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ABSTRACT

This report describes and evaluates a sequential Learning to Learn Program (L.L.P.) for four- and five-year-old children. The long-term plan was for these children to be kept in a continuous sequential program through the first grade. Since another aspect of this project is a systematic attempt to learn how differing lengths of exposure to the L.L.P. influence the children's learning, the overall design calls for one group of children to be in the program for three consecutive years and another group for two consecutive years. The purpose of the evaluation study is: (1) to compare and contrast the development of the children who receive a two-year preschool program with those who receive a one-year pre-school program; and, (2) to compare and contrast the development of the experimental groups with that of the control groups who were matched with them in intelligence, language, ability, perceptual-motor ability, and socioeconomic status. The results indicate that the children who participated in the program made significantly greater intellectual gains over the two- and three-year period than those children who attended and participated in traditional education programs. (Authors/JM)

A Longitudinal Study of the Intellectual Growth of Culturally Disadvantaged Children in a Sequential Learning to Learn Program

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Abstract

This study was designed to investigate the effects of two or three years of a sequential Learning to Learn educational intervention program on culturally deprived children.

Two groups of educationally high risk four-year-olds and two groups of five-year-olds were matched on several developmental variables, with one group at each age level entering the experimental Learning to Learn Program. The other group served as their matched controls.

Intellectual comparisons were made between the experimental and control groups after the first, second, and third years of the program.

The results indicate that E_4 and E_5 Learning to Learn children who began the program at ages four and five made statistically greater intellectual gains than their matched control groups.

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Introduction

Currently there is considerable attention focused on the development of new curricula and materials for early childhood education. The impetus for this interest comes from (1) the need for new programs for the culturally deprived child and (2) the evidence from recent research which questions some previously held assumptions concerning the optimal environment for the overall development of the child.

In view of recent research and thinking it seemed worthwhile to design and operate an early childhood education program organized so that it (1) is appropriate to the stage of cognitive development of the child, (2) makes maximal use of the child's abilities, (3) uses a planned sequence of environmental stimulation based on a knowledge of the stages of cognitive development, (4) emphasizes the process of learning, (5) guides and structures the learning experiences with the goal of self-support and coping on his own rather than presenting the child with a large amount of random, unorganized stimulation.

Purpose

The purpose of this project was to develop a sequential Learning to Learn Program (LTLP) in 1968 with four- and five-year-old children. The long term plan was for these children to be kept in a continuous sequential program through the first grade. The project has two separate aspects. One is the application of the Learning to Learn Program (LTLP) at the

laboratory school. The second is the evaluation and follow-up of this project. The purpose of the evaluation study is (1) to compare and contrast the development of the children who receive a two year preschool program (Group E_4 - those who began the sequential program at age four) with those who receive a one year preschool program (Group E_5 - those who began at age five); (2) to compare and contrast the development of the experimental groups with that of the control groups (Groups C_4 and C_5) who were matched with the experimental groups in intelligence, language ability, perceptual-motor ability, and socio-economic status.

Another aspect of this project is a systematic attempt to learn how differing lengths of exposure to the Learning to Learn Program influence the child's learning. This is of significance because there is a real question about the lasting effects of early education programs for children from a lower socio-eccnomic background. This project may determine whether the commonly found loss of developmental gains after leaving special programs can be avoided by providing these children with longer exposure to a special early education program. Thus the overall design calls for one group of children to be in the Learning to Learn Program for three consecutive years, and another group for two consecutive years.

Description 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 the world around him. Through his 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.

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. Identification of classes and sub-classes
6. Identification and classification on the basis of reduced clues
7. Encouragement by 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 while the program exposes children to developmental experiences, it 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 restrict the child to classification and description of the world around him. An important advantage of the Learning to Learn 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 increasing reliance upon his own resources and decreasing dependence on the teacher. He experiences tremendous satisfaction from the knowledge that he knows how to solve problems and to grow independently.

Design of Project

During the 1968-69 school year two groups of children entered the experimental program and two control groups were selected. (See Figure 1)

Figure 1

Design of Project

Year	Grade	Age	Group Status		Grade	Age	Group Status	
1970-71	1st	6	E^*_4	C_4	2nd	7	E^{**}_5	C_5
1969-70	K	5	E^*_4	C_4	1st	6	E^*_5	C_5
1968-69	N	4	E^*_4	C_4	K	5	E^*_5	C_5

Disadvantaged Children

E_4 N = 23 E_5 N = 21

C_4 N = 21 C_5 N = 21

* In Learning to Learn Program - Experimental (E_5 and E_4)

** Children attended public schools in Duval County

E = Experimental groups who particpated in the Learning to Learn Program:

E_4 during nursery, kindergarten, and 1st grade

E_5 during kindergarten and 1st grade. They attended public schools during the second grade.

C = Control Groups who had:

C_4 traditional day care nursery school, Title I Kindergarten and public school 1st grade.

C_5 Title I Kindergarten and public school 1st and 2nd grade.

Children were drawn from the same disadvantaged neighborhood in Jacksonville. Two five-year-old groups were selected with the experimental group (E_5) attending the Learning to Learn School and the control group (C_5) attending public school kindergarten in Duval County, Florida. Two four-year-old groups were selected with the experimental group (E_4) attending the Learning to Learn School and the control group (C_4) attending OEO sponsored day care centers in Jacksonville.

During the 1969-70 school year, group E_5 was in first grade at the Learning to Learn School, group C_5 was in first grade in Duval County public schools, group E_4 was in kindergarten at the Learning to Learn School and group C_4 was in kindergarten in Duval County public schools. During the 1970-71 school year, groups E_5 and C_5 attended second grade in Duval County public schools, group E_4 was in first grade at the Learning to Learn School, and group C_4 was in first grade in Duval County public schools. This evaluation report is on the data collected on all four groups following the first three years of the project through the spring of 1971.

To control for intelligence and perceptual motor skills the two groups of four-year-old children (E_4 and C_4) had been matched at the beginning of the project (1968-69) on their performance on the Stanford Binet Intelligence Scale and the Seguin Form Board. A comparison of the scores of the two groups on these measures is presented in Table 1.

Table 1

Pre Program Means, S.D.'s and t's for the Learning to Learn Experimental Group (E_4) and their Controls (C_4) on the Stanford Binet and Seguin

PRE LEARNING TO LEARN PROGRAM

Measures	Grp.	N	$\bar{X}$ Age (mths)	$\bar{X}$ Score	SD	t
Stanford Binet	E_4	23	51	87.7	11.9	
	C_4	21	49	88.1	7.0	-0.16
Seguin (time score)	E_4	23	51	75.8	28.2	
	C_4	21	49	66.4	32.2	1.01

The two groups of five-year-old children (E_5, C_5) were also matched as closely as possible on the Stanford Binet, in school readiness skills as measured by the School Readiness Screening Test, on two subtests from the Illinois Test of Psycholinguistic Ability, and on their performance on the Seguin Form Board. These data are presented in Table 2.

Table 2

Pre Program Means, S.D.'s and t's for the Learning to Learn Experimental Group (E_5) and their Controls (C_5) on the Stanford Binet, ITPA, SRST, and Seguin

PRE LEARNING TO LEARN PROGRAM

Measure	Grp.	N	CA (mths)	$\bar{X}$ Score	SD	t
Stanford Binet	E_5	21	62	89.7	9.5	
	C_5	21	62	89.6	8.2	0.03
ITPA-Vocal Encoding	E_5	21	62	9.3	2.8	
	C_5	21	62	9.6	3.9	-0.22
ITPA-Auditory Vocal Assoc.	E_5	21	62	8.2	2.5	
	C_5	21	62	8.1	3.6	0.19
SRST	E_5	21	62	10.6	3.6	
	C_5	21	62	10.2	3.2	0.31
Seguin (time score)	E_5	21	62	49.1	18.6	
	C_5	21	62	44.7	18.4	0.75

Both the experimental (E_4 and E_5) and their control (C_4 and C_5) groups did not significantly differ from each other on any of the measures.

Instruments: Each child in the E_4, E_5, C_4, C_5 groups was individually evaluated with the Stanford Binet Intelligence Test over the period of the Learning to Learn Program.

Results

A pre-post comparison of the experimental (E_5) and control (C_5) groups on the Stanford Binet taken at the beginning of the Learning to Learn Program in 1968 and at the end of the second grade, one year after termination

of the Learning to Learn Program is presented in Table 3. The experimental group's mean IQ gain over two years of the Learning to Learn Program and one year of public school classes was 15.1 IQ points. The control group lost 2.5 IQ points over the same period of time. Thus with the pre-program mean IQ's of the groups being essentially the same (E_5 = 89.7; C_5 = 89.6), the mean IQ point difference between the two groups is 17.6 IQ points at the end of the second grade.

Table 3

A Pre Learning to Learn Program to Post Second Grade[1] Longitudinal Comparison between the Experimental (E_5) and Control (C_5) Groups on the Stanford Binet

Measure	Grp.	N	YLTLP	SBIQ		N	YLTLP	YATOLTLP	SBIQ		IQ Gain or (loss)	t
				$\bar{X}$	SD				$\bar{X}$	SD		
Stanford Binet	E_5	21	0	89.7	9.5	16	2	1	104.8	17.6	15.1	4.92***
	C_5	21	0	89.6	8.2	20	0	NA	87.1	11.7	(2.5)	-1.18

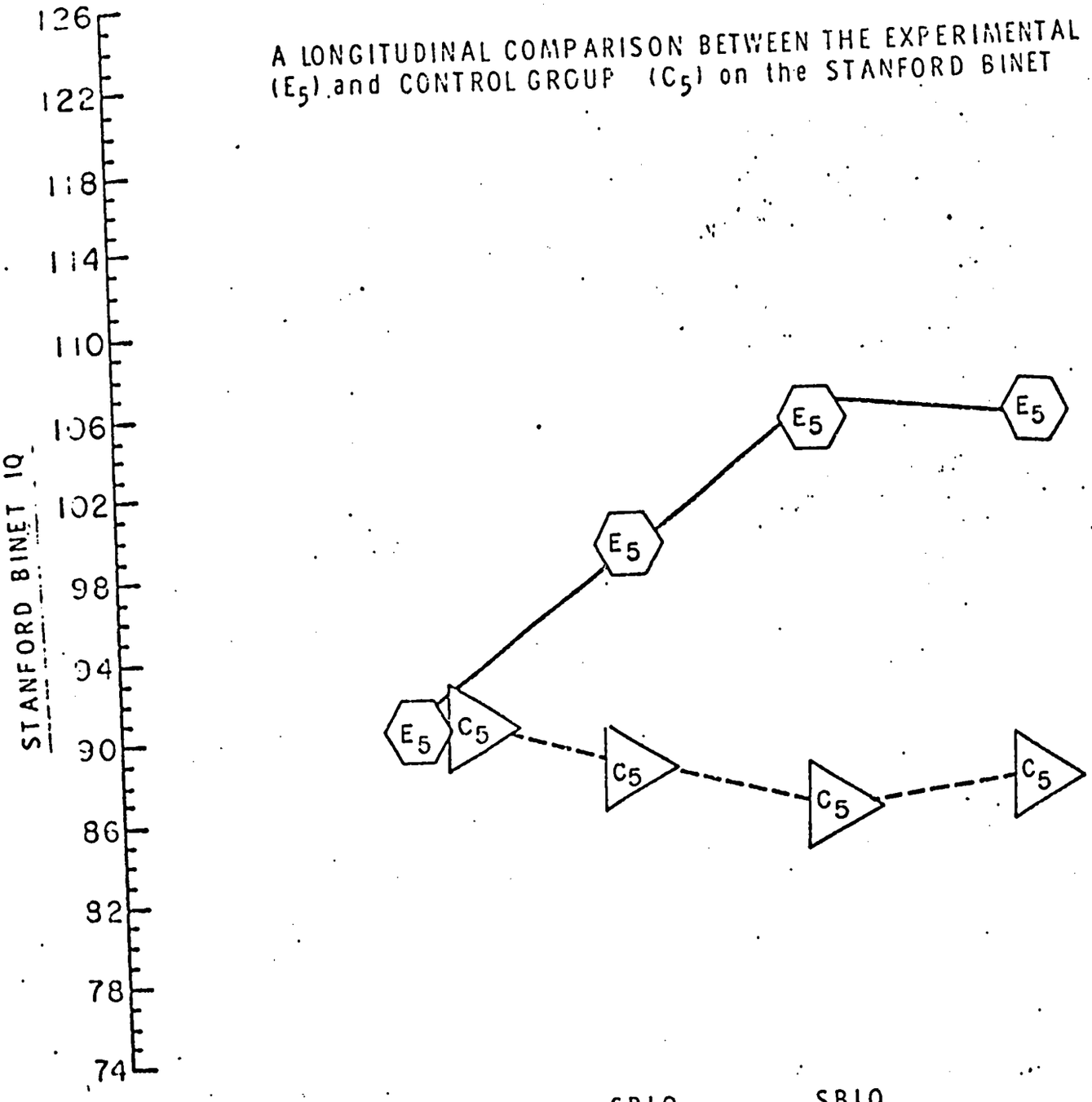
[1] One year after termination of LTLP

***$p < .001$

Figure 2 represents pre-post yearly comparisons of the E_5 and C_5 groups in relation to Stanford Binet IQ. During the first year of the Learning to Learn Program the experimental group gained 9.1 points, while their control group lost 1.6 IQ points. During the second year the experimental group increased their IQ significantly again with a mean gain of 7.4 IQ points. The control group on the other hand had a mean IQ decrease of 1.8 points from the previous year.

FIGURE 2

A LONGITUDINAL COMPARISON BETWEEN THE EXPERIMENTAL (E_5) and CONTROL GROUP (C_5) on the STANFORD BINET



SBIQ Pre-Kind.	SBIQ Post-Kind.	SBIQ Post 1st Grade	SBIQ Post 2nd Grade (1yr. after termination of LTLP)
E_5 = 90	E_5 = 99	E_5 = 106	E_5 = 105
C_5 = 90	C_5 = 88	C_5 = 86	C_5 = 87

One year after termination of the Learning to Learn Program with both groups in public schools, the experimental group's IQ remains relatively constant with a loss of 1.4 IQ points. The control group also remains relatively constant with an increase of .9 IQ points. Figure 2 shows the change over time resulting in the difference of 17.6 IQ points between the E_5 and C_5 groups after the E_5 children have been out of the experimental program for one year.

The E_5 and C_5 groups exhibit entirely different Stanford Binet IQ patterns over time. The E_5 group made approximately equal IQ gain over the first two years of the Learning to Learn Program and maintained the IQ gain one year after termination of the Learning to Learn Program. The C_5 group's performance was one of a slow decline in Stanford Binet IQ over the same period of time.

A pre-post comparison between the experimental (E_4) and control (C_4) groups on the Stanford Binet taken prior to the beginning of the Learning to Learn Program (1968) and at the end of the third year (post first grade, 1971) is presented in Table 4. The E_4 group's mean IQ gain over the three years in the program was 19.3 IQ points, while the control group gained 3.0 IQ points over the same period of time. Thus with the pre program mean IQ's of the two groups being essentially the same (E_4 = 87.7; C_4 = 88.1), the mean IQ point difference between the two groups after three years in the program is 16.3 points.

Table 4

A Pre Learning to Learn Program to Post First Grade Longitudinal Comparison between the Experimental (E_4) and Control (C_4) Groups on the Stanford Binet

		PRE LEARNING TO LEARN PROGRAM				POST FIRST GRADE					
Measure	Grp.	N	YLTLP	SBIQ		N	YLTLP	SBIQ		IQ Gain or loss	t
				X	SD			X	SD		
Stanford Binet	E_4	23	0	87.7	11.9	20	3	107.0	11.7	19.3	9.38***
	C_4	21	0	88.1	7.0	18	0	91.1	11.9	3.0	0.45

***$p < .001$

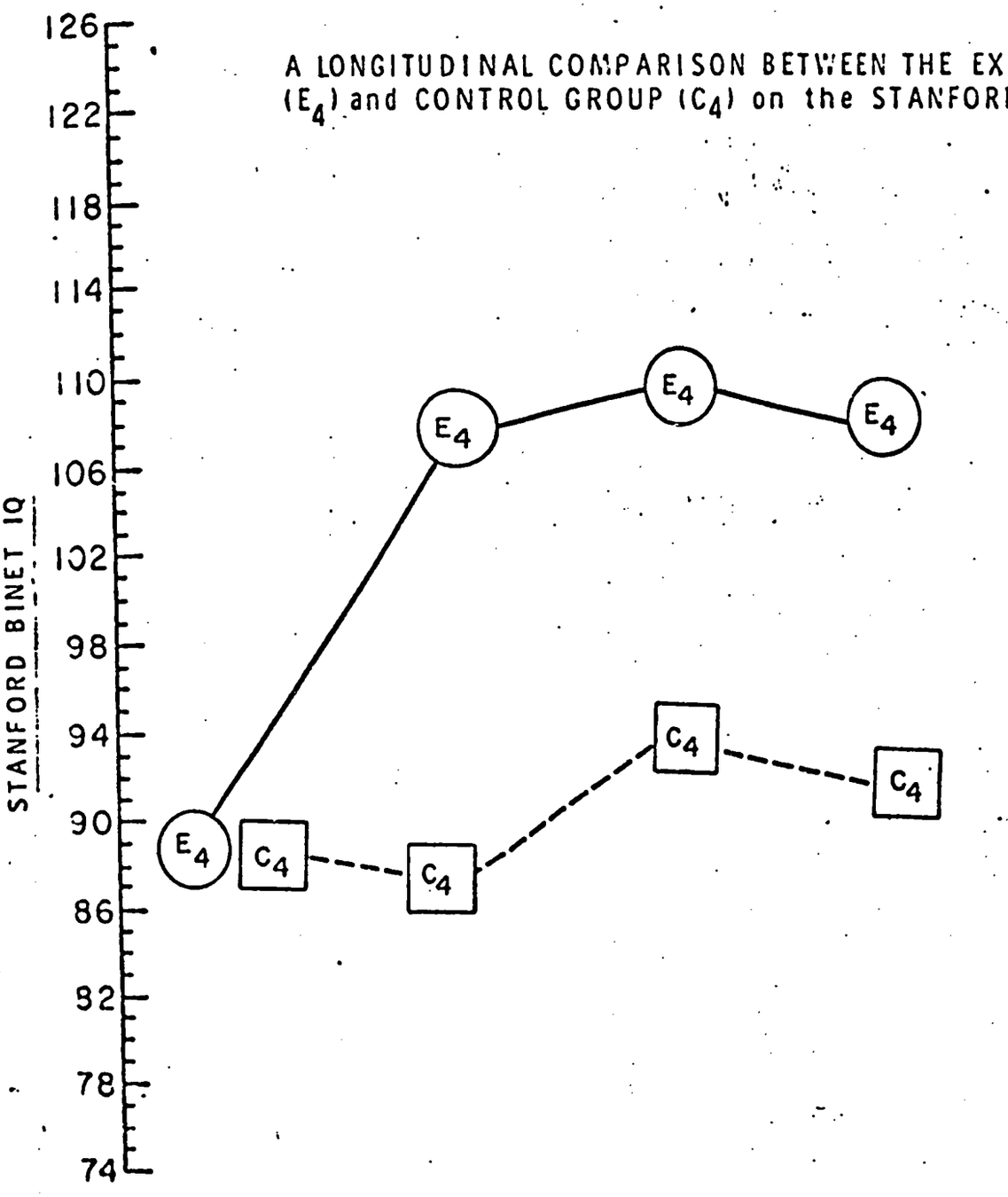
Figure 3 presents the E_4 and C_4 Stanford Binet IQ data in a longitudinal form.

After the first year of the Learning to Learn Program the E_4 group exhibited a mean IQ gain of 19.7 points. During that same period of time the C_4 children lost 1.5 IQ points. These results indicate that the E_4 group made nearly all of its gain during the first year and then sustained that gain during the second and third year of the program. The control group remained relatively constant, losing 1.5 IQ points during the first year, gaining 6.9 IQ points during the second year, then losing 2.4 IQ points during the third year. Thus over the entire three year Learning to Learn Program the experimental group gained 19.3 IQ points while the control group gained 3.0 points.

Discussion

The results of this study indicate that the children who participated in the Learning to Learn Program made significantly greater intellectual gains over the two and three year period they participated in the experimental

FIGURE 3


A LONGITUDINAL COMPARISON BETWEEN THE EXPERIMENTAL (E_4) and CONTROL GROUP (C_4) on the STANFORD BINET
STANFORD BINET IQ
126
122
118
114
110
106
102
98
94
90
86
82
78
74
E_4
C_4
SBIQ Pre-Nursery E_4 = 88 C_4 = 88
SBIQ Post-Nursery E_4 = 107 C_4 = 87
SBIQ Post-Kind. E_4 = 109 C_4 = 93
SBIQ Post 1st Grade E_4 = 107 C_4 = 91

program, than those children who attended and participated in traditional educational programs. Both experimental groups (E_4 after three years of the Learning to Learn Program, and E_5 one year after termination of the Learning to Learn Program preceded by two years participation in the Learning to Learn Program) were functioning in the upper limits of the "Average" range of intelligence, with a percentile rank on the Stanford Binet of 64 for those who began at age four (E_4) and 59 for those who began at age five. When comparing the E_4 and E_5 groups to the Negro standardization sample of the Binet their percentile ranks were at the 96th and 97th percentile levels respectively.

The level of functioning of the two matched control groups was in the "Low Average" range for the C_5 group and the lower limit of the "Average" range of intelligence for the C_4 group with percentile ranks on the Stanford Binet of 19 and 25, respectively.

One of the most significant aims of this project is to determine and evaluate the effects of exposing groups of culturally deprived children to different lengths of specialized sequential educational programs.

The evaluation of the intellectual gains of the experimental groups over time on the Stanford Binet revealed different developmental patterns for the children who began at age four (E_4) and those who began at age five (E_5). The major intellectual gains for the E_4 group occurred during the first year of the experimental program when they gained nearly 20 IQ points. During the second and third years of the program the E_4 group maintained their gains in intellectual functioning.

The intellectual gains of the children who began the program at age five (E_5) showed a different pattern. After both the first and second years of the experimental sequential learning program the E_5 group displayed

significant intellectual growth, with relatively equal IQ gain during each year of the program. (9.10 IQ gain 1st year; 7.37 IQ gain 2nd year). One year after termination of the Learning to Learn Program (post second grade) the E_5 group maintained the intellectual gains they achieved during the program.

It is apparent that the experimental Learning to Learn Program enhanced the intellectual development of the disadvantaged children who participated in it and that the traditional educational programs of the control groups did not achieve similar results.