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ABSTRACT

This is a followup study of second and third grade children who experienced differential treatment during their kindergarten year. A total of 72 disadvantaged black children comprised the sample which was divided into three groups. Group A received a special sequential Learning to Learn Program. Group B participated in a traditional kindergarten and Group C remained at home. At the end of the year, all subjects enrolled in a regular public school first grade. Developmental measures of the children taken periodically during the four-year study included the Stanford Achievement Test, subtests of the Wechsler Intelligence Scale for Children and the Illinois Test of Psycholinguistic Abilities. Early results revealed that the Learning to Learn Program accelerated the children's development, that the regular kindergarten group maintained their previous developmental level, and that the no-program treatment group fell behind in overall development during the kindergarten year. However, later results indicated that while the three groups maintained their order of mean developmental level, the differences among them decreased through the years, until, by the end of the third grade, differences were no longer statistically significant. (MH)

EVALUATION REPORT

Contract No. B89-4425

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Final Report

Project Title: A follow-up evaluation of the effects of a unique sequential learning program, a traditional preschool program and a no treatment program on culturally deprived children.

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Introduction and Purpose

Now that Project Head Start has been in operation for several years it is possible to begin answering the question of what long term effects preschool programs have for culturally deprived children.

During the school year of 1965-66 the present investigators, working with Dr. Sprigle of the Learning to Learn School, evaluated the development of three groups of culturally deprived children. The experimental group (Group A) received a special sequential Learning to Learn Program. One control group (Group B) received a "traditional" preschool program and a third group (Group C) received no formal preschool training. The data collected at the end of the kindergarten year indicated that the children who had attended the Learning to Learn Program scored significantly higher on all nineteen developmental measures that were used. Following the kindergarten year the children from all three groups attended first grade in the public school system. Seventeen developmental measures were taken at the end of the first grade and fifteen of these seventeen measures indicated that the Learning to Learn group was still significantly superior in their performance when compared with the other two groups. (For a more complete description of these results, please see the final report on Contract No. OEO-1389, which is available from the authors or a summary is available from the Division of Research and Evaluation of Project Head Start).

The purpose of this follow-up study was to determine if the differential development of these three groups remained as the children went through the second and third grades in the public school system in Jacksonville, Florida.

It was hypothesized that:

(1) The children from the Learning to Learn Program would remain developmentally superior to the other two groups.

(2) Group B would remain superior to Group C.

(3) The developmental differences between all three groups would continue to decrease from year to year.

(4) The developmental deceleration of Group A and the developmental acceleration of Group C would become less each year.

Each of these hypotheses was tested on the following developmental characteristics:

(1) General intelligence

(2) The ability to express ideas

(3) Language comprehension

(4) Verbal reasoning ability

(5) Concept formation

(6) School achievement

Description of the Learning to Learn Program

The theoretical basis of the program

The Learning to Learn Program was conceived and developed on the premise that the primary objective of early childhood education is to help the child learn to learn. This premise leads to the following seven basic principles underlying the Learning to Learn Program:

(1) The child must be an active participant in the acquisition of knowledge and be given a major share of the work in what he learns. The child is not considered to be a passive data bank that is filled

by a highly verbal teacher who "teaches" the child all he knows.

(2) The child must receive feedback that the application of his knowledge has made a contribution to himself and someone else. Such a realization builds self-confidence and self-worth.

(3) The internal satisfaction and feelings of adequacy that develop from the knowledge that he can cope with and master his environment stimulate the child's growth toward independence and achievement.

(4) Learning becomes more meaningful to the child when it is in the form of a problem which challenges him and sparks his curiosity. The emphasis is placed on the process of problem solving and not on the accuracy of the solution. Such an approach encourages decision making and the development of flexible cognitive sets and strategies for learning without fear of failure and disapproval.

(5) The verbal symbols, concepts, skills and attitudes learned will more readily become a part of the permanent repertoire of intelligent behavior if they are immediately useful and helpful in the child's everyday world.

(6) The child must be exposed to opportunities for the interaction of multiple sensory and motor activities and for the accurate labeling and communication of the information received. The child is usually fascinated with the realization that he can internalize an external process, organize it and report it to a listener who understands the logic of his thoughts. This is especially intriguing when the data processed are from sources other than the eyes and ears.

(7) Learning experiences for the child take on value not in mere exposure but in their timing, continuity and the ways they are structured. Appropriate timing and sequencing of experiences regulate the amount and

intensity of stimulation, and provide an atmosphere that lends itself to attention, concentration and greater sensitivity to the structure of the experiences. This approach assures that the child is moving forward by providing a hierarchical structure of learning experiences.

These seven principles have been shaped by a knowledge of child development, education, learning and by daily observations of teachers' and childrens' behavior and their interaction during the three year experimental use of the Learning to Learn Program.

The organization of the Learning to Learn 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 objects in 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 given the opportunity to perceive, recognize, categorize, 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 tangible objects or relationships. With the acquisition of the ability to communicate verbally comes the capacity to recall the past, represent the present, and to think about the future and the "possible." Language becomes a vitally important tool for thinking, reasoning, and

communicating things that the child has not said or heard before.

With the establishment of the program within a theoretical framework, the next essential step toward putting the theory to work was to determine where most four- or five-year olds are with respect to their development. Psychological and educational literature provided quite clear evidence in this regard. A more challenging step was the necessity for translating theory and research into practical content which would facilitate a child's progress through the developmental sequence.

The natural choice for something to motivate, stimulate, and appeal to children was the use of games or a game atmosphere. The games employed in this program were constructed around five content areas (clothing, food, animals, furniture, transportation) and chosen because examples of this content are familiar to children of all socio-economic backgrounds and because they are readily available as real or miniature three-dimensional objects.

By beginning with a few examples of each content area and gradually expanding to include more members of the class, it was possible to develop a variety of games and activities, each of which is one step beyond the previous one and each incorporating the experiences and knowledge acquired by the child. Each of the five areas is sequenced in such a way that each is revisited and repeated in a variety of ways. Each time, however, the game or activity moves one step beyond the real and the concrete toward the abstract. The real orange, for example, is replaced by a picture of an orange as the only stimulus, and finally, the games are highly verbal and require statements about an orange. Every game or activity actively engages the child in some kind of

interplay of manipulation, perception, and verbalization.

This gradual transformation of overt action into mental operations is a direct consequence of Piaget's key tenet that stable and enduring cognitions about the world come about only through a very active commerce with this world on the part of the knower (Flavell, 1963, p. 367).

It should be pointed out, however, that the goals of the program go beyond competence in manipulating language. The program gives the child an opportunity for the development of strategies of gathering information, problem-solving, and decision making. The skills and concepts children acquire are as follows:

1. Information gathering and processing through the use of all the senses
2. Observation, identification, and labeling of objects
3. Attention to and concentration on attributes that discriminate one object from another (what makes a pear a pear)
4. Classification
5. Classes and sub-classes
6. Identification and classification on the basis of reduced clues
7. Encouragement in the use of guesses and hunches
8. Decision making
9. Use of past learning to make decisions
10. Problem solving
11. Reasoning by association, classification, and inference
12. Anticipation of events and circumstances
13. Expression of ideas

14. Imagination and creativity

15. Conventional(in contrast to idiosyncratic) communication

16. Operations on relationships

17. Exploration of numbers and space

It can be seen that the program not only exposes children to experiences that will gently nudge them along in their development, but also equips them with tools and techniques which enable them to learn how to learn. The emphasis on creative exploration is in vivid contrast to Montessori programs which teach the child classification and description of the world around him. An important advantage of this approach is that it makes the child more independent since his past experiences help him master new situations. His greater maturity is evident in his reliance upon his own resources and less dependence on the teacher. He experiences tremendous satisfaction from the knowledge that he knows how to solve problems and to grow independently.

Two teachers, as well as two classroom areas, are necessary. One room is 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. The careful use of groups is in accord with Piaget's second major implication for education.

> "If social cooperation is thus one of the principal formative agents in the spontaneous genesis of child thought, it is an imperative necessity for modern education to make use of this fact by according an important place to socialized activities in the curriculum." (Aebli, 1951, p. 60)

Considerable stress is placed on the learning atmosphere. The other children must show the learner (player) respect by being quiet so he can "think with his brain" (make observations, organize information and his thoughts before responding). With such an emphasis it soon becomes apparent to the child that he is important and what he is trying to achieve is worthwhile.

The curriculum of the program

The following is a content summary of the programs described in Inquisitive Games, Language and Communication, (Sprigle, in press) and Inquisitive Games, Exploring Numbers and Space, (Sprigle, 1967).

- Language and Communication

I. Learn ways to gather, relate, organize and apply information so that the information becomes meaningful and useful. This involves the use of senses to gather information.

   A. Visual

      1. Observation of and attention to shape, color and distinguishing characteristics to identify items
      2. Observation of and attention to similarities and differences of shape, color and distinguishing characteristics to differentiate between items
      3. Observation of and attention to shape, color and distinguishing characteristics to identify items
      4. Observation of and attention to shape, color and distinguishing characteristics to locate and identify item in an array
      5. Observation of and attention to parts and position of parts of an item to form a whole item

6. Identification of item by observation and attention to partial visual clues (shape without color, partial shape with color, partial shape without color)

B. Auditory

1. Listening to and concentrating on verbal description to identify item
2. Associating verbal description with visual model to identify item
3. Listening to and concentrating on stories to find facts
4. Listening to and concentrating on stories to anticipate outcome
5. Listening to and concentrating on verbal directions to understand nature of a problem and how to complete a task
6. Listening to and concentrating on words to discriminate between sounds

C. Organization

1. Labeling
   (a) Learn to associate name with item having specific attributes (shape, color)
   (b) Learn to associate name with picture of item
   (c) Learn to associate name with picture of item when some visual clues have been removed (shape without color, partial shape with color, partial shape without color)
   (d) Learn names of categories
   (e) Learn to associate groups of items with category name

D. Classification

1. Learn that items can be arranged into categories by some type of system
2. Given the information, learn names of categories and items belonging to each category
3. Given criteria of how items are categorized, and description of how items meet criteria, separate items into categories
4. Recall information to separate array of items into 2, 3, 4, or 5 categories
5. Combine sub-categories into general categories using criteria of attributes and/or function

E. Part-Whole

1. Associate attributes of parts to whole item
2. Arrange parts to form whole
3. Breakdown whole into parts

F. Sequence

1. Anticipate and describe events of a story from a storybook
2. From a story sequence of 2 pictures, choose an appropriate ending from a choice of 2 pictures
3. From a story sequence of 3 pictures, choose an appropriate ending of story from a choice of 2 pictures
4. From an array of seven/eight pictures, choose any number of pictures to make a story

G. Problem Solving

1. Past learning to make decisions

(a) Apply information to separate items into categories

(b) Given all parts, identify whole

(c) Given partial visual clues, identify item (shape without color, partial shape with color, partial shape without color)

(d) Make visual representation of item or items

(e) Using knowledge of story structure, sequence pictures and make up a story about them

(f) Make a series of decisions to complete a task

2. Hunches and guesses to make decision

(a) Identify item from incomplete clues

(b) Associate known items with unfamiliar items for general identification of category

II. Experience satisfaction of possessing knowledge and being able to use it for independent accomplishment

A. Problem solving (see above)

1. Use past learning to make decisions

2. Use hunches and guesses to make decisions

B. Anticipate events and circumstances

1. Apply knowledge of game procedure to new game

2. Anticipate other children's play during a game to block their play

3. Anticipate own next play and structure play for advantage

4. Anticipate and describe events of a story

III. Learn to communicate knowledge and ideas verbally

A. Description

1. Apply name to item
2. Apply name to category
3. Apply learned descriptive vocabulary to describe items
4. Tell uses to describe item
5. Compare and contrast attributes of items

B. Discussion

1. Associate own experience to items and relate experiences to group
2. Apply knowledge to tell reasons for guesses and decisions
3. Answer questions

C. Story telling

1. Describe elements of pictures containing action
2. Express ideas concerning action of a picture
3. Use sentences rather than 1 or 2 words to express ideas
4. Relate action in a sequenced series of pictures to make a story
5. Elaborate on action of a picture giving events before and after, describing emotions of characters, giving dialogue to characters
6. Elaborate on action of sequenced pictures giving story details
7. Choosing a series of pictures, sequencing theme, and telling a story about them

Exploring numbers and space

- Sequence Chart

Games and Activities	Objectives
Obstacle Course	To develop the child's awareness of his own body in relation to an object.
Chairs	To develop the child's ability to use kinesthetic and temporal cues in making spatial judgments.
Road Game I	To provide practice in using kinesthetic and temporal cues as an aid to spatial estimation.
Road Game II	To develop the child's ability to use visual cues and previous experience to make fine discriminations of spatial relationships (no kinesthetic cues).
Colored-Stick Activities	
Activity I - Identifying Colors	To develop the child's ability to identify colors of sticks.
Activity 2 - Free Play	To encourage independent discoveries about the characteristics of the sticks by manipulating them during free play.
Activity 3 - Classification by Color	To develop the child's ability to classify by color.
Activity 4 - Fence	To develop the child's ability to classify by color and size.
Activity 5 - Touch	To develop the child's ability to use the sense of touch to discriminate differences in size.
Activity 6 - Ordinal Position I	To develop the child's ability to construct a sequence by size. To introduce the words first, second, third, fourth, fifth.
Activity 7 - Ordinal Position II	To develop the child's ability to construct a sequence by size and color. To review the words first, second, third, fourth, fifth.
Activity 8 - Stairway	To develop the child's ability to construct a sequence by size and color.

Activity 9 - Guess	To provide experience with size sequence.
Activity 10 - Paper Bag	To develop the child's ability to use the sense of touch to discriminate slight differences in size.
Activity 11 - Replacement	To develop the concepts that (1) length may be composed of different parts and (2) length remains the same regardless of the arrangement of its parts.
Activity 12 - Blocks	To reinforce the concepts that (1) length may be composed of different parts and (2) length remains the same regardless of the arrangment of its parts.
Squares Game (Playing the Game)	To determine the degree of the child's understanding of the concept that length may be composed of different parts.
(Later-Play Activities)	To reinforce the concept presented in the Squares Game by imposing more demanding rules for stick replacement and by using white sticks for replacement.
Equivalence (Playing the Game)	To extend the concepts that (1) length may be composed of different parts and (2) length remains the same regardless of the arrangements of its parts.
(Later-Play Activity)	To reinforce the concepts of the Equivalence Game by using white sticks.
Estimation I (Playing the Game)	To develop the child's ability to use visual cues to estimate spatial relationships. To extend the concepts that (1) length may be composed of different parts and (2) length remains the same regardless of the arrangement of its parts.
(Later-Play Activity)	To reinforce the concepts of the Estimation Game by using white sticks.

House Game (Lead-in Activities)	To review possible stick combinations that can be used to make a given length. To familiarize the child with the House Game playing board.
(Playing the Game)	To develop the concept that length is composed of shorter lengths added together.
(Later-Play Activities)	To reinforce the concept of the House Game by imposing more demanding rules for stick replacement and by using white sticks for replacement.
Steps Game (Lead-in Activities)	To review sequencing by size and color. To familiarize the child with the Steps Game playing board.
(Playing the Game)	To extend the child's ability to construct a sequence according to size and color. To provide practice in performing additive operations.
(Later-Play Activities)	To reinforce the concepts of the Steps Game by removing color cues.
Recognizing and Writing Numerals	To develop the child's ability to recognize the numerals 1 through 9. To develop the child's ability to seriate the numerals 1 through 9. To develop the child's ability to write the numerals 1 through 9.
One to Three Game Version 1	To reinforce the child's recognition of the numerals 1 through 3.
Version 2	To develop the concept that the numerals 1, 2, 3 represent sets of objects.
(Later-Play Activities)	To reinforce the concept that the numerals 1, 2, 3 represent sets of objects.
One to Six Game Version 1	To reinforce the child's recognition of the numerals 1 through 6.
Version 2	To develop the concept that the numerals 1 through 6 represent sets of objects.
(Later-Play Activities)	To reinforce the concept that the numerals 1 through 6 represent sets of objects.

One to Nine Game Version 1	To reinforce the child's recognition of the numerals 1 through 9.
Version 2	To develop the concept that the numerals 1 through 9 represent sets of objects.
(Later-Play Activities)	To reinforce the concept that the numerals 1 through 9 represent sets of objects.
Plus and Minus Signs	To familiarize the children with the plus and minus signs.
Buy and Sell Game 1	To develop the concepts of addition and subtraction.
(Lead-in Activities)	To develop an understanding of the record-keeping function of numerals. To develop the ability to classify according to family.
Buy and Sell Game 1 (Playing the Game)	To reinforce the concepts taught in the lead-in activities.
Buy and Sell Game II (Lead-in Activities)	To extend the concepts of addition and subtraction. To reinforce the child's understanding of the record-keeping functions of numerals. To reinforce the child's ability to classify according to family. To introduce mathematical sentences.
(Playing the Game)	To reinforce the concepts taught in the lead-in activities.
Animal Toss Game (Lead-in Activities)	To familiarize the children with the animals used in the game. To develop the child's understanding of the concepts "more than" and "less than." To provide experiences in counting.
(Playing the Game)	To extend the concepts "more than" and "less than." To develop the child's understanding of the terms plus, minus, and equals.

Land and Water Animals Game (Lead-in Activity)	To familiarize the children with the game board and playing cards used in the game. To provide experiences in counting. To provide experiences in classification by family.
(Playing the Game)	To develop the concepts "more than" and "less than." To extend the child's ability to classify by family.
Theater Tickets Games I and II (Lead-in Activities)	To introduce the concept of multiple-class membership. To reinforce the concepts of "more than" and "less than." To provide practice in performing the operations of addition and subtraction.
(Playing the Game)	To extend the concepts introduced in the lead-in activities.
Estimation II	To extend the concepts that (1) any length is composed of shorter lengths added together and (2) the terms more than and less than describe relationships. To extend the child's ability to make accurate spatial judgments. To develop the child's ability to solve problems involving logical relationships.
Estimation III (Playing the Game)	To develop the child's ability to apply the previously learned concepts that (1) any length is composed of shorter lengths added together, (2) the terms more than and less than describe relationships, and (3) there are specific relationships between the lengths of the colored sticks. To extend the child's ability to make accurate spatial judgments.
(Later-Play Activities)	To further extend the child's ability to make accurate spatial judgments by removing color cues.

The Two Game	To develop insights into the nature of equivalence.
The Three Game	To develop insights into the nature of equivalence.
The Four Game	To develop insights into the nature of equivalence.
The Five Game	To develop insights into the nature of equivalence.
(Later-Play Activity)	To determine the extent of transfer of learning from the Two, Three, Four, and Five Games.

Other aspects of the Learning to Learn Program

(1) In this approach to learning, the teachers spend less time talking and more time making observations about the child's rate and level of learning.

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

(2) In this program the child is given the opportunity to develop strategies for gathering information, problem solving, and decision making. The acquisition of these skills provides the child with a basis for confident, independent learning. The teacher creates an atmosphere where she is a source of stimulation, but where the child

is given the major share of the work in the learning process. With such an approach the child gets continuous feedback that he can trust himself and his abilities. At the same time he becomes aware of his limitations in a non-threatening atmosphere.

(3) In the beginning children are homogeneously grouped and the teacher takes from four to six children at a time to a part of the classroom that is screened off to engage in a planned sequential learning activity (reading, math, science, etc.). The larger part of the classroom is divided into four activity areas. Each area contains a supply of games and activities which either reinforce, extend, or expand upon what is taking place in the small groups. Children are free to move from one activity to another. A teacher aide is available to give the child just enough help to send him on his way. The children are free to work together or alone in their explorations of and experimentations with the games and activities.

The activities within themselves give the child a chance to see the goal for which he is striving, and in the process of moving towards this goal, he has some feedback as to his progress in that direction. Thus, his motivation and interest in learning remain high.

The way in which the games and activities involve the child in thinking and reasoning forces him to draw upon past experiences and information to solve a problem or make a decision, builds his self-confidence and makes him more independent. His greater maturity is evidenced by his increased reliance upon his own resources and efforts and lessened dependence on others. He benefits by developing and strengthening achievement skills and by experiencing satisfaction for independent accomplishment.

Method

Subjects: The subjects consisted of 72 culturally deprived Negro children who were in the matched groups mentioned earlier. As many of these children as could be located in the Jacksonville school system were evaluated. (Please see the final report on Contract No. OEO 1389 for a more detailed description of how these subjects were matched).

Instruments: The instruments which were used to measure the developmental characteristics at the end of the second and third grades in the public school system were as follows:

Developmental Characteristics	Instruments
(1) General Intelligence	The Wechsler Intelligence Scale for Children
(2) Verbal Intelligence	The WISC Verbal subtests
(3) Performance Intelligence	The WISC Performance subtests
(4) The ability to express ideas	The Illinois Test of Psycholinguistic Abilities, Vocal Encoding subtest
(5) Language comprehension	The ITPA, Visual Decoding subtest
(6) Verbal reasoning ability	The ITPA, Auditory-Vocal Association subtest; WISC Similarities subtest
(7) Concept formation	The ITPA, Visual-Motor Association subtest; WISC Picture Arrangement subtest
(8) Visual-motor coordination	WISC Block Design and Coding subtest
(9) Vocabulary	WISC Vocabulary subtest
(10) School achievement (third grade only)	Stanford Achievement Test

It was also originally planned to collect achievement test data at the end of both years. This was not possible because of a state-wide teacher walkout near the end of the school year when the children were in the second grade.

Procedure: The evaluation data were collected individually for all subjects near the end of each school year. The testing was done by trained examiners in rooms within the school setting. After the data were collected all the test material was reevaluated to insure proper scoring.

Results

Results at the completion of the second grade

The means, standard deviations, and F ratios of the measures taken at the end of the second grade by the three groups of children are presented in Table 1.

TABLE 1

The Means, Standard Deviations, and F Ratios for the WISC and ITPA Subtests taken at the end of the Second Grade

Measure	Group	Mean	S.D.	N	F Ratio
WISC Full Scale I.Q.	A	96.61	10.82	21	2.92
	B	92.75	10.94	20	
	C	87.72	12.70	18	
WISC Verbal I.Q.	A	97.04	12.02	21	2.01
	B	92.95	12.99	20	
	C	89.22	11.37	18	
WISC Performance I.Q.	A	96.57	9.46	21	2.56
	B	93.79	9.60	20	
	C	88.44	14.53	18	
ITPA Vocal Encoding	A	19.90	3.44	21	1.76
	B	15.05	4.01	20	
	C	12.33	4.70	18	
ITPA Visual Decoding	A	14.85	2.74	21	1.92
	B	13.70	3.16	20	
	C	13.00	3.10	18	

TABLE 1 con't

Measure	Group	Mean	S.D.	N	F Ratio
ITPA Auditory Vocal Assoc.	A	19.76	2.36	21	1.77
	B	19.29	1.52	20	
	C	18.38	2.85	18	
ITPA Visual Motor Assoc.	A	17.52	3.15	21	1.37
	B	17.70	3.48	20	
	C	17.16	3.76	18	

$F_{.95} = 3.17$

The performance of the three groups was compared by means of a simple analysis of variance for each developmental measure. These analyses indicate that the differences between the three groups at the end of the second grade have decreased enough so that they no longer reach significance at the .05 level.

Thus, the hypothesis is supported that the differences between the three groups would continue to decrease. The same pattern of scores, however, appears at the end of the second grade as was present at the end of the first grade. With the exception of one subtest on the ITPA the experimental group obtains the highest mean scores, and the children who remained at home during the kindergarten year obtained the lowest mean scores.

Table 2 gives a comparison of the scores obtained by each of the three groups at the end of the second grade on the two subtests of the Wechsler Intelligence Scale for Children. The F ratios indicate that on 9 out of the 10 subtests the differences between the groups are not great enough to be statistically significant. The exception occurs on the comprehension subtest which is designed to measure judgment, verbal comprehension and sensitivity to problems.

TABLE 2

The Means, Standard Deviations, and F Ratios for Groups A, B and C on WISC Subtests at the end of Second Grade

Measure	Group	Mean	S.D.	N	F Ratio
Verbal Subtests					
Information	A	9.80	2.85	21	2.38
	B	9.45	2.91	20	
	C	8.05	1.83	18	
Comprehension	A	9.61	2.61	21	4.34*
	B	8.40	2.50	20	
	C	7.16	2.66	18	
Arithmetic	A	9.57	1.91	21	1.13
	B	10.20	2.37	20	
	C	9.22	1.76	18	
Similarities	A	10.38	2.99	21	.71
	B	9.45	2.83	20	
	C	9.44	2.74	18	
Vocabulary	A	8.28	2.47	21	.76
	B	7.15	3.03	20	
	C	7.61	3.39	18	
Performance Subtests					
Picture Completion	A	9.66	2.93	21	.88
	B	9.65	2.51	20	
	C	8.55	3.32	18	
Picture Arrangement	A	8.80	2.20	21	.60
	B	7.90	2.59	20	
	C	8.61	3.44	18	
Block Design	A	8.61	2.01	21	1.77
	B	8.75	2.07	20	
	C	7.50	2.61	18	
Object Assembly	A	8.52	2.63	21	1.04
	B	8.25	1.88	20	
	C	7.44	2.57	18	
Coding	A	11.52	2.85	21	2.91
	B	11.05	1.93	20	
	C	9.66	2.49	18	

*$F_{.95}$ = 3.17

Results at the completion of the third grade

Table 3 shows the means, standard deviations and F ratios for the WISC and ITPA measures taken at the end of the third grade.

TABLE 3

The Means, Standard Deviations and F Ratios for the WISC and ITPA Subtests taken at the end of the Third Grade

Measure	Group	Mean	S.D.	F Ratio
WISC Full Scale I.Q.	A	92.47	10.62	2.42
	B	92.76	10.79	
	C	85.32	13.39	
WISC Verbal I.Q.	A	94.84	12.69	1.51
	B	94.94	11.36	
	C	88.47	14.64	
WISC Performance I.Q.	A	91.26	10.10	2.24
	B	91.88	9.99	
	C	84.89	12.92	
ITPA Vocal Encoding	A	20.37	3.92	7.84
	B	16.17	3.61	
	C	16.05	3.82	
ITPA Visual Decoding	A	15.63	2.67	0.10
	B	14.53	2.07	
	C	15.42	2.57	
ITPA Auditory-Vocal Assoc.	A	20.37	1.74	1.06
	B	20.82	2.10	
	C	19.84	2.22	
ITPA Visual-Motor Assoc.	A	19.16	3.52	1.17
	B	19.82	2.79	
	C	18.16	3.47	

$N_A = 19$

$N_B = 17$

$N_C = 19$

$*F_{.95} = 3.18$

These data indicate that there were no significant differences between the three groups when compared by means of a simple analysis of variance of each of the measures.

The overall pattern of scores is very similiar to the results at the end of the second grade. By the end of the third grade Groups A and B, who both received kindergarten training, have very similiar scores on most of the measures. Group C obtains the lowest score on most of the measures as has been true over the duration of the study.

The hypothesis that the differences between the groups will continue to decrease is supported by these data as it was at the end of the second grade. The degree of similiarity in the test scores between the Groups A and B is somewhat surprising in that on most of the measures there is very little difference in mean scores.

A simple analysis of variance was also performed on the scores obtained by the subjects in each group on the 10 subtests of the WISC. These data are presented in Table 4.

TABLE 4

The Means, Standard Deviations, and F Ratios for Groups A, B and C on WISC Subtests at the end of Third Grade

Measure	Group	Mean	S.D.	F Ratio
WISC Verbal Subtests				
Information	A	8.89	2.69	2.02
	B	8.47	1.70	
	C	7.37	2.65	
Comprehension	A	9.31	3.11	0.28
	B	9.18	2.37	
	C	8.63	3.30	
Arithmetic	A	9.11	2.64	1.91
	B	9.12	3.04	
	C	7.53	2.91	

TABLE 4 con't

Measure	Group	Mean	S.D.	F Ratio
Similarities	A	10.32	2.67	0.55
	B	10.35	1.62	
	C	9.58	3.02	
Vocabulary	A	8.26	2.79	0.65
	B	8.82	2.90	
	C	7.74	2.88	
WISC Performance Subtests				
Picture Completion	A	7.11	1.73	4.63*
	B	9.06	2.14	
	C	7.16	2.57	
Picture Arrangement	A	8.74	2.28	0.54
	B	9.18	3.97	
	C	8.05	3.42	
Block Design	A	8.68	2.06	2.51
	B	8.41	2.35	
	C	7.16	2.29	
Object Assembly	A	7.79	2.29	0.58
	B	6.94	1.85	
	C	7.16	3.08	
Coding	A	11.42	2.27	3.34*
	B	10.59	1.80	
	C	9.58	2.43	

$N_A = 19$ $*F_{.95} = 3.18$

$N_B = 17$

$N_C = 19$

Examination of Table 4 indicates that the same pattern occurs on the subtests of the WISC as does on the other measures at the end of the third grade. Groups A and B score very similiarly with Group C obtaining the lowest score on all but one of the measures. The two subtests on which significant differences are obtained are Picture

Completion and Coding. On Picture Completion Group B scores significantly higher and on Coding Group A scores higher than the other two groups.

Near the end of the third grade the Stanford Achievement Test was also administered to the three groups of children. These data were analyzed by means of simple analysis of variance. The means, standard deviations, and F ratios for the Stanford Achievement Test are presented in Table 5.

TABLE 5

Means, Standard Deviations and F Ratios for the Stanford Achievement Test taken at the end of Third Grade, 1969

Measure	Group	Mean	S.D.	F Ratio
Stanford Achievement				
Word Meaning	A	2.89	0.69	3.34*
	B	2.71	0.94	
	C	2.22	0.80	
Paragraph Meaning	A	2.63	0.86	2.04
	B	2.78	0.76	
	C	2.25	0.79	
Science & Social Studies Concepts	A	2.93	0.97	1.55
	B	3.07	1.45	
	C	2.45	0.85	
Spelling	A	3.13	1.23	1.97
	B	2.77	1.07	
	C	2.31	1.45	
Word Study Skills	A	2.56	0.98	0.41
	B	2.24	0.65	
	C	2.36	1.34	
Language	A	2.94	0.86	1.70
	B	2.64	0.70	
	C	2.45	0.89	

TABLE 5 con't

Measure	Group	Mean	S.D.	F Ratio
Arithmetic Computation	A	3.28	0.88	3.49*
	B	2.91	0.90	
	C	2.47	1.03	
Arithmetic Concepts	A	2.94	1.09	2.53
	B	3.02	1.25	
	C	2.28	2.28	
Total	A	2.92	0.79	2.56
	B	2.76	0.78	
	C	2.34	0.86	

$N_A = 18$ $*F_{.95} = 3.18$

$N_B = 17$

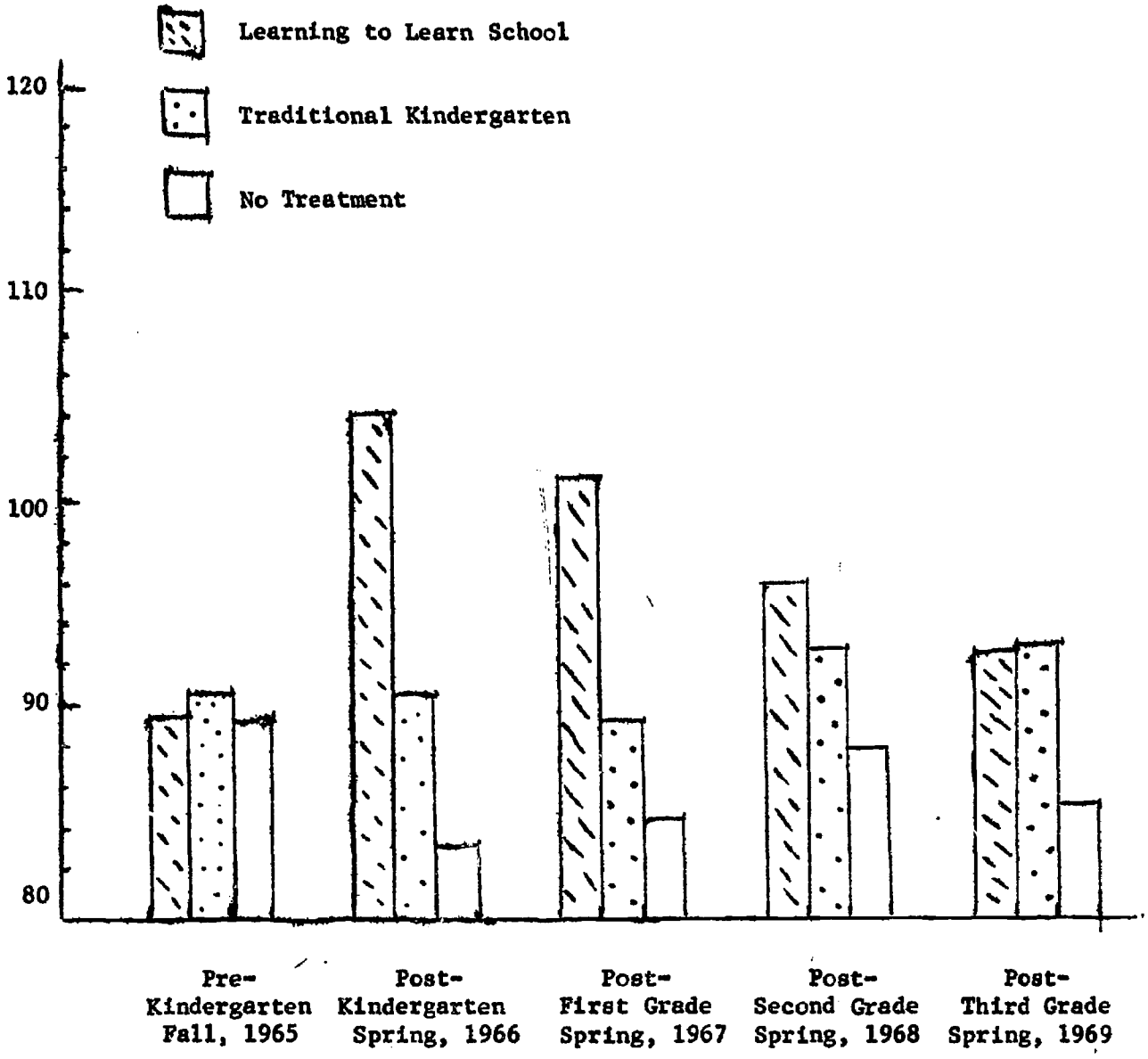
$N_C = 19$

Group A scores significantly higher on two of the eight subtests, Word Meaning and Arithmetic Computation. On these two subtests *t* tests between the groups indicate that the main difference on both is between Groups A and C where the *t*'s are significant, however, they are not significant between A and B. The pattern of results for the Stanford Achievement Test is similiar to that on the other tests obtained in both the second and third grades. Group A obtains the highest mean scores with Group B close behind and Group C obtains somewhat lower mean scores.

Table 6 gives the Intelligence Test scores obtained by each group over the entire duration of this study. These same data are presented in graphic form in Figure 1. The changes in the intelligence test scores over the four years of this study indicate that the advantages

FIGURE 1

Repeated Measures of Intelligence



of the Learning to Learn group which were present at the end of kindergarten are gradually disappearing, while the lower performance of the no treatment group is continuing. The difference of over 20 I.Q. points between these two groups at the end of kindergarten has decreased to less than 9 points at the end of second grade and to about 7 points at the end of third grade. The scores for Group B remain quite consistent over the duration of the study. Some possible reasons for these changes and trends are mentioned in the discussion section.

TABLE 6

Mean Intelligence Test Scores over time for Groups A, B, and C

Group	Pre Kindergarten	Post Kindergarten	Post First Grade	Post Second Grade	Post Third Grade
A	89.62	104.12	101.10	96.61	92.47
B	90.62	90.33	89.30	92.75	92.76
C	89.33	83.29	84.40	87.72	85.32

Discussion

The results of the evaluations over the four year period give a rather consistent pattern of what is occurring developmentally as these children progress through the first three grades of their neighborhood schools. The substantial advantage of the children from the Learning to Learn Program at the end of kindergarten has steadily decreased. On the other hand the development of the two control groups remains relatively consistent after they enter neighborhood schools.

The results indicate that the advantage gained during the Learning to Learn Preschool Program is disappearing as the children attend neighborhood schools.

A variety of workers (McCandless, 1967; Hess and Bear, 1968; and Heywood, in press) have discussed the possible reasons for this commonly found decrease in the rate of development among children who enter neighborhood schools after a special early education program.

On the basis of the data from this study and additional research now in process, we hypothesize that what is occurring to produce much of the decrease in the scores of the experimental children is a consequence of the characteristics of the other children in their classes in the neighborhood schools. Most of the children from the present study attend public schools in low income neighborhoods. Most of the classmates of the experimental children were at a considerably lower developmental-educational level at the beginning of the first grade. As a result of this class composition the teacher presumably started at the level of the majority of the class and moved at their pace. Therefore, the experimental children are likely to have received comparatively less new learning and stimulation. It is possible that had the experimental children entered classes where the other children were at the same developmental level the deceleration would not have occurred or would have been less. This hypothesis is supported by data available from a project in which the Learning to Learn Program was conducted through kindergarten and the first grade. The results indicate that the decrement does not occur; instead, these children

continue to gain in their development over children from a control group.

It is hoped that in another project we will be able to gather additional data concerning this hypothesis. The Learning to Learn Program is being conducted with a group of culturally deprived children for three consecutive years beginning at kindergarten and for four consecutive years beginning with four-year-olds, and their progress will be compared with control children who receive traditional preschool programs and enter the public school system in their neighborhood schools.

Conclusions from this Study

This study provides evidence for the following conclusions:

1. Culturally deprived children who attend a preschool program show overall developmental superiority at the completion of the program over those who did not attend.

2. The children attending the experimental program designed to teach children to learn how to learn made larger developmental gains during the kindergarten year than did those attending "traditional" preschool progams, where the children approximately maintained their previous developmental level.

3. Culturally deprived children who did not attend a preschool program fell behind in their overall development during the kindergarten year, while those attending a preschool program did not.

4. At the end of the first grade in public school the children who attended the Learning to Learn Program maintained their developmental

superiority to the "traditionally" trained group and the no treatment group. The differences between the groups, however, were smaller than at the end of the kindergarten year.

5. At the end of the second and third grades in the public schools the same trends existed as were present in the first grade, however, the differences between the groups continued to decrease to the point where they were no longer statistically significant on most measures.

Summary

This is a follow-up study of three groups of second and third grade children who had differential treatment during their kindergarten year. Group A received a special sequential Learning to Learn Program, Group B a "traditional" kindergarten program, and Group C remained at home during the kindergarten year. Evaluation of their development in kindergarten and first grade indicated that the Learning to Learn Group made substantial developmental gains during the kindergarten year and maintained a significant portion of this advantage through the first grade. Group B has performed relatively consistently on developmental measures throughout the four years of the study, while Group C dropped on developmental measures during the kindergarten year but showed a small gain during the first grade.

The data from the second and third grades indicate that the differences between the groups have steadily decreased as the children are progressing through the neighborhood public schools. Some reasons for the decrease in differences between the groups are discussed.

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