construction of Triangle

Same procedure and sequence as Circle and Square.

Thinking in Color Series - Colored sticks of varying lengths.

Objective: Experiences to provide a foundation on which children can successfully build and develop thinking and reasoning ability and mathematical skills and concepts.

Period of Play and Observations - Properties of the sticks; general observation of equivalence. Arrangement of sticks by color and size. Introduction of tall, short, tallest, shortest.

Steps in Color - Continuation of concepts, tallest, shortest, by making steps.

Color Combinations Games - Child is to find the two colors that will make the color which the teacher gives them.

Objective: To develop scanning and exploration to solve a problem. Also, to observe the additive concept of length.

Part 2 -- Color Combination Game - Same as above but must make two different combinations by reversing the colors.

Objective: Experience with commutative property.

Constructive Form - Construction of sequence of some color, then triangles.

Constructive Form 2 - Using color square as a model, build the same size square using the combination of colors that make up that one color.

Constructive Form 3 - Same as 2 but building a triangle with color combinations.

Thinking in Color - Early experiences in relationships and conservation of mass. Colored construction clay.

Objective: To make observations about invariance of quantities; that the whole remains, whatever may be the arrangement of its parts and the change of its form.

Non-directive Play - To get the child acquainted with the colored construction clay.

Balls in Color - Observation of equivalence. Arrangement of clay by color and size. Observation of largest, smallest, middle size.

Hot Dogs and Candy - Observation of changes in form and size.

Hot Dogs and Candy 2 - Additional observation of changes in form and size to measure the extent of transfer of learning.

Thinking in Color - Early Experience in Relationships and Conservation of Volume.

Procedure similar to that used with conservation of mass.

Motor Clues - Child imitates an activity (like hammering) and other children attempt to guess what he is doing.

Objective: To facilitate the development of mental imagery and verbal expression.

Perceptual Phase

Self Awareness Activities - Viewing self in mirror and performing activities suggested by teacher.

Identification - To place the parts of the body to make a boy.

Objective: To give the child experiences with parts of the body. It also requires that the child make discriminations and in so doing confronts him with the fact that things have a place and belong together. Encouragement of any verbalization that might arise.

Draw a Boy and Girl - Further experience with body parts. To be first entry in scrapbook.

Association - To place clothes on appropriate person and appropriate part of body.

Objective: To acquaint the child with common objects as well as associating clothes with parts of the body. To stimulate and encourage verbalization and sharing of common experiences.

Search for Clothes - To find and identify boys' and girls' clothes and place them appropriately in scrapbook. Use popular magazines, Sears catalog.

Classification - To place the furniture in the appropriate rooms.

Objective: To organize and classify. To stimulate and encourage verbalization and discussion.

Search for Furniture - To find and identify furniture and place them appropriately in the scrapbook.

Stories and pictures of fruits, vegetables, meats - Teacher describes, tells about and shows where they grow and how or where they come from.

Category - Identifies and places objects in appropriate place. Fruits, vegetables, meats.

Objective: To organize and classify; to stimulate and encourage verbalization and discussion.

Search for Fruits, Vegetables, Meats - To find, identify and place appropriately in scrapbook.

Spatial Judgement-- Visual-- Motor-- Temporal - Child walks to two objects spaced different distances apart. Each object associated with a color. He is to pick the color that is closer or farther away.

Objective: To develop judgements about spatial relationships as they related to child's own body. Also, to stimulate conversation as child must say why he made the particular choice.

Sounds of the Farm - Auditory-visual association. Record with sounds of farm animals and teacher holds up picture of that animal.

Animals - Classifies farm or zoo animals as he wins them on his turn with the spinner.

Objectives: Reasoning by association and to stimulate and encourage verbal expression.

Sounds of the City - Auditory-visual association. Record with sounds of city and teacher holds up picture of object making that sound.

Transport - Classifies what carries people where they want to go and what carries things people need as he wins them with his turn on the spinner.

Mental Recognition - Blindfolded, the child identifies part of the body.

Objective: To develop a mental representation in the absence of visual clues and to verbalize tactile impression.

Haptic Perception - Blindfolded, the child identifies body parts by tactile impressions and places it on the body.

Objective: To determine if child has a well developed image of the body. Also requires close attention and concentration. Transfer of learning.

Perceptual awareness and discriminations are developed.

Activity -- Furniture - Child identifies the piece of furniture held up by the teacher, reports its location in the house and its function.

Objective: To use the knowledge acquired from previous experiences in developing symbolic representations and being able to verbalize them.

Perceptual awareness and discriminations are developed.

Tactile -- Visual Recognition - Child uses prior knowledge to select from among several choices the object hidden from view which he must identify by tactile impression. Real fruit and vegetables are used.

Objective: To give the child experience at processing information needed to solve a problem. Child must get a mental image from the tactile impressions and successfully put together various clues. Stimulation of verbal expression.

Tactile -- Visual Closure - Builds upon previous game. This time child must select from pictures rather than real object.

Objective: To gradually remove the perceptual vividness and bring to a symbolic, verbal level.

Absurd - Child makes use of past information to place objects together that go together.

Objective: To measure the degree of understanding of previous experiences. The game requires associating ideas, reasoning, and generalizing from previous experiences.

At this point the child uses his understanding of the perceptual properties of the sticks to think and solve problems.

Commute Game - To see which of two opposing teams of two children each can complete a square using the five colored sticks.

Objective: To measure the degree of understanding of the relationships of the sticks and the commutative property.

Additive Game - To build a house with the colored sticks which are obtained by rolling dice and interpreting the sign.

Objective: To give child experience at processing information he needs to solve a challenging problem. It also measures the degree of understanding of the relationship of the sticks and the commutative property.

Equivalence - To find the combination of colored sticks that will be equivalent to a plain unmatched stick.

Objective: To develop and master the notion of equivalence.

Estimation - To reproduce a length that is visually present but gives no clues. The child must decide what combination of lengths are equivalent to the one presented.

Objective: Measures extent to which child can transfer previous learning to new situation. Also develops spatial judgements.

Steps - To build an ordered set of sticks using the various combinations.

Objective: To measure the degree of understanding of relationships of colors and degree of transfer of learning. The game requires that the child attend closely and concentrate in order to build an ordered set.

Reversible - To find out which of three balls made the hot dog.

Objective: To give the child experience in making critical judgements about an object when its form has been changed. It also gives the teacher some idea of the extent to which the child generalized from previous activities.

With an understanding of the colored sticks, their properties and the operations that can be performed with them, the child is now ready to move into numbers. This will follow the previous pattern of exposing the child to a planned sequence of numerals. Children will be given concrete experiences that demonstrate how numerals represent something, and how they convey a meaning.

One to One - Child associates pebble and numeral with animal which he wins by rolling the dice.

Objective: To help the child develop a solid understanding of numbers by giving him concrete experiences with numerals and the objects they represent.

Sets of Elements - Child rolls the dice and finds the number of objects on his card that corresponds to the numeral. Numerals and objects from one to five.

Objective: To reinforce the understanding of the numerals learned in the previous game.

Sets of Elements 2 - Continuation of previous game. Objects and numerals six to nine.

Inclusion - Child attempts to get as many animals of one kind as possible by the wise choice of alternatives.

Objective: To give the child early experiences with decision making, probability, relational concepts and multiple class membership.

Interest - To see which circle can be filled with girls and boys, keeping track of how many is in each circle and how many children are in both circles. Children can be added or taken away, depending on show of dice.

Objective: To strengthen the concept of numbers, how they express a value and aid in keeping records. Also to develop concept of class and class membership.

Base Two - To replace two red sticks with a purple one until he has made five purple sticks.

Objectives: To get the child familiar with numerals and a base system.

Base Three - To replace three red sticks with a green one until he has made five green sticks.

Base Four - To replace four red sticks with a brown one until he has made five brown sticks.

Base Five - To replace five red sticks with an orange one until he has made five orange sticks.

Extension - To make a brown stick from two purple and four red sticks.

Using objects with which the child is quite familiar, the next series of games and activities attempt to bring the child from the stage of dependence on vivid perceptual features of an object to the stage where he can identify an object on the basis of a few clues. This can be accomplished with the development of perceptual imagery.

Part -- Whole - Objects previously used are presented at progressively increasing levels of completeness.

Objective: To help release the child from need for redundancy of details and be able to construct whole from details. Also, to gain experience at hypothesis making and testing.

Perception - To complete pictures by identifying the other part that is needed to make the whole.

Objective: To develop greater economy of perception by having the child reconstruct objects from fragments. Attention, concentration, and ability to scan are also demanded to play the game successfully.

Closure - Game is played similar to Scrabble. The child matches up the parts to make a whole animal.

Integration - Game is played exactly like Closure, only this time there are three instead of two pieces.

Symbolic Phase

Encourage and stimulate verbal expression about this on previous experience. Group interaction.

Sounds of the Farm - Auditory - Verbal. Child hears only the sound and must tell the name of the animal making that sound.

Sounds of the City - Auditory - Verbal. Child hears only the sound and must tell the name of object making the sound.

Transpose - Match the objects teacher holds up with those on his card. Must report the category of the objects. Encouraged to say names to himself as he scans his card.

> Objective: To measure the degree of learning of past experiences and bring experiences to verbal level. Also demands attention and concentration as the objects are transformed. Internalized conversation.

Order - To reproduce on a horizontal line, what has been briefly exposed on a vertical line and to report its classification.

> Objective: Child must pay close attention to the order of the objects as well as their number. He must commit these to memory and hold them in mind while he scans a board of pictures, all of which are potential distractors. He must select the appropriate picture and mentally transform their position to a horizontal line. Internalized conversation.

From this point the games and activities place a heavy emphasis on verbal and creative expression. The child is called upon to put into words all the previous experience he has had with the objects and materials. The shift is from showing to relating in a meaningful way. What he relates and the materials he uses will reflect the degree of learning and understanding that has taken place up to this time.

Precise - Replace an inappropriate picture with one that accurately identifies the function.

> Objective: To develop precision in language usage in his quest to master it. Also, to determine the amount of learning about parts of the body and their function.

Rhymes - The child finds an object that rhymes with the teacher's word, says its name and places it with similar objects (house, food, animal, etc.)

> Objective: Auditory discrimination. Also, to measure the degree to which child can classify and generalize.

Distortions - Telling a story with pictures in a non-sensical way and having the child correct the incongruity.

> Objective: To develop an understanding of how things are related and to access the extent of transfer of learning.

Choice - The child is to find the multiple choice picture that finishes the story and then tell a story about it.

Objective: To give the child an opportunity and experience in seeing cause and effect relationships and successfully interpret his environment. Also, to give the child experience in verbal expression and fluency. Still another important goal is to help the child delay and think before going into action.

Changing Name Game - Child explains why you cannot arbitrarily change the names of objects.

Objective: To develop verbal expression and fluency to get the child thinking in terms of likenesses and differences and the building of auditory associations.

Feelings - The child is to find the multiple choice picture that finishes the story according to the mood he chooses the person to have. Child then tells the story.

Objective: To give the child experiences with recognizing and coping with feelings. It also helps develop verbal expression and fluency.

Insight - Child builds a story with pictures, then people depicting various feelings.

Objective: To help develop creative use of language. Also, to give the child an opportunity to talk about their feelings and the emotions they perceive in others.

Sequence 1 and 2 - Using rural or urban pictures, the child constructs a story and relates it to other members.

Objective: To develop creative expression and assess the extent to which child has generalized his exposure to cause and effect relationships.

Verbal Clues - Child thinks of something (mental image) and gives clues about it and other children attempt to guess it.

Creative Expression - To construct something and other children attempt to guess what it is. Child must give clues to help in identification.

Appendix B
Group A

Test data of each subject on all measures

SUB. NO.	SEX	BINET PRE	BINET POST	HUMAN FIG. PRE I	HUMAN FIG. PRE II	HUMAN FIG. POST I	HUMAN FIG. POST II	PPVT	BENDER POST I	BENDER POST II	VOC. PRE	VOC. POST	SEQ.	SOC. MAT. TOT.
1	F	84	120	13	14	13	16	60	11	10	4	6	23	9
2	M	89	103	6	5	14	15	60	18	16	3	6	24	11
3	M	94	107	7	9	18	19	63	13	14	2	7	21	12
4	M	78	100	6	7	14	11	51	15	13	0	5	29	11
5	M	89	97	8	11	20	17	50	14	15	4	5	21	9
6	M	93	91	4	8	12	14	60	13	12	5	6	31	15
7	M	84	99	5	6	10	11	55	17	14	4	6	23	10
8	F	94	115	15	15	20	20	56	12	11	3	5	31	7
9	M	82	97	1	0	16	16	52	15	13	1	5	27	7
10	F	100	119	17	17	21	24	61	6	7	5	6	17	7
11	M	87	98	9	11	9	7	59	16	15	3	0	24	11
12	M	84	96	7	7	12	13	49	14	13	2	6	24	10
13	F	100	107	10	13	18	16	59	13	12	6	7	18	14
14	F	100	111	21	19	28	27	65	8	6	5	8	20	7
15	F	92	112	15	15	14	12	53	14	16	2	6	20	13
16	F	80	96	3	2	19	19	54	15	16	2	5	22	17
17	F	103	122	18	20	13	14	60	3	4	4	6	19	7
18	F	85	100	7	9	13	16	44	11	10	4	6	23	10
19	F	87	97	4	3	16	17	54	9	9	2	5	21	14
20	F	87	88	1	10	13	12	37	17	14	3	5	32	20
21	M	93	110	5	6	17	19	57	10	10	4	7	23	9
22	F	80	91	4	4	15	19	44	15	19	2	6	24	7
23	F	92	103	5	4	14	15	60	14	14	4	5	23	9
24	M	94	120	16	20	20	23	45	9	4	4	6	23	15

Group A -- cont.

SUB. NO.	METRO READINESS TEST							SSRT		ITPA			RAIL WALK	ITPA V-M
	WD	SEN	IF	MTCH	NO	CYP	TOT	PRE	POST	VB	VIS	AV		
1	17	12	12	17	15	6	79	12	25	27	14	16	13	18
2	15	11	13	8	11	6	64	12	20	22	10	16	10	18
3	16	10	11	9	12	4	62	11	20	20	14	12	14	18
4	11	6	10	12	14	6	59	6	16	15	17	12	21	20
5	15	11	11	10	17	7	71	10	24	25	12	15	4	17
6	15	10	11	12	14	4	66	13	17	20	10	20	10	13
7	14	5	12	8	9	4	52	9	11	18	13	14	12	13
8	15	9	10	11	18	8	71	11	24	18	11	19	8	10
9	14	10	9	12	15	6	66	10	23	19	15	13	10	20
10	14	11	14	16	17	7	79	14	25	22	16	18	4	19
11	12	9	8	10	15	3	57	8	17	21	11	10	22	16
12	13	8	11	14	15	5	66	9	15	19	18	14	14	18
13	15	11	13	16	18	8	81	14	19	22	17	20	13	18
14	16	10	12	12	17	7	74	14	24	17	15	17	7	15
15	14	11	11	12	16	8	7[illegible]	9	18	21	14	16	13	14
16	15	9	8	10	11	8	61	8	20	20	13	16	10	18
17	16	10	13	18	17	8	82	14	27	18	12	18	15	20
18	13	8	10	11	12	5	59	12	19	19	11	12	16	21
19	11	6	9	11	21	7	65	10	21	19	11	17	4	15
20	11	8	10	12	11	3	55	9	14	14	8	11	19	12
21	16	12	13	11	10	5	67	11	24	29	16	19	6	14
22	12	7	8	11	9	2	49	9	16	16	8	12	2	14
23	14	9	12	13	17	8	73	13	23	22	15	20	9	19
24	13	8	12	13	11	8	65	10	20	22	12	13	[illegible]6	18

Appendix B
Group B

Test data of each subject on all measures

SUB. NO.	SEX	BINET PRE	BINET POST	HUMAN FIG. PRE I	HUMAN FIG. PRE II	HUMAN FIG. POST I	HUMAN FIG. POST II	PPVT	BENDER POST I	BENDER POST II	VOC. PRE	VOC. POST	SEQ.	SOC. MAT. TOT.
1	M	84	96	11	14	15	14	55	18	18	4	7	24	16
2	F	91	86	7	13	18	18	41	18	16	2	4	30	19
3	M	93	100	8	10	18	18	42	12	18	0	7	23	16
4	M	83	80	4	4	5	6	34	15	16	4	4	39	18
5	F	94	100	11	9	11	10	42	17	16	0	4	40	15
6	M	94	91	7	6	15	16	39	16	14	4	3	34	12
7	M	83	78	4	5	7	7	29	20	16	4	3	38	12
8	F	91	90	9	11	8	8	36	12	13	4	2	21	12
9	M	89	92	12	10	10	10	38	12	12	4	5	36	14
10	F	103	96	15	19	18	20	45	10	13	4	5	16	9
11	M	90	94	2	4	6	8	39	16	17	4	4	27	10
12	F	82	75	4	5	1	0	23	23	19	4	2	55	18
13	F	100	100	5	5	12	11	44	13	14	5	4	27	9
14	F	103	102	22	20	14	12	54	17	15	4	4	20	12
15	F	92	87	10	9	11	10	32	13	15	0	3	25	12
16	F	81	78	1	1	3	3	42	17	20	3	5	33	12
17	F	101	100	11	9	4	5	35	17	14	0	3	31	11
18	M	86	89	5	5	6	8	39	17	14	2	2	41	12
19	F	89	93	6	7	4	5	33	15	16	4	3	44	17
20	F	87	86	4	5	14	17	43	18	17	2	4	41	16
21	F	95	89	15	14	12	14	26	13	8	3	0	24	11
22	F	80	85	5	6	5	6	33	18	18	2	5	33	17
23	F	92	88	6	6	4	5	37	20	18	4	4	22	15
24	M	92	93	10	10	8	10	44	16	14	4	2	31	13

Group B -- cont.

SUB. NO.	METRO READINESS TEST							SSRT		ITPA			RAIL WALK	ITPA V-M
	WD	SEN	IF	MTCH	NO	CYP	TOT	PRE	POST	VB	VIS	AV		
1	16	5	12	15	5	3	56	12	18	13	10	17	21	12
2	11	6	9	7	4	3	40	12	11	9	5	12	49	13
3	10	6	12	7	3	3	41	11	15	11	10	10	32	11
4	10	6	6	6	6	0	34	9	15	15	12	11	37	14
5	13	8	9	8	6	2	46	10	15	7	6	13	26	10
6	13	10	12	12	9	2	58	13	17	11	13	12	28	14
7	10	5	7	4	4	0	30	9	10	8	10	9	36	10
8	10	9	6	6	5	1	37	11	13	9	11	15	22	11
9	14	13	11	12	5	3	58	8	14	14	9	11	32	13
10	14	11	9	16	11	6	67	17	18	10	11	16	30	12
11	10	7	8	4	14	2	45	11	17	12	12	10	12	9
12	7	5	6	6	1	0	25	8	6	9	6	5	28	6
13	11	9	12	15	10	2	59	15	20	9	10	14	27	13
14	15	10	12	16	9	6	68	17	17	18	13	15	36	15
15	9	7	9	5	7	1	38	9	10	9	11	9	32	16
16	9	6	9	5	2	2	33	9	11	12	13	13	22	11
17	10	7	10	10	8	3	48	14	15	8	10	11	34	5
18	15	6	6	8	4	2	41	11	11	11	11	12	23	11
19	10	6	6	5	4	0	31	10	11	13	11	8	25	7
20	11	7	9	6	3	1	37	9	12	10	12	12	59	10
21	8	6	7	16	12	7	56	13	16	12	9	6	55	16
22	8	6	8	4	6	1	33	8	9	7	8	12	52	7
23	13	7	7	10	7	0	44	13	17	10	10	10	24	15
24	13	5	10	7	11	2	48	11	13	12	10	11	22	13

Appendix B
Group C

Test data of each subject on all measures

SUB. NO.	SEX	BINET PRE	BINET POST	HUMAN FIG. PRE I	HUMAN FIG. PRE II	HUMAN FIG. POST I	HUMAN FIG. POST II	PPVT	BENDER POST I	BENDER POST II	VOC. PRE	VOC. POST	SEQ.	SOC. MAT. TOT.
1	M	85	81			6	6	38	13	12	4	0	24	None
2	M	88	82			9	8	35	19	19	3	4	23	obtained
3	M	9[illegible]	85			7	8	46	19	18	5	5	29	
4	F	82	71			4	9	29	18	17	2	0	35	
5	M	92	86			12	9	25	17	14	4	2	34	
6	F	93	85			11	8	28	19	17	6	2	23	
7	F	81	78			10	9	33	21	21	1	1	29	
8	M	94	91			1	0	48	25	22	3	4	29	
9	F	83	68			1	3	22	23	21	3	0	42	
10	F	103	90			20	17	39	10	11	4	1	24	
11	F	92	89			7	6	35	16	16	4	2	35	
12	M	81	72			1	0	24	30	23	3	2		
13	M	98	95	4	4	11	10	33	20	17	3	2	28	
14	F	103	109			14	11	54	18	20	6	7	23	
15	F	85	75			16	15	36	13	13	3	3	29	
16	M	81	73			4	4	21	21	17	3	2	53	
17	M	102	92			12	14	41	18	15	4	4	24	
18	M	83	78			4	4	43	19	16	5	3	24	
19	M	92	89			4	5	36	18	16	4	3	40	
20	F	84	81			8	6	40	20	17	4	3	46	
21	M	87	82			2	2	47	21	16	2	4	48	
22	F	80	74			6	4	30	23	18	2	6	76	
23	F	89	90			6	5	51	19	20	5	5	38	
24	F	92	[illegible]3			7	7	26	19	20	3	0	38	

Group C -- cont.

SUB. NO.	METRO READINESS TEST							SSRT		ITPA			RAIL WALK	ITPA V-M
	WD	SEN	IF	MTCH	NO	CYP	TOT	PRE	POST	VB	VIS	AV		
1	4	9	11	8	4	2	38	10	12	10	8	9	21	11
2	10	7	9	7	4	2	39	12	17	11	7	8	29	7
3	13	6	10	6	7	2	44	11	13	10	10	11	23	12
4	7	4	10	7	4	0	32	8	11	9	3	10	22	9
5	10	6	7	8	4	3	38	12	13	7	8	7	30	11
6	13	8	8	9	9	6	53	11	17	14	7	13	15	12
7	11	6	4	5	1	0	27	9	9	8	10	4	34	3
8	15	9	10	9	3	0	46	12	13	7	11	10	22	13
9	11	6	3	5	2	0	27	8	10	7	7	8	46	7
10	14	9	13	13	5	3	57	15	17	15	12	10	17	15
11	12	4	5	8	4	2	35	10	11	10	9	9	36	7
12	8	9	3	4	2	0	26	8	11	10	4	3	29	8
13	8	11	5	12	8	2	46	13	18	11	10	12	22	12
14	14	10	12	13	7	2	58	15	20	10	9	12	19	9
15	13	7	10	8	2	1	41	9	13	9	10	11	28	10
16	12	5	9	8	3	0	37	9	8	11	7	8	33	5
17	14	7	10	12	9	4	56	15	18	16	10	16	24	13
18	11	7	10	12	5	3	48	11	13	18	9	9	9	10
19	8	5	8	6	5	2	34	10	13	10	6	9	21	12
20	12	10	9	10	4	0	45	9	7	13	11	4	32	16
21	10	5	11	6	4	0	36	12	14	13	12	7	28	9
22	8	7	3	10	3	0	31	9	13	6	7	9	67	9
23	11	9	10	12	8	2	52	13	16	11	16	12	19	9
24	10	7	4	7	5	0	33	10	10	8	5	7	51	9

APPENDIX C

Social Maturity Rating Scale *

Name of child: _____

Place an x in front of the number that best describes the child.

Social Development

A. Atiitude Toward School
   1. Eager to come to school
   2. Does not seem relaxed and to be enjoying himself in school
   3. Does not seem to care if he comes or not

B. Attitude Toward Children
   1. Gets along well with others, shares and takes turns
   2. Is about average in getting along
   3. Is aggressive and does not play long without having trouble
   4. Seems to prefer playing by himself

C. Other Children's Attitude Toward Him
   1. Children seek him out to play, is popular
   2. Play together well when around, but do not seek him out
   3. Others do not want him in the group. Do not seem to like him.

D. Attitude Toward Teacher
   1. Responds well to teacher's supervision and guidance
   2. Sometimes listens and sometimes not
   3. Obeys teacher only when he feels like it. Has mind of his own

E. Teacher's Attitude Toward Him
   1. Is an easy child to like and get along with
   2. Sometimes he is easier to like than other times
   3. Creates tension and uneasiness in the teacher; hard to get along with

F. Participation in Group Responsibility
   1. Is a leader in group activities and others do not object
   2. Is cooperative
   3. Uncooperative in group activities

* This scale is an adaptation of the one developed by Axtell and Edmunds in their article: Axtell, Job B. and Edmunds, Mary W. The effects of preschool experience on the Father, Mother and Child. Cal. J. Ed. Research, 2, No. 5, Nov. 1960.

Appendix D
Group A - Follow-up Study

First Grade Test Data of each subject on all measures

Sub. No.	Sex	Binet	Human Figure	PPVT	Bender	Binet Vocab.	Seguin	ITPA VE	ITPA VIS	ITPA A-V	ITPA V-M
1	F	101	18	66	8	8	21	22	17	21	17
2	M	104	18	64	13	7	18	19	17	19	18
3	M	105	21	64	6	6	20	16	15	16	22
4	M	90	7	49	7	5	26	13	13	15	15
5	M	94	22	61	8	6	21	20	12	18	19
6	M	104	15	76	3	7	20	24	18	19	19
7	MOVED										
8	F	111	22	62	7	8	20	21	14	22	17
9	M	94	12	54	15	6	21	22	11	15	11
10	F	111	21	71	4	8	16	20	16	21	17
11	M	93	17	57	8	5	25	21	10	15	19
12	M	90	10	52	7	6	20	15	11	18	19
13	MOVED										
14	F	109	22	67	3	6	17	25	15	21	18
15	F	111	18	59	6	8	18	21	16	21	18
16	F	87	20	48	8	5	19	13	14	18	20
17	F	133	16	62	3	6	21	22	9	20	22
18	M	79	20	60	10	3	20	22	14	17	21
19	MOVED										
20	F	89	17	64	11	6	26	17	16	17	13
21	M	117	29	65	7	5	19	20	20	22	19
22	F	78	19	54	14	5	20	13	10	9	10
23	F	106	19	70	6	9	18	21	15	22	18
24	M	117	18	61	12	7	23	23	9	18	20

Group A - cont.

Sub. No.	WISC			STANFORD Achievement Test				
	Full	Verbal	Performance	Word Reading	Paragraph Meaning	Vocab.	Arith.	Total
1	105	108	101	1.6	1.5	2.3	1.5	6.9
2	105	103	107	1.4	1.5	1.4	1.4	5.7
3	104	101	106	1.8	1.7	1.3	2.6	7.4
4	101	97	104	2.6	2.0	2.2	2.9	9.7
5	100	100	100	2.5	1.7	1.3	2.6	8.1
6	104	108	100	1.7	1.5	2.6	1.5	7.3
7	MOVED							
8	111	109	111	1.6	1.6	4.4	1.4	9.0
9	94	101	87	2.6	1.5	1.6	2.5	8.2
10	118	116	115	1.8	2.0	1.8	1.5	7.1
11	95	100	90	2.2	1.5	2.0	2.6	8.3
12	88	95	83	1.5	1.7	1.7	2.5	7.4
13	MOVED							
14	118	116	114	1.4	1.6	2.7	1.4	7.1
15	117	114	115	1.5	1.5	1.9	1.3	6.2
16	87	85	92	2.3	2.3	1.5	1.9	8.0
17	119	131	101	2.9	3.1	3.1	3.0	12.1
18	86	89	86	2.9	2.0	1.8	3.0	9.7
19	MOVED							
20	94	95	94	1.3	1.5	1.4	1.2	5.4
21	115	114	114	1.4	1.5	1.8	1.5	6.2
22	81	81	85	1.6	1.5	2.2	2.2	7.5
23	107	113	100	1.5	1.5	4.8	1.3	9.1
24	114	113	113	2.9	2.0	2.5	2.4	9.8

Group A - cont.

Sub. No.	Leader-ship	Effort	Interest sch. wk.	Ability write	Ability read	Ability arith	Stand-ing in class	Ability get along	Over-all discip.	Adapt to 1st grade
1	10	10	10	8	10	10	10	10	9	10
2	9	8	10	10	9	9	9	9	8	9
3	6	8	8	6	7	7	6	8	7	9
4	3	6	6	3	6	6	4	8	5	5
5	4	6	6	5	7	7	5	7	6	7
6	8	9	10	10	9	9	9	10	10	10
7	MOVED									
8	10	10	10	10	10	10	10	10	10	10
9	1	2	3	5	4	5	4	5	5	6
10	10	10	10	10	10	10	10	10	10	10
11	4	3	3	8	8	4	5	6	8	5
12	7	5	6	8	7	7	7	8	8	8
13	MOVED									
14	10	10	10	10	10	10	10	10	10	10
15	9	10	9	9	10	9	9	10	10	9
16	8	10	10	10	8	9	9	7	8	9
17	8	10	10	10	10	10	10	10	9	10
18	8	6	6	7	6	6	7	9	5	8
19	MOVED									
20	6	6	6	5	6	6	6	5	8	6
21	6	6	6	9	6	6	8	9	9	7
22	2	2	2	8	5	5	5	7	7	5
23	10	10	10	10	10	10	10	10	10	10
24	9	8	9	5	9	8	9	10	5	8

Appendix D
Group B-- Follow-up Study

First Grade Test Data of each subject on all measures

Sub. No.	Sex	Binet	Human Figure	PPVT	Bender	Binet Vocab.	Seguin	ITPA			
								VE	VIS	A-V	V-M
1	M	88	17	56	11	6	28	12	14	16	15
2	F	81	27	56	9	5	29	12	8	15	13
3	M	101	29	56	11	10	30	17	12	16	19
4	M	84	15	50	6	4	21	17	14	15	21
5	F	83	20	52	14	5	32	15	6	19	17
6	M	81	22	53	6	5	22	9	15	21	17
7	M	97	19	58	5	6	21	15	15	16	17
8	F	90	18	49	7	6	19	14	13	14	12
9	MOVED										
10	F	90	30	57	5	7	22	15	12	18	16
11	M	92	12	55	9	5	19	10	12	16	11
12	MOVED										
13	F	107	15	40	9	7	22	15	15	21	17
14	F	111	18	63	8	7	19	21	11	18	23
15	F	96	26	39	12	6	22	18	6	14	12
16	F	84	21	53	18	5	26	11	13	14	10
17	F	94	25	58	4	5	24	12	17	15	17
18	M	89	13	46	11	5	21	13	12	14	3
19	F	80	21	57	12	3	27	21	8	14	15
20	F	82	25	43	11	3	38	10	8	14	16
21	MOVED										
22	F	72	12	59	16	5	23	12	10	15	17
23	F	84	28	59	12	4	26	13	13	10	14
24	MOVED										

Group B - cont.

Sub. No.	WISC			STANFORD Achievement Test				
	Full	Verbal	Performance	Word Reading	Paragraph Meaning	Vocab.	Arith.	Total
1	88	91	87	1.0	1.0	1.0	1.0	4.0
2	81	81	85	1.0	1.0	1.2	1.1	4.3
3	89	101	78	2.6	2.3	3.1	2.2	10.2
4	102	94	111	1.6	1.5	1.1	1.3	5.5
5	85	89	85	1.8	1.8	2.1	2.2	7.9
6	85	92	80	2.3	2.2	1.8	2.6	8.9
7	101	101	101	1.0	1.0	1.0	1.0	4.0
8	93	80	108	1.8	1.9	2.1	1.4	7.2
9	MOVED							
10	98	97	99	2.3	2.4	1.8	1.4	7.9
11	79	89	72	2.7	1.8	1.4	2.0	7.9
12	MOVED							
13	90	95	86	2.3	2.1	2.3	2.7	9.4
14	109	110	106	1.6	2.3	2.3	2.0	8.2
15	94	86	104	1.3	1.5	1.4	1.3	5.5
16	85	81	93	2.4	1.8	1.9	1.7	7.8
17	92	100	85	2.7	2.3	3.1	2.6	10.7
18	96	89	104	1.4	1.4	1.3	1.5	5.6
19	71	74	74	1.1	1.5	1.5	1.5	5.6
20	77	79	80	1.4	1.3	1.6	1.1	5.4
21	MOVED							
22	83	76	93	1.0	1.1	1.4	1.1	4.6
23	96	97	93	1.2	1.5	1.5	1.2	5.4
24	MOVED							

Group B - cont.

Sub. No.	Leader-ship	Effort	Interest sch. wk.	Ability write	Ability read	Ability arith	Stand-ing in class	Ability get along	Over-all discip.	Adapt to 1st grade
1	9	9	9	7	8	9	8	9	8	8
2	3	5	6	8	6	6	5	3	5	6
3	10	9	10	10	10	9	10	9	9	9
4	5	6	6	6	7	10	6	7	6	7
5	10	10	10	8	9	8	10	10	10	10
6	9	10	10	10	9	10	10	10	10	10
7	3	4	5	9	5	5	5	5	9	5
8	9	10	9	9	9	8	9	9	9	10
9	MOVED									
10	9	10	9	10	9	7	9	9	9	9
11	10	10	10	10	10	10	10	9	10	10
12	MOVED									
13	10	10	10	10	9	9	10	10	10	10
14	9	10	9	10	9	9	9	10	10	9
15	8	9	10	7	9	8	8	9	10	10
16	5	3	4	6	5	5	5	6	5	5
17	9	9	9	9	9	9	10	9	9	9
18	10	10	10	10	10	10	10	10	10	10
19	5	5	5	9	5	5	5	9	5	5
20	1	1	3	3	3	3	2	3	4	3
21	MOVED									
22	5	8	9	8	6	3	6	7	5	6
23	9	8	9	7	6	8	8	8	8	9
24	MOVED									

Appendix D
Group C - Follow-up Study

First Grade Test Data of each subject on all measures

Sub. No.	Sex	Binet	Human Figure	PPVT	Bender	Binet Vocab.	Seguin	ITPA			
								VE	VIS	A-V	V-M
1	M	72	13	51	13	3	23	12	14	15	19
2	M	93	19	48	8	6	18	18	13	18	20
3	M	111	19	67	1	8	31	17	17	16	17
4	F	80	9	32	9	5	30	12	4	10	16
5	M	84	9	52	5	6	22	6	11	10	13
6	MOVED										
7	F	79	26	51	12	4	29	4	10	9	15
8	M	96	17	56	17	7	33	6	15	19	13
9	F	66	14	51	16	3	50	14	13	17	10
10	F	88	22	47	8	6	15	12	10	15	10
11	F	96	18	55	13	8	26	10	14	17	12
12.	M	80	11	51	16	6	45	11	7	11	8
13	MOVED										
14	F	112	9	52	8	9	19	12	11	20	20
15	F	73	16	45	10	5	27	12	12	15	17
16	M	75	11	48	11	4	55	7	10	8	11
17	M	92	11	50	14	6	19	13	9	18	14
18	M	80	14	53	2	6	20	18	13	18	20
19	M	87	18	62	9	2	NO DATA				
20	F	80	18	52	7	6	31	10	10	10	12
21	M	83	13	57	9	6	31	17	12	14	17
22	F	66	14	39	11	5	27	6	9	14	11
23	F	88	26	59	12	6	20	19	11	13	16
24	MOVED										

Group C - cont.

Sub. No.	WISC			STANFORD Achievement Test				
	Full	Verbal	Performance	Word Reading	Paragraph Meaning	Vocab.	Arith.	Total
1	71	74	74	1.3	1.5	1.1	1.1	5.0
2	99	95	104	MOVED	-	-	-	-
3	97	101	93	1.4	1.2	1.6	1.7	5.9
4	68	79	66	1.3	1.2	1.4	1.3	5.2
5	85	87	85	1.0	1.0	1.0	1.0	4.0
6	MOVED							
7	75	75	79	1.6	1.6	1.4	1.1	5.7
8	86	94	80	1.4	1.6	1.2	1.2	5.4
9	72	76	75	1.4	1.5	1.3	1.2	5.4
10	93	87	100	1.4	1.4	3.1	1.3	7.2
11	86	87	87	1.6	1.6	1.4	1.2	5.8
12	71	76	71	1.0	1.0	1.3	1.1	4.4
13	MOVED							
14	107	113	100	1.1	1.5	1.9	1.2	5.7
15	69	72	74	1.4	1.6	1.5	1.2	5.7
16	67	76	58	1.0	1.3	1.0	1.0	4.3
17	85	82	90	1.2	1.4	1.3	1.5	5.4
18	90	85	97	1.0	1.4	1.1	1.1	4.6
19	83	97	69	1.4	1.6	1.7	1.3	6.0
20	76	79	78	1.3	1.4	1.3	1.2	5.2
21	92	92	93	1.3	1.4	1.2	1.4	5.3
22	71	81	65	1.3	1.5	1.3	1.1	5.2
23	99	108	90	1.6	1.6	2.0	1.4	6.6
24	MOVED							

Group C - cont.

Sub. No.	Leader-ship	Effort	Interest sch. wk.	Ability write	Ability read	Ability arith	Stand-ing in class	Ability get along	Over-all discip.	Adapt to 1st grade
1	6	5	6	5	5	5	5	8	9	6
2	4	6	6	5	4	4	5	7	6	5
3	5	7	4	5	4	3	4	8	8	7
4	2	3	3	4	2	2	2	5	4	3
5	9	9	9	9	8	8	9	9	9	9
6	MOVED									
7	9	7	7	6	4	3	5	9	8	6
8	9	7	8	5	4	6	6	9	9	8
9	1	1	1	1	1	1	1	5	8	1
10	8	10	9	9	9	10	9	7	7	9
11	9	9	9	8	8	8	8	9	9	8
12	1	2	1	1	1	1	1	4	5	1
13	MOVED									
14	6	5	4	6	6	4	5	10	8	6
15	4	5	5	3	3	4	4	8	9	5
16	1	1	4	2	1	2	1	5	1	2
17	8	8	10	9	9	9	9	9	9	9
18	3	4	4	1	1	1	1	5	5	4
19	5	6	7	4	4	3	4	8	9	5
20	1	3	3	1	2	2	2	6	6	4
21	4	5	6	2	5	7	4	4	2	6
22	5	3	5	3	3	2	3	8	8	4
23	3	6	5	7	4	4	5	5	7	8
24	MOVED									

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