72-5801

BORDEN, Barbara C., 1931-
CONCEPT LEVEL, SEPARATION BEHAVIOR AND PRE-SCHOOL PERFORMANCE OF THREE-YEAR-OLDS.

The City University of New York, Ph.D., 1971
Psychology, experimental

University Microfilms, A XEROX Company, Ann Arbor, Michigan

CONCEPT LEVEL, SEPARATION BEHAVIOR AND PRE-SCHOOL PERFORMANCE OF THREE-YEAR-OLDS

by

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A dissertation submitted to the Graduate Faculty in Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

1971

This manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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ACKNOWLEDGMENTS

My gratitude is extended to many people for their aid and encouragement regarding the completion of this study. I am particularly indebted to Dr. Francis H. Palmer, who was importantly involved in the planning and execution of this project. I am also most grateful to Dr. Joseph Glick for his invaluable assistance and to Dr. Ann Rees, whose suggestions and criticisms were most helpful.

I wish also to express my appreciation to the staff of the Harlem Research Center for their enthusiastic cooperation in making observations and obtaining data and especially to Mrs. Helen Moren, who was most generous with her time and great statistical knowledge. To my co-observer, Mrs. Madeline Hammer, I am deeply indebted.

My very special thanks go to my husband, Joel Borden, and to my children, Kathi and Peter, for their patience, understanding, encouragement and help during this long project.

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CHAPTER I

INTRODUCTION

Interest in Pre-School Population

Within the last few years, increasing concern with the amelioration of poverty conditions, along with the realization that such conditions seriously affect the capacity for school achievement, has promoted the emergence of a considerable number of compensatory education programs. In a review of such programs, Gordon (1965) notes that within this currently crucial area, the early admission or pre-school program has received a great deal of emphasis. Miller (1967) states that the "basic assumption that early childhood intervention can provide a major answer to the problems of disadvantaged children has seemed as unassailable as motherhood." To some extent, this focus on the first several years of life derives from the belief that the prevention of educational failure is both less costly and more human than the introduction of remedial treatment at a later age.

This investigation has received support from the National Institute of Child Health and Human Development, grant #HE-02253, made to Dr. Francis H. Palmer.

Moreover, evidence against the previously accepted assumptions of fixed intelligence and the pre-ordained unfolding, with maturation, of intellective capacities, and supporting the notion that differential experiences early in life have differential effects on cognitive development (e.g., Hunt, 1961) has compounded the educational and psychological interest in the pre-school population.

The questions of the exact timing of this early intervention and the most beneficial program content have received, and are receiving, substantial attention. Regarding the former, the trend appears to be toward the inclusion of younger and younger children in formal educational programs; Fowler (1966) has made the statement that "the world is destined in no more than a generation or so to find itself caring for and cognitively cultivating its children from the cradle on..." Recent emphasis on the effects of early stimulation on the later behavior of both human and animal subjects has contributed to this trend.

The content issue is less resolved. Stendler-Lavatelli (1968) describes both "general enrichment" programs and those directed toward improvement in specific areas such as language, academic orientation, logical thinking, etc. Many approaches appear to be resulting in measurable gains in I. Q. and according to other criteria. But the gains must prove durable and the criteria for their evaluation must be expanded and refined before conclusions can be drawn regarding the ideal content for an early enrichment program - - if there is a single ideal content.

Aside from timing and content, another aspect of the early intervention situation appears to merit consideration. This concerns certain of the individual behavioral characteristics of the children involved and the relationships of these characteristics to gain derived from the educational program.

Considering human variability in talent, motivation and other characteristics that contribute to the performance of school-related tasks, it is probable that different individuals will react differently to the complex experiences involved in a pre-school program, with some "getting more out of: the program than others, and that these differential reactions may be systematically related to a variety of cognitive, affective and demographic variables.

Therefore, the primary aim of this study was to investigate the relationships between certain pertinent organismic variables, measured at the outset of an intervention program, and progress in the program. The study was also regarded as an attempt to identify predictors of performance which might be useful in considering or classifying applicants for admission to pre-school programs.

Sontag, Baker & Nelson (1958) state that differences in learning histories and motivation should have an effect on test performance, not only in respect to the "immediate motivations of taking a test but also regarding the achievement of the child and in his acquisition of the ability to learn." This statement suggests that it might be worthwhile for

purposes of investigation to examine certain variables that are likely to relate to pre-school behavior in terms of two basic categories: learning and motivation. It also indicates the necessity for a dual orientation in exploring the influence of such variables, including an investigation of their effects regarding both performance on initial assessment measures and potential for achievement or gain in the pre-school.

That is, while it is theoretically conceivable that a perfect correlation can exist between initial performance and progress in a relatively long term learning situation, it is just as conceivable (and, from a practical standpoint, certainly more probable) that at least some subjects who do well on measures administered at the outset of the program will not progress well in the long run and that some poor initial performers will progress exceedingly well.

The inter-relationships among these two facets of performance and other variables are likely to be complex and must be investigated with this likelihood in mind.

Variables of Interest: Motivational - Initial Separation Behavior

Although many motivational variables undoubtedly have a bearing on pre-school behavior (e.g., need to achieve, curiosity, etc.), Separation Behavior was the particular variable chosen for investigation in the present study.

Zigler & Butterfield (1968) used "optimizing" and standard testing procedures and nursery school and non-nursery school

comparison groups of subjects to assess the influence of motivational factors on change in I. Q. scores. Their findings indicated that the increased scores of the nursery school subjects were largely a function of a reduction in debilitating motivational factors such as fearfulness in the testing situation.

Sontag, Baker & Nelson (1958) have pointed to the influence of the particular type of motivational factor of interest here, specifying that a child who had a strong emotional dependence on parents would be likely to approach learning situations differently than would a child motivated more by other aspects of his surroundings. They noted that children who tended to gain in I. Q. during the pre-school period appeared to be those "venturing out of the maternal fold," and suggested that curiosity and exploration in children who have gained some proportion of emotional independence from their parents may positively influence early mental growth.

Along the same lines, but more recently, Ainsworthy & Wittig (1969) and Ainsworthy & Bell (1970) demonstrated an association between attachment behavior and exploratory behavior implying a negative relationship between the two behavioral systems. Crandall, Preston & Robson (1960) rated both achievement behavior in a nursery school free play situation and child-mother interaction in the home. They found the high-achieving child to be less dependent on the mother for emotional support. Palmer (1968) has also focused on the child's need for contact with his mother as a motivational

variable, stating that this dimension of behavior is related to readiness to enter and ability to benefit from an early intervention program. For the most part, the literature on dependence has indicated a correlation between high achievement and low dependency.

The aspect of the child's relationship with his mother variously called his "dependence on," "attachment to" or "need for contact with" her, (the confusion among these terms and the associated theoretical viewpoints has recently been discussed by Ainsworth (1970)), has been related to behavior in a separation situation by Bowlby (1960), who characterized the separation response as, "the inescapable corollary of attachment behavior - - the other side of the coin," and by Schaffer & Emerson (1964) who uses separation anxiety as a measure of degree of attachment to the mother. Ainsworth (1970) suggests the use of a "strange situation," that is, one which is unfamiliar to the child, for studying attachment behavior. Such a situation would include separation from the mother as well as other aspects like exposure to a strange adult.

Thus, Separation Behavior was selected for investigation in the present study on the basis of its probable association with test performance, per se, and because of the implications in the literature regarding its relationship to attachment behavior.

Variables of Interest; Learning - Prior Knowledge of Concepts

The specific variables available for investigation under the "Learning" classification are numerous indeed; the ultimate choice for the current study was made on the basis of pertinence to the particular pre-school situation involved. In general, how much relevant information a child possesses before starting to participate in a pre-school program certainly seems likely to be a variable of importance relative to his reaction to the program. That is, the degree of progress he is able to make is at least partly dependent on what he already knows. Aside from its face validity, this statement is, in general, in line with Hebb's (1949) reasoning concerning cerebral functioning. His theory states that primary learning based on very early perceptual experience is basic to later effective problem solving behavior, with this effect becoming more and more pronounced as one ascends the phylogenetic scale. (There is also the implication that if necessary early perceptual experience is lacking due to a paucity of pertinent stimulation in the environment, later cognitive behavior is likely to suffer.) Further, Piaget's theory suggests that all cognitive constructions achieved by the individual hinge on previous constructions.

The specific relationship between previously attained relevant knowledge and progress in a particular educational situation is not necessarily clear. That is, one might assume that those who know a lot to begin with will progress more

than those who know less at the start of the program because they have "learned how to learn" or have more basic talent or because the information they possess is an aid in the processing of new material.

Or, on the other hand, one might conjecture that those starting a program with less information will make more progress than those with a more extensive backlog of pertinent information. That is, if they know less because they have had less opportunity to learn, exposure to a stimulating environment might mean tremendous gain in a relatively short span of time.

Even the finding of a cumulative deficit in disadvantaged children as they proceed through public school does not eliminate the second alternative, since it is not clear that the school environment has been a stimulating one for those children, or geared to cope with their educational needs.

The specific type of knowledge selected for investigation in the present study was knowledge of certain relational concepts, conceived to be generally helpful to the child in dealing adaptively with objects in his environment. Palmer (1968) states that adequate knowledge of these relational concepts (described in more detail below) is presumed to constitute a significant part of the behavior necessary for success in the next environment the child will encounter; that is, they are relevant to the school environment. In fact, the curriculum of the pre-school program on which this investigation was based consisted of a particular group of

such concepts which had been established as "school-relevant" and appropriate to the age and level of development of the participants in the program (Institute of Child Development and Experimental Education, 1967).

Interaction Between Separation Behavior and Concept Level

Whereas, as previously noted, several studies have shown a negative association between dependency on the mother and intellective performance, Palmer (1968) predicts that, in the pre-school situation, this relationship is complicated by the influence of the other dimension of behavior discussed - - the current state of the child's concept knowledge. What he hypothesizes is a particular interaction between need for contact with the mother and concept knowledge as follows: children who show intense separation behavior at the beginning of the pre-school program and who have a high level of concept knowledge will make the most progress in the program; those who are high in concept knowledge but low in separation behavior will make good progress but less than the first group; those low in concept knowledge and low in separation behavior will make little progress; those low in concepts and high in separation behavior will progress the least, tending to maintain their initial separation behavior intensity to such a degree that it prevents their learning in the pre-school situation. For this last group, Palmer (1968) suggests that intervention, at least in a program outside the home, should be delayed. The basis for this reasoning

will be specified below. At any rate, the prediction of an interaction between the two variables of interest was explored in reference to the data, in addition to the assessment of the two main effects.

Criteria - - Subsequent Adjustment to the Pre-School

Since it was expected with a sample of three-year-olds that some subjects would have difficulty in separating from their mothers at the outset of the intervention program, the duration of such frustrative behavior as might be evidenced was thought to be of interest. That is, the continuance of such activities as crying, running out of the room, etc., was considered non-adaptive in the framework of the program, since it would be likely to have prevented or to have decreased the occurrence of effective educational interaction between the child and an instructor. The incidence of such behavior was, therefore, measured in the middle of the school year.

Criteria - Test Performance

Gain, as a result of attending the program, was assessed in reference to several areas of competence by a comparison of scores in these areas on tests administered before and after the school year. Gordon (1965) has noted that attempts to equip very young children more adequately for school learning must add to the usual nursery school curriculum activities that emphasize language development and enrichment.

social and perceptual discrimination, broadened encounters with the environment and socialization in directed learning situations. The criterion measures were initially selected as representative of the abilities to which these activities are directed and will be described in the Methods Section below. The degree of relevance of each of them to the curriculum was also a matter of concern and was evaluated.

Questions to be Investigated

In exploring a more or less uncharted area, regarding which relevant theory has not yet provided a sufficient foundation to support specific predictions regarding outcomes, it seems, at best, artificial to impose formal hypotheses on the situation. Therefore, it was considered that the purposes of the present investigation would best be served by setting up a framework of questions to be answered in reference to the variables involved. The questions follow:

1. How do the two organismic variables of interest relate to each other at the outset? That is, what is the relationship between initial separation behavior and initial intellectual behavior?

2. If relationships are found between separation behavior and intellectual test performance at the outset of the program, do changes occur in these relationships over the course of the school year? Further, if such

changes do occur, are they associated with differential gain as a function of the pre-school program?

3. If relationships are found between initial concept knowledge and initial knowledge in other intellectual areas, do changes occur in these relationships over the course of the school year? If such changes are found to occur, are they associated with differential gain?

4. Can a linear combination of initial separation behavior and initial concept knowledge predict impact of the program in the intellective areas under consideration? Further, does the data support Palmer's (1968) hypothesis of an interaction or curvilinear relationship between separation behavior and initial concept level regarding the prediction of gain in the test areas?

5. What is the relationship between later adjustment to the program and initial separation behavior?

6. How are initial scores in the intellective areas and later adjustment to the program related to each other?

7. What is the impact of the program on the initial relationships between the intellective tests and later adjustment?

8. How do other pertinent variables about which information is available (e.g., socio-economic status, ordinal status, etc.) relate to: initial separation behavior, initial concept knowledge, later adjustment to the program and impact of the program in the intellective areas included?

9. A ninth section is devoted to supplementary analyses of certain relatively incidental aspects of the data that help to clarify the relationships under investigation.

The procedures followed in investigating these question are described in the Methods Section below.

CHAPTER II

METHOD

Subjects

A group of subjects participating in a longitudinal study of intellective development at the Harlem Research Center was available for the present research. For this longitudinal study, male, Negro children born within a two-month span, north of 80th Street in Manhattan, whose names were obtained from birth records at the New York City Department of Health, were originally selected. Criteria for inclusion in the sample were: both parents Negro; birth weight at least five pounds; single birth; mother between the ages of 15 and 45; mother not a drug addict or with a history of syphillis; no clearcut abnormality at birth; language other than English not spoken in the home. The subjects were about equally split on socio-economic status between middle and lower class as measured by Hollingshead scores. One-hundred-twenty-one children in the sample received special training at the Center starting in September, 1967, and participated in the current experiment. They were three years old at the start of the school year.

Procedures - Assessment of Initial Separation Behavior

During the first few weeks of the Training Center program, the children were brought to the Center by their mothers. The procedure specified that each child leave his mother,

who would wait for him in the reception room, and enter a training room with his instructor (all interaction between children and instructors was on a one-to-one basis). The physical layout of the Center included eight separate training rooms, all accessible to observers via one-way viewing glass and audio equipment.

Attendance at the Training Center consisted of two 45-minute sessions weekly per child. The 121 subjects were observed originally on six separate occasions, their first six sessions at the school, as to their reactions to separation from their mothers, who were requested to accompany the children to the Center for these sessions. Observations were recorded by both participant observers (the Training Center Instructors) and by non-participants (the author and a co-observer) on a specially designed checklist form including six items. The first was labeled General Activity and aimed to assess whether the child's behavior was primarily oriented toward his mother or toward the scheduled content for the session; alternatives ranged from one extreme ("child clings to mother") to the other ("child working in room, door closed, mother outside"). The other items noted the incidence of leaving the training room, crying, aggressive behavior (toward his mother, the Instructor and/or the equipment), withdrawing behavior and hyperactivity. (See Appendix.)

The Instructors filled out a form for each Subject immediately after concluding a session with the child. Their ratings were made on the basis of behaviors occurring during

the entire 45- to 50-minute period. The non-participant observers took two one-minute time samples on each of up to eight Subjects per hour, depending on how many children were actually in attendance during any particular hour of the school day. The order of the time-sampling was randomized.

It should be noted that the Instructors at the Training Center were not aware of the specific questions on which this research was based. They were young adults selected as Instructors largely on the basis of their ability to get along with pre-school age youngsters and came from a variety of social, educational and vocational backgrounds. They were accustomed to being observed, not only as part of their own training as Instructors but by parents and other interested parties as well as by researchers.

Reliability of ratings on the Separation Behavior Checklist, between the non-participant observers, was computed on 280 one-minute observations: 162 at the start of the observation period and spotchecks of 46, 34 and 38 throughout the remainder of the period. Percent agreement was very high, ranging from 93% to 97%.

An item-by-item check on 234 one-minute observations showed 64 disagreements out of 1404 (or 234 x 6 items) item observations. They were distributed as shown in Table 1.

Item #	# Disagreements	% Agreement	Item Description
1	21	91%	General Activity - Orientation to mother vs. Orientation to Scheduled Activity*
2	2	99%	Leaving Room
3	3	98%	Crying
4	2	99%	Angry Behavior
5	12	95%	Withdrawing Behavior
6	24	90%	Hyperactivity

TABLE 1

Inter-Observer Reliability: Separation Behavior Checklist Items

*Note: Of the 21 disagreements for the General Activity item, 60% were a/b disagreements - - child working in room vs. child playing in room.

Instructors' and Observers' scores for each child over six sessions were totaled separately. The Instructors' Raw Scores ranged from 3 to 304 and the Observers' Raw Scores from 0 - 103. The correlation between the two sets of scores was found to be .80, with N = 115. (A few subjects were not included in this calculation because, due to absences, their scores were incomplete.) While the correlation cannot be considered a reliability estimate, since the Instructors rated on the basis of an entire session and the Observers on two one-minute time samples from that session, the coefficient obtained gives some indication that the Observers were obtaining representative samples of the ongoing behavior.

Separation Behavior Checklist Analysis

The six-item checklist was subjected to analysis in an effort to investigate the interrelationships among the items. Correlating each item with all others resulted in the matrix summarized in Table 2.

All except two correlations were significant (nine at $p<.01$, four at $p<.05$) with the sample size of 121. The non-significant correlations were between Withdrawing Behavior and Hyperactivity, and between Withdrawing and Angry Behavior.

Correlating each item with the total Checklist score resulted in the coefficients shown in Table 3. The low coefficients for Items 4 and 6 (Angry Behavior and Hyperactivity) compared with those for the other four items suggested that

	1	2	3	4	5
1. General Activity (Orientation toward Mother (+) vs. Orientation toward Task (-)).					
2. Leaving Room	.58				
3. Crying	.77	.36			
4. Angry Behavior	.20	.27	.22		
5. Withdrawing Behavior	.79	.54	.62	.06	
6. Hyperactivity	.28	.21	.20	.58	.01

TABLE 2

Intercorrelations: Separation Behavior Checklist Items

(N = 121. p = .05 = .14;
p = .01 = .23)

Item #	r with Total Score
1	.98
2	.61
3	.81
4	.29
5	.82
6	.25

TABLE 3

Correlations of Separation Behavior Checklist Items with Total S.B.C. Scores

(N = 121)

the Checklist was not unidimensional. To investigate this further, a Principal Component Analysis (IBM Application Program, 1967) was performed. This method of analysis breaks down a correlation matrix into orthogonal components which are extracted in descending order of their magnitude. That is, the first component extracted accounts for a larger proportion of variance than subsequent components, and so on. The final matrix obtained indicated that, as expected, two components were necessary to account for the variance. The loadings of the six items on these two components after the original component matrix was rotated for simple structure are listed below (Table 4).

It may be seen that Items 1, 2, 3 and 5 (Mother vs. Task Orientation, Leaving the Room, Crying and Withdrawing from the Situation) all loaded high on the first component and low on the second, while Items 4 and 6 (Angry Behavior and Hyperactivity), showed the reverse pattern. Component 1 was therefore assumed to represent passive types of non-adaptive behavior in the pre-school, involving physical or psychological retreat from the situation and Component 2, the kinds of behavior involving active manifestations of non-acceptance of the situation.

Since the Separation Behavior Checklist was thus shown to measure two relatively uncorrelated aspects of behavior, scores on each of these aspects, as well as a total Separation Behavior score for each subject, were included in the analysis.

Item #	Component 1	Component 2
1	.92	.11
2	.61	.33
3	.83	.13
4	.13	.86
5	.91	.08
6	.05	.88

TABLE 4

Loadings of S.B.C. Items on Components Emerging from Principal Components Analysis

It must be noted that the distributions of Total, Component 1 and Component 2 Separation Behavior scores, obtained by summing the Instructors' and Observers' scores on the appropriate items for each child, were considerably skewed, indicating that many more subjects had low scores than high scores.

Therefore, logarithmic transformations were utilized to obtain distributions closer to normal. This procedure is recommended (McNemar, 1962) on the basis that relatively arbitrary units are involved in this type of psychological measurement and because "correlational description of relationship need not be qualified because of skewness."

Pre- and Post-Training Test Performance Measures

Before the training program per se was started, as part of the longitudinal study referred to in the Subjects Section above, an assessment battery consisting of seventeen verbal and non-verbal measures of ability was administered to the children. At the close of the school year, a comparable battery was given. From this group of tests, six measures covering a variety of abilities were originally selected for inclusion in the current study.

1. One of these was an instrument constructed for use at the Training Center (Institute of Child Development and Experimental Education, 1967) to evaluate knowledge of selected concepts, the Concept Familiarity Index (CFI). Since the curriculum at the Center consisted of the teaching of concepts,

the test was necessary at the outset, to ascertain the level at which each Subject's training should begin and, after the program, to measure achievement.

The initial Concept Test was a 50-item instrument which required examinees to demonstrate their understanding of concepts such as up, smooth, little, on top of, etc. The list consisted of prepositions and adjectives applicable to a range of objects and was scaled in difficulty. The Subjects, in some instances, had to select the object exemplifying the concept; in others, they had to manipulate the testing material as directed. Two examples of items as described in the Examiner's Manual are:

(1) OUT OF (box and chips). Place box with three chips and the separate chips in front of child, saying, "See the box. See the chips. Take the chips out of the box."

(2) SOFT (rock and cotton). Place both objects in child's hands, the cotton in his left. Say, "Feel them." Allow him to do so for some seconds. Say, "Give me the one that feels soft."

The Concept Test had a reliability of .74. For the current sample, the mean score was 28.08 with a standard deviation of 5.70. The highest score achieved by any Subject was 41 correct out of the 50 items. Also, 35 of the test items were actually included in the curriculum; the remainder were not taught because the Concept Test indicated that they were already part of the repertoires of the Subjects.

The Concept post-test consisted of 71 items, 25 of which had also been included in the pre-test. For the later version,

the easiest items were eliminated and a number of more difficult ones added to raise the ceiling of the test. Of the 71 post-test items, 50 represented concepts that had actually been taught in the curriculum. The other 21 did not directly reflect achievement. The mean Concept post-test score was 46.77 with a standard deviation of 9.06. The highest score was 68 correct.

2. The Peabody Picture Vocabulary Test is a multiple choice situation in which a test word and four pictures are presented to the examinees, who must then indicate the picture showing the test word. A different set of pictures accompanies each word. Words are scaled in difficulty, starting out with such items as "table," "bus" and "horse" and getting more and more difficult. For the pre-test, the mean was 18.22, and the standard deviation 7.38; for the post-test, these figures were computed at 26.85 and 9.42 respectively.

3. The Stanford Binet Intelligence Test. If the child did not reach a basal M. A. of two years on this test of general intelligence, he was also given the Cattell Infant Scale. For the current sample, the pre-test mean was 94.68 with a standard deviation of 13.00; the post-test mean was 99.18 with a standard deviation of 13.02.

4. The Simple Perceptual Discrimination Test is a battery including three tasks which evaluates a child's ability to make perceptual discriminations among similar objects and to carry out behavior appropriate to these discriminations. The

tasks are: a) geometric form board completion - - a form board containing ten geometric pieces was shown to the child. The pieces were removed from the board and the child had to replace them. Two trials were given. b) puzzles - - two puzzles graded in difficulty were used, one picturing a mannequin and the other a bear (the latter was the more difficult puzzle). The child's task was to assemble the puzzles. c) the WPPSI block design - - required the child to reproduce a series of geometric designs using a set of colored blocks; ten items were included.

For the pre-test, $\bar{X}$ = 7.94, s = 3.69; for the post-test, $\bar{X}$ = 10.90, s = 4.31.

5. The Motor Test Battery evaluated fine motor coordination. It included paper folding (the subject was required to fold a square sheet of paper in half to form a rectangle and then a triangle), buttoning and stringing beads onto a shoelace.

For the pre-test, $\bar{X}$ = 5.84, s = 2.98; for the post-test, $\bar{X}$ = 11.35, s = 2.78.

The Clowns Test was designed to measure persistence at a boring task. The child was shown pictures of two clowns, a sad one and a happy one, and the differences in expression between the two were pointed out. After this discrimination training, the child was shown a picture of a sad and a picture of a happy clown and simply asked to take one. Another set of the two pictures was presented and the request repeated for 48 trials or until the child refused to continue. The child's score on this test was the number of trials before

his refusal. The mean pre-test score was 18.24 with S = 16.71; the mean post-test score was 18.84 with s = 14.42.

The means and standard deviations of the pre- and post-tests are summarized below (Table 5).

It must be noted that the preceding tests were part of a "blind" assessment procedure. That is, no child was post-tested by an individual who had served as his instructor in the program.

	Pre-Test			Post-Test		
	Mean	S. D.	Maximum	Mean	S. D.	Maximum
Concept Test	28.08	5.70	50	46.77	9.06	71
PPVT	18.22	7.38	--	26.85	9.42	--
Stanford Binet	94.68	13.00	--	99.18	13.02	--
SPD	7.94	3.69	24	10.90	4.31	24
Motor Battery	5.84	2.98	14	11.35	2.78	23
Clowns Test	18.24	16.71	48	18.34	14.42	48

TABLE 5

Means, Standard Deviations, Maximum Possible Scores of Six Pre-Tests and Six Post-Tests

Interrelationships of Pre-tests in Intellective Areas

Since the intent of this study was to investigate the relationships between a pre-school experience and certain characteristics of the children undergoing the experience, and since one category of these characteristics was measured in terms of six different test areas, it was necessary to evaluate the relationships among those six areas at the outset of the program. The relevance of each area to the particular experience (curriculum plus other facets) involved was also of interest. Thus, the relationships with the Concept Test were of particular interest, since that measure was most closely tied to the curriculum at the pre-school. The correlation coefficients obtained relative to the interrelationships among the six pre-tests are summarized in Table 6.

Of the fifteen possible correlations, nine were significant. The four strongest relationships found (significant at the .01 level) were between: Concept and Stanford Binet; Concept and PPVT; Concept and Clowns; and Stanford Binet and PPVT. Five correlations were significant at $p < .05$ and six failed to reach the significance level.

			4	5
		** .03		
		*	-.00	
		.20*	.05	.29*

** = .01

Assessment of Later Adjustment to the Program

The instrument used to measure subsequent adjustment to the program, the Pre-school Adjustment Checklist (PAC), was similar in construction to the original Separation Behavior Checklist.

Use was made of the fact that the Center's calendar included a one-week Spring vacation; that is, this set of observations was made immediately after this break, which functioned as a controlled absence for all the children in the program.

The behaviors observed were similar to those observed at the beginning of the school year: The General Activity item referred to whether the child was doing what he was supposed to be doing (rather than having reference to orientation to the mother); leaving the room, crying, aggressive behavior, withdrawing behavior and restlessness or hyperactivity were observed as before. In addition, the Instructors completed a new item on how the children greeted them at the start of each session, in consideration of the fact that these sessions came right after a few days' separation.

Again, the Instructors rated behaviors occurring during entire sessions and the author and a co-observer took two one-minute time samples per child per hour. Each child was observed for three sessions. This smaller number of observations was considered sufficient because it was apparent that by this point in the school year, the behavior of the children had stabilized considerably. Again, the sum of the Instructors'

and Observers' ratings were used to obtain Total Scores on this measure as well as Component Scores parallel to those obtained on the Separation Behavior Checklist.

Before considering the additional item rating the child's greeting to the Instructor at the start of each session, an indication of his general adjustment to the pre-school program, it was necessary to investigate whether the greeting was, to any extent, a function of his familiarity with the particular Instructor. That is, the vacation interrupted six-session sequences with an Instructor for some subjects so that when they returned to the school, they came back to an Instructor with whom they already had spent some time. For other subjects, the last pre-vacation session completed a sequence with an Instructor so that their return was to a completely new Instructor.

Therefore, scores on the Greeting Item were correlated with the number of sessions the Instructor and the Child had previously spent together, for a sample of 82 sessions immediately following the vacation. The Greeting Item was scored from 0 = enthusiastic, happy greeting to 4 = negative greeting.

The resulting coefficient ($r = -.123$) was not significant, indicating that the number of sessions previously spent together had no relationship to how enthusiastically or reluctantly a child greeted his Instructor after a week's absence from the Center.

Further, toe Total PAC scores for 149 sessions were subjected to an analysis of variance to evaluate differences in rating of pupils among the fourteen Instructors involved.

That is, each Instructor interacted with a number of children at any given point in the school year, sutdents having been assigned to them randomly so far as adjustment to the program was concerned. Due to this random assignment in respect to the variable of interest, each Instructor's current group of students should have been relatively representative of the range of "adjustment" behavior in the total group. Thus, any differences among the scores analyzed by Instructor could be presumed to reflect different criteria of judgment used as a basis for the ratings, for example, some Instructors rating more conservatively than others.

The Anovar resulted in an F-ratio of 1.49 (n.s.), indicating that no appreciable differences existed among Instructors in rating methods and standards (see Table 7).

	SS	df	MS	F
Total	7073.76	148		
Among Instructors	888.40	13	68.32	1.49(n.s.)
Within	6185.36	135	45.88	

($F_{.05\ (12,125)} = 1.83$)

TABLE 7

Anovar Assessing Instructor Differences in Rating Children on the Pre-school Adjustment Checklist

CHAPTER III

RESULTS AND DISCUSSION

This section has been organized in terms of responses to the nine questions proposed earlier.

QUESTION 1:

Initial Separation Behavior - - Correlations with Pre-tests

After the pre-training assessment period, the Separation Behavior Checklist scores were correlated with the pre-test scores in the areas of competence under consideration. The resulting coefficients are shown in Table 8. (In the course of the school year, twelve children stopped attending the Training Center Program for a variety of reasons including illness, families moving to other cities and just dropping out. Since for these subjects, no post-test scores were available, they were not included in the final statistical analyses. Therefore, the correlations of Separation Behavior with the various pre-test scores were recalculated without the dropouts' scores. The coefficients that resulted are also shown in Table 8 and the Dropout Group is discussed further in the answer to Question 9 below.)

The most obvious outcome was the series of negative relationships shown between Separation Behavior and the tests included in the analysis - - intense separation behavior was, in every case, associated with lower performance level, regardless of the kind of performance involved.

TEST	Correlations			
	Total Score (N=121)	Total Score (N=109)	Component I (N=109)	Component II (N=109)
Stanford Binet	-.54**	-.40**	-.37**	-.34**
Concept	-.29**	-.29**	-.19*	-.20*
PPVT	-.23**	-.23**	-.22*	-.18*
Clowns	-.34**	-.20*	-.15*	-.18*
SPD	-.20*	-.19*	-.13(n.s.)	-.31**
Motor	-.09(n.s.)	-.10(n.s.)	-.13(n.s.)	-.10(n.s.)

** = $p < .01$
* = $p < .05$

TABLE 8

Correlations of Separation Behavior Total Score with Intellective Pre-tests: N = 121 (Initial Sample) and N = 109 (Dropouts' Scores Eliminated): Component I and Component II Separation Behavior Score Correlations. N = 109.

It must be noted that no testing at all was attempted while a subject demonstrated any intense Separation Behavior. That is, the mothers had to be out of the rooms and children relative acquiescent (at least outwardly) before the assessment could proceed. In some cases, a number of adaptation sessions were necessary before a subject was considered ready - - comfortable enough at the Center to remain in the training room alone with his Instructor and to participate in a testing situation. Therefore, it is unlikely that the relationships found were artifactually due to assessment procedures and probable that something more central was being tapped.

As might be expected, the correlation between Separation Behavior and the number of hours required for the total assessment procedure was quite high ($r = .69$).

The range in the sizes of the correlations obtained between Separation Behavior and the pre-tests raised the question of order of testing. For example, did the stronger relationship between the Stanford Binet and Separation Behavior result from that test having been administered before the Concept Test? (One might assume that intensity of reaction would decrease with familiarity with the situation.)

The schedule records revealed that, regarding these two tests, .37 subjects took the Stanford Binet first and more than twice as many, 84, took the Concept Test first. If order of testing was an effective variable, the Concept Test had a higher probability of relating more strongly to Separation Behavior than the Stanford Binet. Yet the reverse was true

($r_{\text{Sep Behav/Concept}} = -.29$; $r_{\text{Sep Behav/Stan Binet}} = -.54$).

To evaluate this difference more precisely, the correlations between Separation Behavior and the two tests were computed separately for subjects who took the Stanford Binet first and those who took the Concept Test first. The resulting coefficients are shown in Table 9.

Comparisons of the two groups' correlations for each of the tests revealed no significant differences ($z = 1.3127$ for the Concept Test and $z = .2448$ for the Stanford Binet). It was also interesting to note that for the group that took the Stanford Binet first, there was no difference between the correlations regarding the two tests. But for those who took the Concept Test first, the relationship with that test was significantly smaller than that with the Stanford Binet. While the implications of this finding are not completely clear, it is apparent that the behaviors underlying the Separation Behavior scores occurred considerably in association with the Stanford Binet whether that test was taken first or not. When it was taken first, the occurrence of Separation Behaviors appears to have carried through to other testing areas like the Concept. On the other hand, for Subjects who took the Concept Test first, there was significantly less co-variation between it and Separation Behavior.

Another good opportunity to investigate the order variable was available. The Concept Test was given twice as part of the pre-training assessment procedure, in order to evaluate its reliability. If order of testing was a significant factor

	Stanford Binet first	Concept Test first	
r between Concept Test and Separation Behavior	-.37 n = 37	-.12 n = 84	> z = 1.3127 (n. s.)
r between Stanford Binet and Separation Behavior	-.47 n = 37	-.43 n = 82	> z = .2448 (n. s.)
	< z = .5008 (n.s.)	< z = 2.1474 p < .05	

TABLE 9

Correlations Between Separation Behavior and Two Tests Calculated Separately for Subjects Differing in the Order of Testing; Evaluations of Differences

in the relationships between the tests and Separation Behavior scores, the first Concept scores would be expected to have a higher correlation with Separation Behavior than the re-test scores. Yet the Concept 1 x Separation Behavior coefficient was -.29 and the Concept 2 x Separation Behavior coefficient was - .36. Although these are not significantly different from each other ($F = 1.34$, $F_{05\ (1,125)} = 3.92$), the direction of the difference supports the position that tests given earlier were not necessarily more highly associated with Separation Behavior. Thus, it appears likely that the variation in size among the relationships found between Separation Behavior and the different tests is associated with content or administration differences among the tests themselves. (It must also be noted that all subsequent correlations based on Concept Pre-test scores involve Concept 1 scores.)

Correlations of Pre-Tests with Separation Behavior Component Scores

For five of the six pre-tests in the analysis, there was no significant difference between the Component I and Component II coefficients (see Table 8). Only the SPD test related appreciably differently to the two Components of Separation Behavior with a -.13 (n.s.) coefficient for Component I, and a -.31 ($p < .01$) for Component II. Thus, it appears that children showing considerable aggressive and restless behavior upon separation from their mothers tend to score lower than children who cry, cling and withdraw from the situation on

tasks involving simple perceptual discriminations, while this difference does not hold up in reference to other types of tasks.

Curvilinearity

An inspection of preliminary scatter plots for the bivariate distributions of scores on the Separation Behavior Checklist and the various pre-tests did not clearly eliminate the possibility that the relationships involved might be better described by a curve than by a straight regression line. Therefore, the coefficient data was computed for each of the relationships. All the coefficients calculated turned out to be close to zero. Since they were not higher than r's calculated on the same data, the relationships involved are assumed to be linear.

QUESTION 2:

Strategies for Evaluating Gain

The proper assessment of change is a complex task. The most obvious indicators of change or gain, Raw Gain Scores (Post-test minus Pre-test), do not suffice, according to Cronbach & Furby (1970) because they are systematically related to random errors of measurement. These authors have reviewed the various situations in which estimates of gain are necessary and have suggested methods to be used in each case.

For the present investigation, gain was regarded in two of the ways catalogued by Cronbach & Furby (1970): as a criterion variable in a correlational study, and as a dependent variable in an experiment involving an attempt to change behavior. Therefore, the procedures suggested by them for evaluating gain under these two circumstances were utilized.

In the first context, regarding the relationship of initial Separation Behavior, for example, and gain on the intellective measures, first, correlations were computed between Separation Behavior and the post-test scores. Then the appropriate pre-test scores were partialed out so that initial differences in performance were statistically accounted for. The partial correlation coefficients resulting from this procedure provided group information regarding the impact of the program on the relationships involved.

In the second circumstance, it was necessary to compare certain sub-groups with others, to see which had changed more

or less than expected. Thus, a process of residualizing gains was utilized. This involved performing a regression analysis for the total group of pre-test/post-test relationships for the variables in question, which provided an "expected" post-test score for each subject or, in other words, the portion of his actual post-test score that could have been linearly predicted from his pre-test score. Then a comparison of the "expected" with the actual score for any individual indicated whether that person had gained more or less than expected. Of course, placing individuals in sub-groups made it possible to evaluate differences among the sub-groups in terms of this residualized gain.

One further topic must be mentioned in discussing the evaluation of gain. Campbell & Erlebacher (1970) have discussed regression effects in psycho-educational research assessing gain, stating that "manifest" scores of groups assembled other than randomly are biased estimates of the true scores involved. That is, if groups are selected for comparison on the basis of scores on pertinent covariates, as their means differ initially on the dependent variable (pre-test), so will their subsequent or post-test scores tend to regress toward different population means. This pseudo-effect of differential gain always works to make the initially superior group look better.

Thus, the possible operation of such regression effects was considered in reference to the present data. This topic is discussed further below in relation to the results of specific analyses.

Impact of the Program on the Relationship of Separation Behavior and Test Performance - - Partial Correlations

The r's between Separation Behavior and the pre-and post-tests, and the partial r's resulting from the analysis are shown in Table 10.

In three of the six areas covered, the PPVT, Stanford Binet and Motor Battery, the correlations of Separation Behavior with the post-tests are higher than those with the pre-tests, indicating the possibility of a common source of impact from the program for these three areas. Regarding Component I of Separation Behavior, the correlations were higher with the post-tests for the Clowns Test and the Motor Battery; for Component II, the post-correlations were higher for all six areas.

The partial correlation coefficients indicate that the program had an effect on the relationships between Total Separation Behavior and three measures: the Stanford Binet, the PPVT and the Motor Battery. (The pre-test in the last of these areas, in fact, was not significantly related to Separation Behavior but both the post-test correlation and the partial correlation with this variable were significant at $p < .01$. Separation Behavior Component I partial correlations indicated a significant impact of the program in respect to the Stanford Binet and the Motor Battery; Component II, for all six tests again.

The implication is that the more active elements of Separation Behavior are generally more highly related to

	r's between Separation Behavior and:		
	Pre-test	Post-test	Post- with Pre-Partialed Out
Stanford Binet	-.40**	-.46**	-.27**
PPVT	-.23**	-.26**	-.15*
Clowns	-.20*	-.08(n.s.)	-.004(n.s.)
SPD	-.19*	-.12(n.s.)	-.05(n.s.)
Concept	-.29**	-.22*	-.12(n.s.)
Motor	-.10(n.s.)	-.28**	-.29**

Correlations of Separation Behavior Total Scores with Post- and Pre-Tests. Partial Correlations between Separation Behavior and Post-tests with Pre-test Influence Partialed Out

	r's between Sep. Behav. Component I and:		
	Pre-test	Post-test	Post- with Pre-Partialed Out
Stanford Binet	-.37**	-.42**	-.24**
PPVT	-.22*	-.24**	-.13(n.s.)
Clowns	-.15*	-.02(n.s.)	-.05(n.s.)
SPD	-.13(n.s.)	-.11(n.s.)	-.07(n.s.)
Concept	-.19*	-.19*	-.11(n.s.)
Motor	-.13(n.s.)	-.23**	-.25**

Correlations and Partial Correlations as Above For Separation Behavior Component I Scores

	r's between Sep. Behav. Component II and:		
	Pre-test	Post-test	Post- with Pre-Partialed Out
Stanford Binet	-.34**	-.37**	-.19*
PPVT	-.18*	-.21*	-.16*
Clowns	-.18*	-.34**	-.30**
SPD	-.31**	-.27**	-.18*
Concept	-.20*	-.29**	-.22*
Motor	-.10(n.s.)	-.31**	-.30**

Correlations and Partial Correlations as Above For Separation Behavior Component II Scores

** = $p < .01$
* = $p < .05$

TABLE 10

performance measured later, after exposure to the pre-school program, than to performance measured concurrently. The possibility is raised that the Component I behaviors observed were directly dependent on the separation situation, while the Component II behaviors, aggressiveness and hyperactivity, were more generally characteristic of the individuals exhibiting them and more stable over time and situations. It is even conceivable that these latter behaviors might have been somewhat constrained at the outset of the program so that tendencies to behave aggressively or restlessly could have become more pronounced as the school year progressed, interfering with the educational process and accounting for the more substantial and general negative correlations between gain and Component II.

Separation Behavior and Differential Gain -- Comparison of High and Low Separation Behavior Subjects

The 109 Subjects were divided into High and Low groups on the basis of their initial Separation Behavior scores. (The mean was used as a dividing point.) Their residualized gain scores in three areas: Stanford Binet, PPVT and the Motor Battery (the areas in which the partial r's between Separation Behavior and gain were significant) were compared. The comparison was made in terms of a double classification analysis of variance for each area. (These analyses involved another independent variable, Initial Concept Level, which will be discussed in a later section, below.)

Regarding the Stanford Binet and the Motor Battery, the two Separation Behavior groups differed at $p < .05$, with the Low Separation Subjects showing significantly greater gains in these areas.

For the PPVT, the difference between the groups was not significant.

The group means are summarized in Table 11, and the ANOVARS in Tables 12, 13 and 14.

Area:	X High Sep. Behavior	X Low Sep. Behavior
Stanford Binet	-1.83	+1.32
PPVT	+ .10	+ .12
Motor Battery	- .55	+ .48

TABLE 11

Mean Residualized Gain Scores for High and Low Separation Behavior Groups

Note: Mean residualized gain scores indicate departure from expectation. + scores indicate greater gain than expected, and - scores, less gain than expected.

Source	SS	df	MS	F
Total	10163.59	106		
Concept Level	1063.23	1	1063.23	12.59**($p < .01$)
Sep Behav Level	393.72	1	393.72	4.66*($p < .05$)
Concept X Sep Behav	8.41	1	8.41	< 1 (n.s.)
Within	8698.23	103	84.45	

TABLE 12

Analysis of Variance - - Residualized Gain Scores, Stanford Binet

Source	SS	df	MS	F
Total	5952.7	109		
Concept Level	99.5	1	99.5	1.8(n.s.)
Sep Behav Level	.5	1	.5	< 1 (n.s.)
Concept X Sep Behav	47.5	1	47.5	< 1 (n.s.)
Within	5805.2	106	54.6	

TABLE 13

Analysis of Variance - - Residualized Gain Scores, PPVT

Source	SS	df	MS	F
Total	678.96	105		
Concept Level	21.70	1	21.70	3.54(n.s.)
Sep Behav Level	31.86	1	31.86	5.20($p < .05$)
Concept X Sep Behav	1.34	1	1.34	< 1 (n.s.)
Within	624.06	102	6.12	

TABLE 14

Analysis of Variance - - Residualized Gain Scores, Motor Battery

Separation Behavior Component II and Differential Gain - - Comparison of High and Low Component II Subjects

Since all six partial correlation coefficients in respect to Component II of Separation Behavior were significant, while only three were significant regarding Total Separation Behavior, differential gain analyses were performed comparing High and Low Component II Subjects. Double classification Anovars were used (again including Initial Concept Level as the second independent variable).

The results were similar to those of the previous analyses, indicating that the Low Component II Subjects showed significantly greater gain only in the Stanford Binet and the Motor Battery areas. The implication regarding the other four areas, SPD, Clowns, Concept Test and PPVT, is that although the program had an impact on the relationship with Separation Behavior (as shown by the significant partial correlations obtained), this effect cannot be defined in terms of differential gain.

The mean residualized gain scores for the Component II groups on the six tests are summarized in Table 15, and the Analyses of Variance in Tables 16 through 21.

Area:	$\bar{X}$ High Component II	$\bar{X}$ Low Component II
Stanford Binet	- .48	+2.28
Motor	- .70	+ .52
PPVT	- .30	+ .25
Concept	-1.23	+1.48
Clowns	-2.42	+2.38
SPD	- .24	+ .22

TABLE 15

Mean Residualized Gain Scores for High and Low Component II Separation Behavior Groups on Six Tests.

Source	SS	df	MS	F
Total	9799.15	105		
Component II Level	508.74	1	508.74	6.48 $p < .05$
Concept Level	377.03	1	377.03	4.80 $p < .05$
Component II x Concept Level	908.63	1	908.63	11.58 $p < .001$
Within	8004.75	102	78.48	

TABLE 16

ANOVAR of Residualized Gain Scores on the Stanford Binet: Component II Separation Behavior x Initial Concept Level

Source	SS	df	MS	F
Total	673.54	105		
Component II Level	38.24	1	38.24	6.23 $p < .01$
Concept Level	0.29	1	0.29	< 1 (n.s.)
Component II x Concept Level	8.91	1	8.91	1.45 (n.s.)
Within	626.10	102	6.14	

TABLE 17

ANOVAR of Residualized Gain Scores on the Motor Battery: Component II Separation Behavior x Initial Concept Level

Source	SS	df	MS	F
Total	5543.19	108		
Component II Level	8.14	1	8.14	1 n.s.
Concept Level	93.74	1	93.74	1.84 n.s.
Component II x Concept Level	57.38	1	57.38	1.12 n.s.
Within	5363.93	105	51.08	

TABLE 18

ANOVAR of Residualized Gain Scores on the PPVT: Component II of Separation Behavior x Initial Concept Level

Source	SS	df	MS	
Total	6525.66	108		
Component II Level	194.97	1	194.97	3.24 n.s.
Concept Level	11.85	1	11.85	1 n.s.
Component II x Concept Level	0.03	1	0.03	1 n.s.
Within	6318.81	105	60.18	

TABLE 19

ANOVAR of Residualized Gain Scores on the Concept Test: Component II of Separation Behavior x Concept Level

Source	SS	df	MS	F
Total	20710.87	104		
Component II Level	594.74	1	594.74	2.99n.s.
Concept Level	0.72	1	0.72	< 1 n.s.
Component II x Concept Level	18.88	1	18.88	< 1 n.s.
Within	20096.53	101	198.97	

TABLE 20

ANOVAR of Residualized Gain Scores on the Clowns Test: Component II of Separation Behavior x Initial Concept Level

Source	SS	df	MS	F
Total	1854.24	107		
Component II Level	5.67	1	5.67	< 1 n.s.
Concept Level	5.67	1	5.67	< 1 n.s.
Component II x Concept Level	6.24	1	6.24	< 1 n.s.
Within	1836.66	104	17.66	

TABLE 21

ANOVAR of Residualized Gain Scores on the SPD: Component II of Separation Behavior x Initial Concept Level

QUESTION 3:

Impact of the Program on Relationship of Initial Concept Knowledge to the Other Intellectual Areas - - Partial Correlations.

Scores on the Concept pre-test were related to the Concept, Stanford Binet, PPVT and Motor Post-tests at $p < .01$, and to the Clowns post-test at $p < .05$. When the appropriate pre-test scores were partialed out, significant relationships remained with the PPVT and the Motor Battery at $p < .01$ and with the Stanford Binet at $p < .05$. The partial r's regarding the Clowns and SPD Tests were not significant. The coefficients obtained are shown in Table 22.

Initial Concept Knowledge and Gain in Other Areas - - Comparison of High and Low Initial Concept Level Groups.

The Subjects were grouped into Highs and Lows on the basis of their scores on the Concept Pre-test, using the mean as a cut-off point, and their residualized gain scores in the Stanford Binet, PPVT and Motor areas compared in a double classification Anovar with Total Separation Behavior as the second independent variable, regarding each of these three test areas (see Tables 12, 13 and 14).

For the Stanford Binet, the High Initial Concept Level group gained significantly more than the Lows at $p < .01$. For the other two tests analyzed, the two Concept groups did not differ significantly. The group means are reported in Table 23.

	r's between Concept Pre-test and:		Partial r's with effect of pre-tests removed
	Pre	Post	
Stanford Binet	.52**	.54**	.19*
PPVT	.44**	.46**	.32**
Clowns	.26**	.20*	.10 (n.s.)
SPD	.13 (n.s.)	.12 (n.s.)	.08 (n.s.)
Motor	.09 (n.s.)	.28**	.27**

TABLE 22

Correlations of Concept Pre-test with Pre-and Post-tests In Other Areas: Partial Correlations of Initial Concept Scores with Post-tests. Accounting for Influence of Pre-tests

Area:	$\bar{X}$ High Concept Group	$\bar{X}$ Low Concept Group
Stanford Binet	+2.80	-3.30
PPVT	+1.02	- .80
Motor Battery	+ .34	- .55

TABLE 23

Mean Residualized Gain Scores for High and Low Initial Concept Groups: Total Separation Behavior x Initial Concept Level Analysis

When the High and Low Concept Groups were compared in the six Anovars using Component II of Separation Behavior as the second independent variable, the High and Low Concept groups were found not to differ significantly except in relation to the Stanford Binet. (See Tables 16 through 21.)

The group means for the SPD, Clowns and Concept Test analyses are summarized in Table 24.

Area:	$\bar{X}$ High Initial Concept	$\bar{X}$ Low Initial Concept
Stanford Binet	+3.02	- .98
Motor	+ .20	- .38
PPVT	+ .72	- .76
Concept	+ .11	+ .14
Clowns	+ .41	- .45
SPD	+ .24	- .25

TABLE 24

Mean Residualized Gain Scores for High and Low Initial Concept Level Groups On Six Tests

QUESTION 4:

Multiple Prediction from the Combination of Initial Concept Knowledge and Separation Behavior.

In the investigation of two basic types of variables, motivational and intellectual, in relation to the impact of a pre-school program, the possibility exists that a more accurate prediction might be made using a combination of information from these two areas than by using either type of information alone.

Therefore, Multiple Correlation coefficients were obtained using Initial Concept and Separation Behavior scores as predictors, and post-test performance in the different areas as criteria. Further, the effects of initial differences in performance in these areas were accounted for by partialing out the pre-test scores in each case.

The results of these analyses are shown in Table 25, along with those from similar analyses in which Separation Behavior Component II was substituted for Separation Behavior Total score as a predictor. For ease of comparison, the partial correlations of each of the predictors with the criterion have also been shown.

For each area, the most effective predictor of program impact was: Stanford Binet - Multiple R with Concept Pre-test and Separation Behavior as predictors; PPVT - Concept Pre-test; Motor Battery - Separation Behavior Total Score; SPD - Multiple R with Concept Pre-test and Component II of Separation Behavior as predictors; and Clowns - Separation Behavior Component II.

	Partial r between Concept pre-test/ post-tests in 5 areas, accounting for pre-test influence	Partial r between Sep. Behav./post-tests in 5 areas, accounting for pre-test influence	Multiple R with 2 predictors, accounting for pre-test scores
Stanford Binet	.19*	-.27**	.40**
PPVT	.32**	-.15*	.28**
Motor	.27**	-.29**	.12 (n.s.)
SPD	.08 (n.s.)	-.05 (n.s.)	- -
Clowns	.10 (n.s.)	-.004 (n.s.)	- -

	Partial r (as above)	Partial r substituting Sep. Behav. Component II Scores	Multiple R (as above)
SPD	.08 (n.s.)	-.18*	-.25**
Clowns	.10 (n.s.)	-.30**	-.24**

TABLE 25

Multiple Correlations Between the Concept Pre-test and Separation Behavior (Total or Component II) with post-test scores in Intellectual Areas, accounting for Differences in Pre-test Scores

Apparently, no generalization can be made regarding a "best" predictor - - it depends on the measure involved. However, for all measures but the PPVT, the most effective predictor or combination of predictors involved Separation Behavior or one of its Components.

Palmer's Interaction Hypothesis - - Theoretical Basis

Palmer's hypothesis can be considered an extension of the Multiple Prediction situation involving Separation Behavior and initial Concept Level as predictors in which these two variables interact rather than predicting in a linear fashion.

His inferences about the pre-school child are derived largely from the deprivation literature regarding infrahuman organisms. He utilizes the distinction made by Bronfenbrenner in a comprehensive review of animal deprivation studies (1966) between drive deprivation, the prevention of the normal gratification of inherent or acquired drives, and stimulus deprivation, the lack of experience of stimuli normally available in the environment of the young animal.

According to this formulation, early drive deprivation has the effect of increasing drive level in general, and especially in respect to the particular need deprived. The increased drive, which is particularly evident when the organism is again placed in a state of deprivation, then may function either as a facilitator or as an inhibitor of a specified behavior pattern, depending on whether that pattern is well organized or not at the time the deprivation occurs. That is, with the increased drive level, a response pattern

or sequence that is well-organized, having an existing high probability of occurrence in a given situation, will be even more likely to occur in that situation, and a poorly organized response sequence, with a low probability of occurrence, will be even less likely to occur.

An example from the animal literature supporting this reasoning comes from the work of Seitz (1954, 1959). He investigated the effect of litter size in rats on several variables including hoarding, mating behavior and successful competition with other animals for food (which are thought to be behaviors organized early, either through genetic process, learning or both) and, on the other hand, exploratory behavior and speed in running down an alley at a signal (which are considered to be behaviors established later). The responses in the former group appeared to be facilitated in rats from large litters. (These animals represent the deprived group, with increasing size of litter corresponding to increasing degrees of feeding frustration early in life.) On the exploratory and running responses, the large litter rats scored lower than a group of animals from small litters. Thus, the inference by Bronfenbrenner (1966) that the increased drive resulting from early drive deprivation facilitates a well-organized response pattern and inhibits a poorly organized response pattern.

He further concludes after reviewing other deprivation studies (e.g., Schneirla, Rosenblatt & Tobach, 1963) that early stimulus deprivation in a particular modality leads to subsequent impaired functioning in that modality and that

continued general stimulus deprivation can result in severe cognitive as well as emotional impairment.

His distinction between the two kinds of deprivation appears to be related to Yarrow's (1964) analysis of the global term "maternal deprivation" into different categories representing varying conditions of mother-infant relationship.

This author speaks of maternal separation which..... "in its purest sense involves a break in the continuity of relationship with a mother figure after a meaningful focused relationship has been established"....."the loss of a significant loved person." He defines true maternal deprivation, on the other hand, in terms of "a quantitative lack of tactile, kinesthetic, auditory and other kinds of stimulation normally provided by a mother figure, or a lack of sensitive individualized adaptation to the child's needs..." According to Bronfenbrenner's (1966) formulation, the latter situation might be an instance of stimulus deprivation and the former, one of drive deprivation.

Palmer's (1968) extension of the reasoning regarding the stimulus deprivation/drive deprivation distinction involves certain critical assumptions whose justification is somewhat questionable.

First, it assumes that Separation Behavior is an index of attachment, which is still an issue under investigation. Not only does Ainsworth (1969) differentiate between attachment which she defines as stable, inner predisposition to seek the proximity of a particular individual, and attachment behavior, which varies as a function of intra-organismic and

environmental conditions. She states that even the latter, which is more open to evaluation, cannot be directly inferred from the ease or difficulty with which the child parts from his mother, the situation being complicated by the presence of contact-resisting and proximity-avoiding behaviors referred to the mother along with proximity-seeking and contact-maintaining behaviors and by the situational sensitivity of attachment behavior.

Palmer's (1968) formulation also requires the assumption that a high score on a Separation Behavior Index is indicative of prior drive deprivation regarding attachment, which would then have to be defined as a learned drive for contact with the mother. Actually, the antecedents of intense separation behavior are not clear. It is just as reasonable to assume that the child who is not in the least deprived of contact with his mother will be more attached and, therefore, (going along with the first assumption), score high on Separation Behavior. Ainsworth (1970) also conceives of attachment as having positive and negative aspects, the former concerning the ability to relate to other individuals and the latter having to do with dependency in the sense of not being able to function on one's own. If these different aspects can be demonstrated and measured as such, it is possible that they may relate differently to Separation Behavior, such that the antecedents of this behavior may be clarified.

A third assumption implicit in Palmer's (1968) reasoning is that a low score on a Concept task indicates prior stimulus deprivation. To the extent that individuals varying widely

in exposure to pertinent stimulation are likely to score quite differently on such a task (all other things being equal), this is not an unwarranted assumption. But all other things tend not to be equal - - and if they were, how would we know it? One must assume that there are other obvious sources of variance involved.

Nevertheless, since the original purpose of this investigation was to explore the interrelationships among separation behavior, current concept knowledge and performance in a pre-school program, the results of the study may be looked at with respect to the specific hypotheses stemming from Palmer's thinking.

Palmer's Interaction Hypothesis Specified

Palmer's (1968) formulation regarding the interactive effect of initial knowledge of concepts and separation behavior on progress or gain in a pre-school program can best be described by referring to four groups of subjects based on the possible combinations of high and low scorers on measures of concept knowledge and separation behavior obtained at the start of the pre-school program, as follows:

1. Subjects high on both measures will gain most in the program, according to the following reasoning: Their high separation behavior indicated the existence of a high level of drive as a function of early drive deprivation regarding the need for contact with the mother. This high drive tends to facilitate well-organized behavior patterns. The high

concept scores of these subjects represent evidence of well-established response patterns in the learning situation. This type of responding also happens to be adaptive in respect to the particular environment involved. Since this adaptive behavior is likely to be facilitated by the high level of drive, its increased probability of occurrence should be associated with excellent progress in the school program.

2. Subjects scoring high on the concept measure but low in separation behavior will gain considerably but not as much as Group 1. That is, their lower separation scores indicate that less drive is present to facilitate the adaptive behavior pattern which their high concept scores indicate is well-organized for these subjects.

3. Subjects scoring low on both measures will tend to make very slow progress in the program, having neither a well-organized response pattern that is adaptive in the school environment, nor a high level of drive to act as a facilitator.

4. Those subjects with high scores in separation behavior but low scores on the concept measure are predicted to gain the least. That is, their high drive would tend to increase the probability of occurrence of behavior patterns that are well-organized in these subjects under the particular circumstances involved. Actually, for them, the response patterns likely to be well-organized in the learning situation are protest and withdrawal behaviors similar to those observed in the measurement of separation behavior. If so, the high drive would facilitate such behaviors and support their

continuance past the initial separation period at the start of the school year. The continuation of protest, withdrawal, etc., would certainly be likely to function so as to interfere with instructor-pupil interaction, thus preventing progress in the pre-school.

Figure 1 will illustrate the interaction predicted.

This "group" strategy has been pursued in the following analyses, since the correlational procedures utilized up to this point are relatively insensitive to the particular kind of question being asked.

Comparison of Predicted Interaction with Data

The predicted interaction actually specifies that for subjects high in Separation Behavior, amount of concept knowledge before training will make a large difference in the degree of gain realized, with High Separation High Concept individuals making the most progress and High Separation Low Concept individuals making the least progress of the four groups involved in the comparison. For those low in Separation Behavior, concept level is predicted to make much less of a difference.

In order to investigate this specification, the Interaction effect was evaluated in the Double Classification Anovar already reported in respect to the main effects of the variables involved (see Tables 12, 13 and 14).

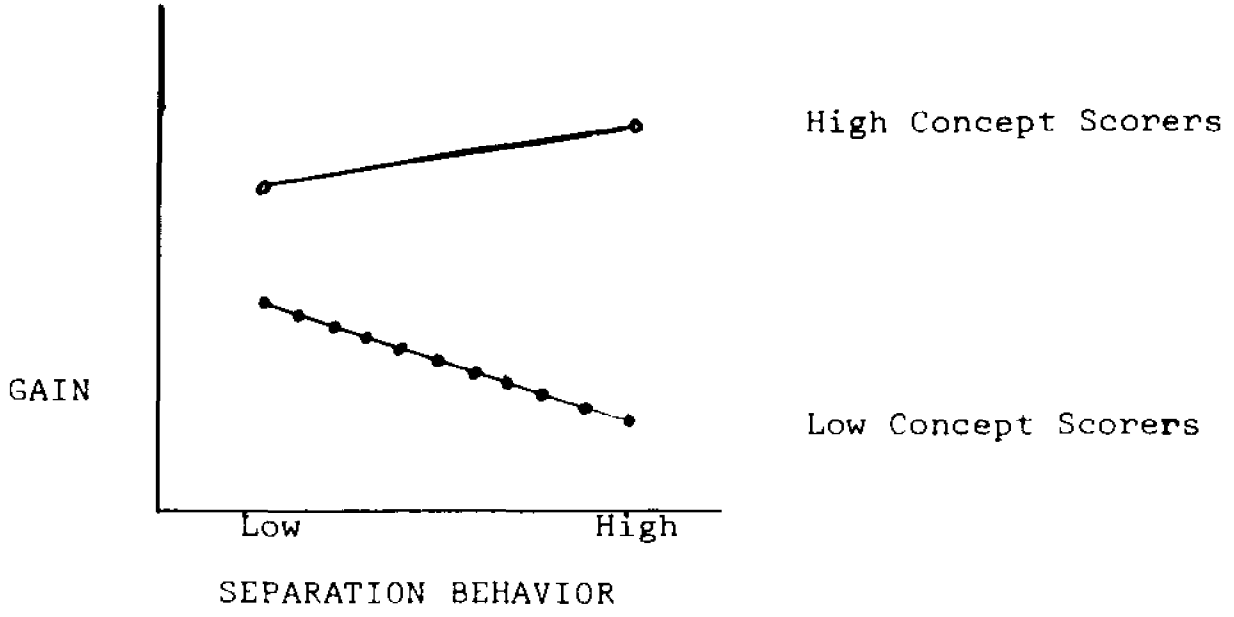

FIGURE 1

Interaction Predicted by Palmer's Hypothesis

Considering the subjects as four groups based on high vs. low scores on Separation Behavior and Initial Concept Level, indicated that there were differences in pre-test performance in the areas analyzed. Thus, according to Campbell & Erlebacher's (1970) position, it was not unlikely that regression effects would influence the data. These authors point out that the existence and direction of a bias due to regression effects can be determined by the ease or difficulty with which the various groups are populated. In this case, there were fewer High Separation High Concept and Low Separation Low Concept subjects than "High-Lows" and "Low-Highs."

Thus, the test of Palmer's specifications could be considered a conservative one. That is, if the data supported his predictions, indicating that the two concept groups within each level of Separation Behavior had gained differently, those effects would have been strong enough to overcome the expected regression biases.

For the Total Separation Behavior x Initial Concept Level Anovars performed on the residualized gain scores on the Stanford Binet, PPVT and Motor Battery, none of the interaction effects was significant. The mean residualized gains for the four groups were as follows:

Stanford Binet:

1) Low Separation, High Concept $\bar{X}$ = +3.65
2) High Separation, High Concept $\bar{X}$ = +1.95
3) Low Separation, Low Concept $\bar{X}$ = -1.00
4) High Separation, Low Concept $\bar{X}$ = -5.61

Palmer's (1968) hypothesis would have predicted a reversal of the order of groups 1) and 2) above and, of course, a significant interaction. The actual order would reflect either the operation of the regression effects previously referred to or, simply, an interpretation based on two significant main effects.

PPVT:

1) Low Separation, High Concept $\bar{X}$ = +1.68
2) High Separation, High Concept $\bar{X}$ = + .36
3) High Separation, Low Concept $\bar{X}$ = - .13
4) Low Separation, Low Concept $\bar{X}$ = -1.48

Regarding the PPVT, Palmer would have predicted a reversal of the order of groups 1) and 2), and groups 3) and groups 3) and 4). Since, for this test, neither of the main effects nor the interaction was significant, one must conclude that none of the groups differed in terms of the departure of their actual post-test scores from those predicted by the regression analysis.

Motor Battery:

1) Low Separation, High Concept $\bar{X}$ = + .83
2) Low Separation, Low Concept $\bar{X}$ = + .12
3) High Separation, High Concept $\bar{X}$ = - .14
4) High Separation, Low Concept $\bar{X}$ = - .96

Palmer's formulation would have predicted that the groups would have come out in 3), 1), 2), 4) order.

Thus, the order predicted by Palmer was not found in regard to any of the three test areas analyzed and, in no case, was there a significant interaction.

The means of the four groups have been shown graphically in Figures 2, 3 and 4.

Regarding the Component II Separation Behavior x Initial Concept Level Anovars, the only significant interaction effect was found in relation to the Stanford Binet ($F = 11.58$, $p < .001$). For this test, the mean residualized gain scores for the four groups were:

1) Low Component II, High Concept $\bar{X} = +3.33$
2) High Component II, High Concept $\bar{X} = +2.71$
3) Low Component II, Low Concept $\bar{X} = +1.22$
4) High Component II, Low Concept $\bar{X} = -3.19$

Palmer's formulation would have predicted froups 1) and 2) in reverse order. But the means of these two groups are relatively close together and the results of this analysis most closely approximate those predicted by Palmer (1968).

For the other areas, the group means were as follows:

Motor Battery:

1) Low Component II, High Concept $\bar{X} = + .86$
2) Low Component II, Low Concept $\bar{X} = + .17$
3) High Component II, High Concept $\bar{X} = - .46$
4) High Component II, Low Concept $\bar{X} = - .94$

Palmer's hypothesis would predict a 3), 1), 2), 4) order.

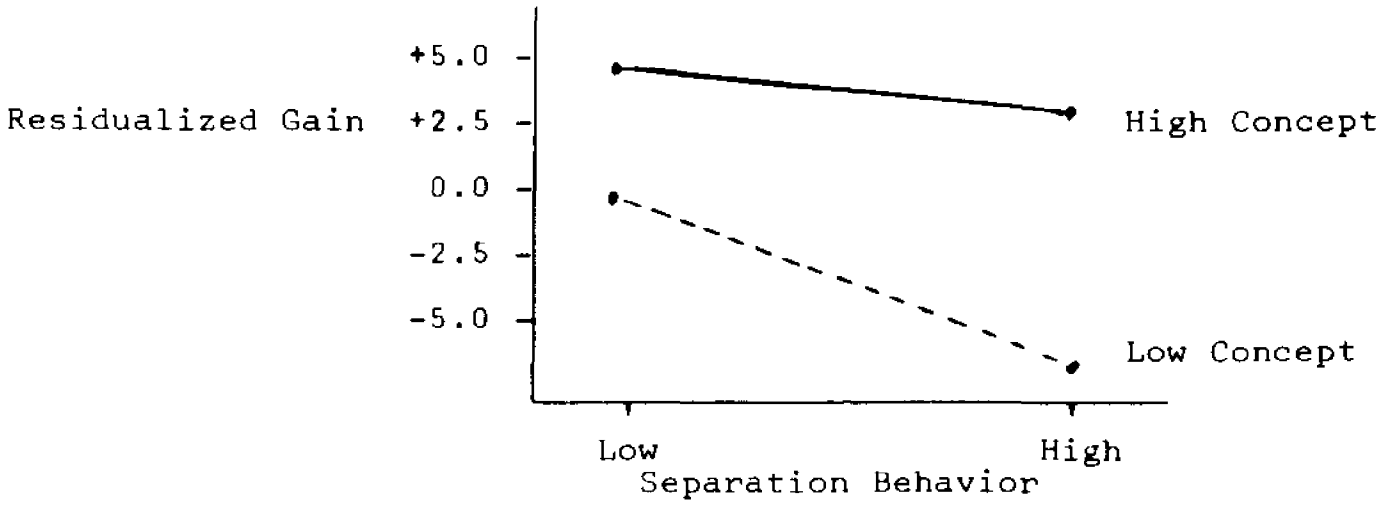

FIGURE 2

Group Mean Residualized Gain - - Stanford Binet

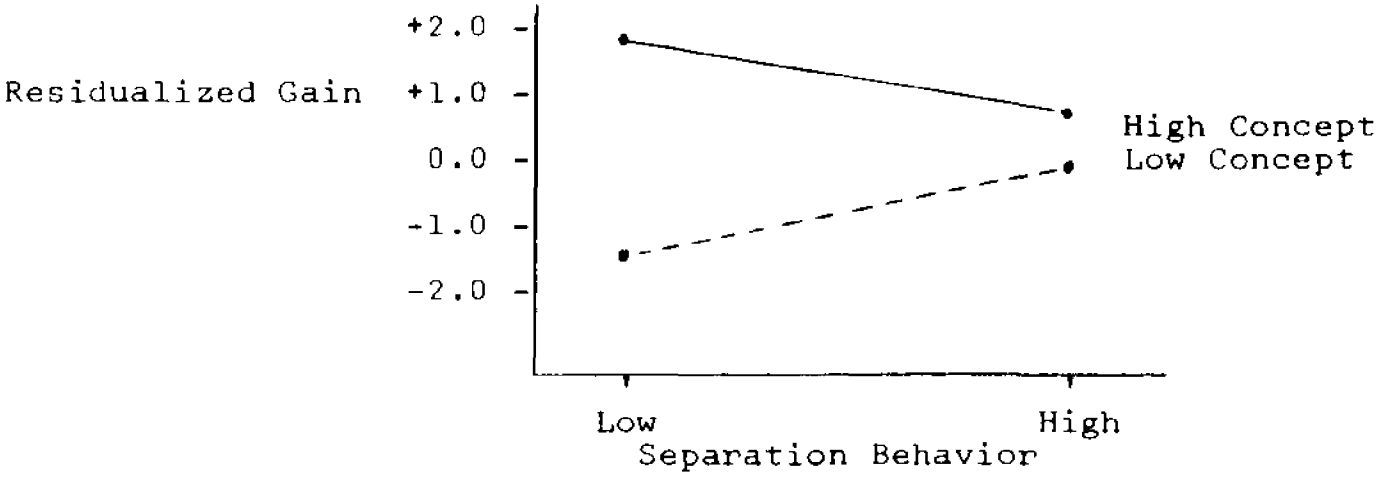

FIGURE 3

Group Mean Residualized Gain - - PPVT

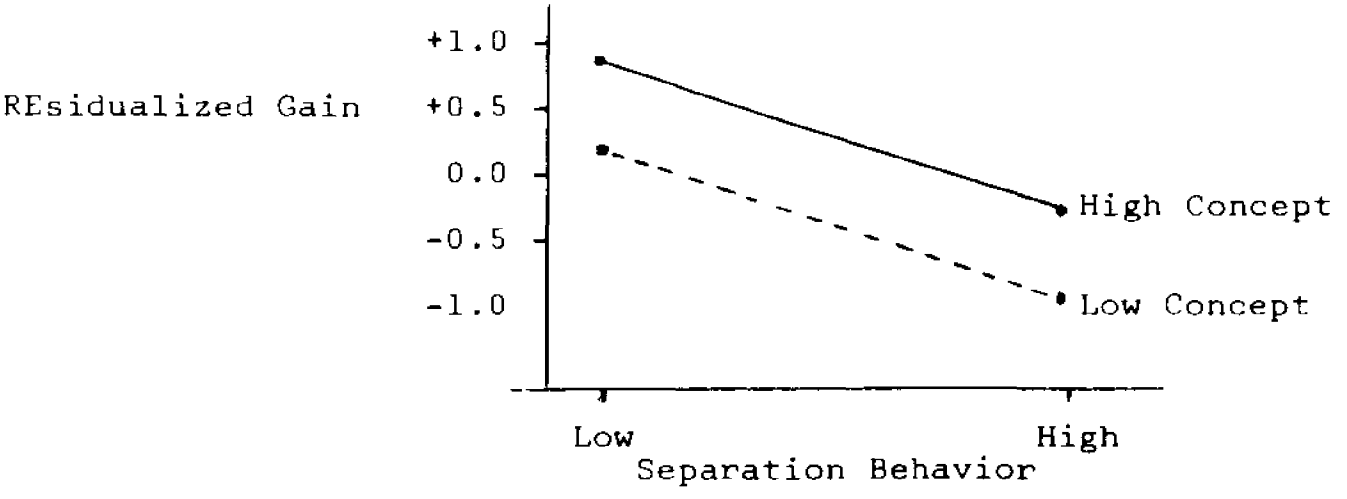

FIGURE 4

Group Mean Residualized Gain - - Motor Battery

Concept Test:

1) Low Component II, Low Concept $\bar{X}$ = +1.83

2) Low Component II, High Concept $\bar{X}$ = +1.13

3) High Component II, High Concept $\bar{X}$ = - .91

4) High Component II, Low Concept $\bar{X}$ = -1.55

The prediction in this case would have been 3), 2), 1), 4).

Clowns Test:

1) Low Component II, High Concept $\bar{X}$ = +2.73

2) Low Component II, Low Concept $\bar{X}$ = +2.04

3) High Component II, High Concept $\bar{X}$ = -1.91

4) High Component II, Low Concept $\bar{X}$ = -2.94

Palmer's hypothesis would predict a 3), 1), 2), 4) order.

PPVT:

1) Low Component II, High Concept $\bar{X}$ = +1.93

2) High Component II, Low Concept $\bar{X}$ = - .09

3) High Component II, High Concept $\bar{X}$ = - .50

4) Low Component II, Low Concept $\bar{X}$ = -1.42

The predicted order would be 3), 1), 4), 2).

SPD:

1) Low Component II, High Concept $\bar{X}$ = + .70

2) High Component II, High Concept $\bar{X}$ = - .23

3.5) High Component II, Low Concept $\bar{X}$ = - .25

3.5) Low Component II, Low Concept $\bar{X}$ = - .25

Palmer's formulation would predict a reversal of the order of Groups 1) and 2). The Group Means for these six analyses are shown graphically in Figures 5 through 10.

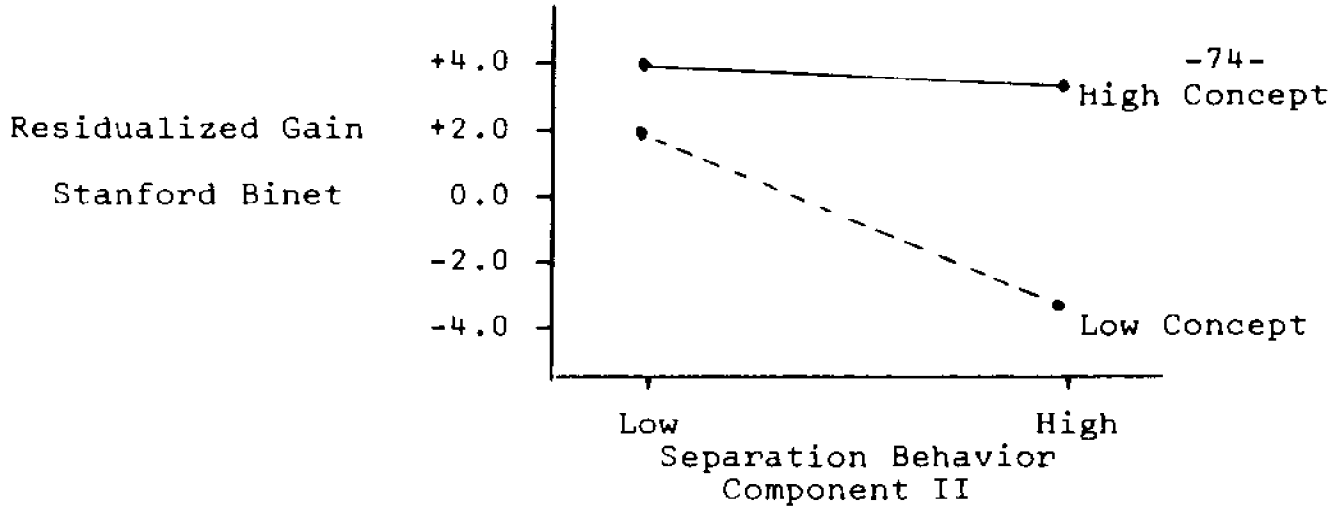

FIGURE 5

Group Mean Residualized Gain - - Stanford Binet

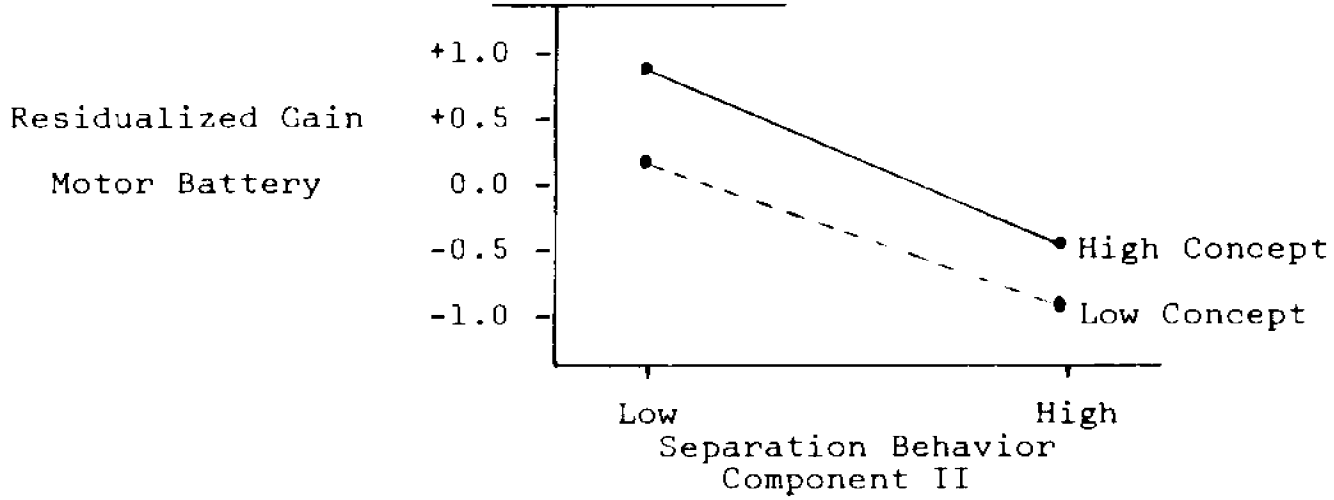

FIGURE 6

Group Mean Residualized Gain - - Motor Battery

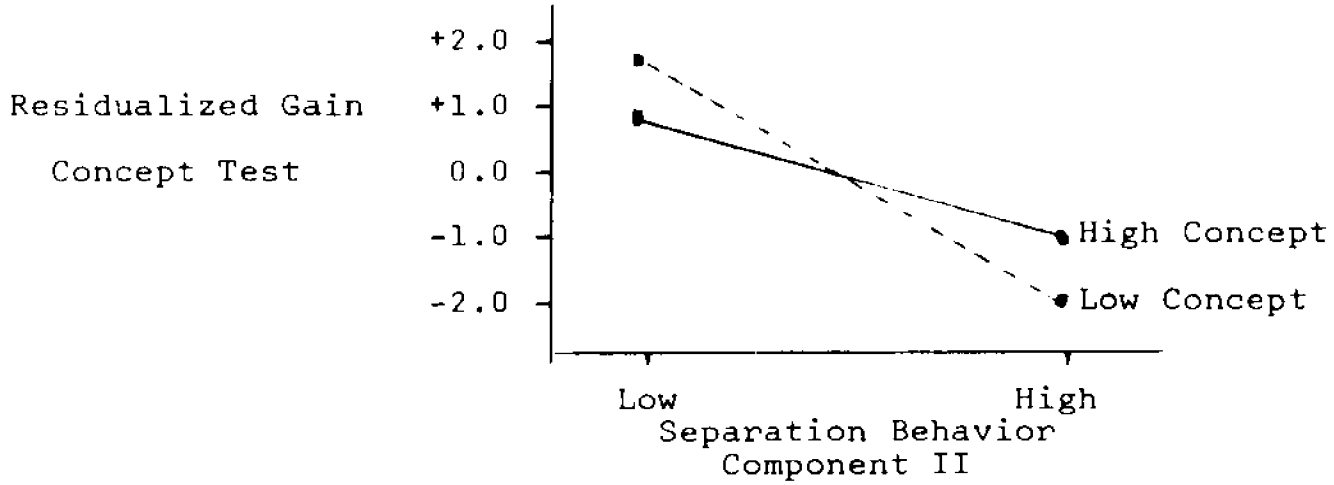

FIGURE 7

Group Mean Residualized Gain - - Concept Test

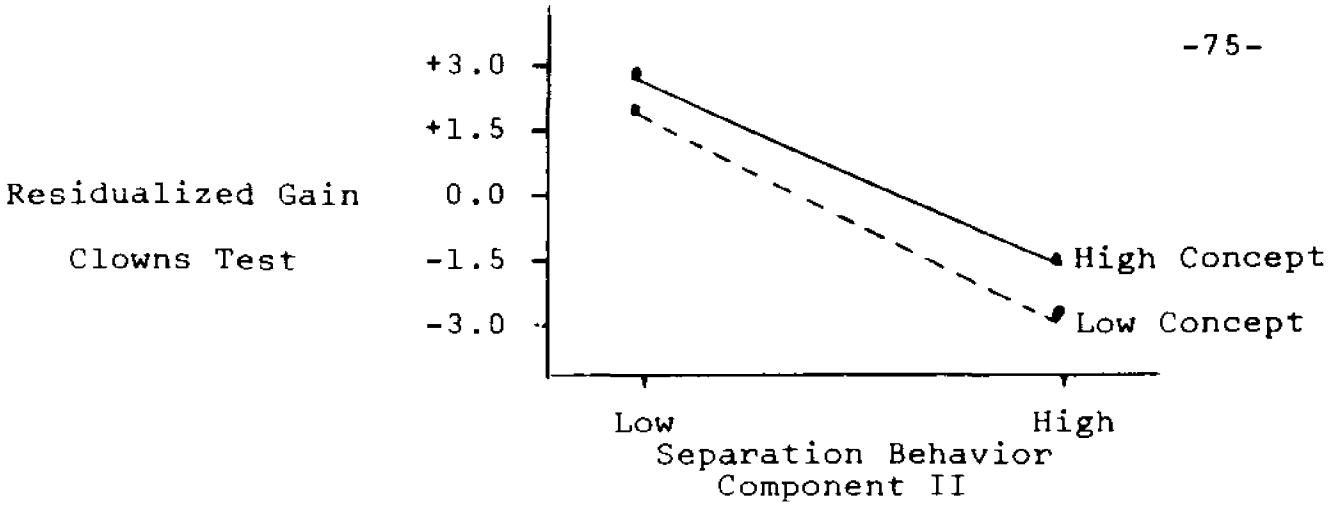

FIGURE 8

Group Mean Residualized Gain - - Clowns Test

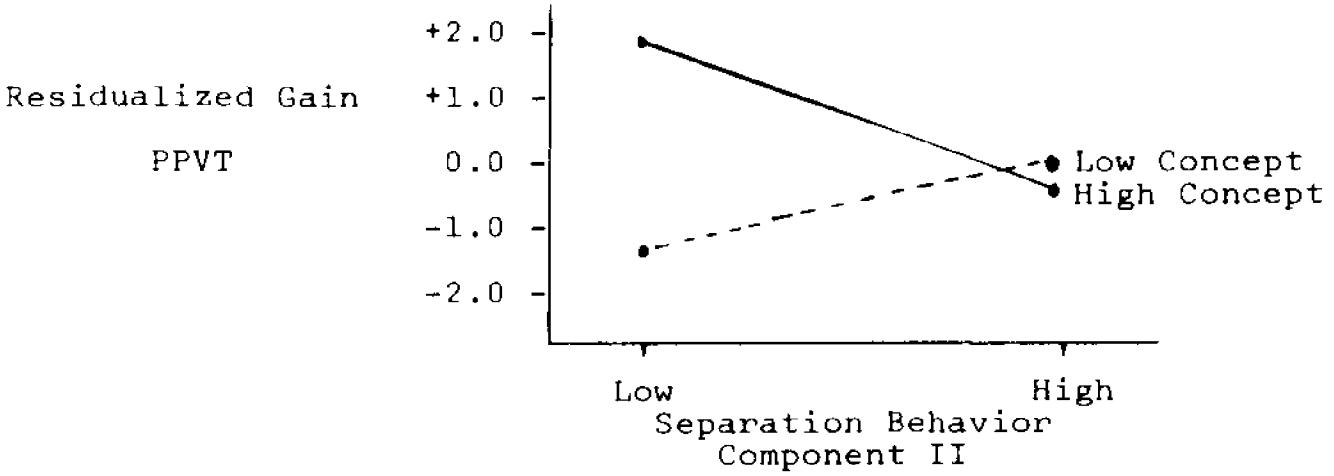

FIGURE 9

Group Mean Residualized Gain - - PPVT

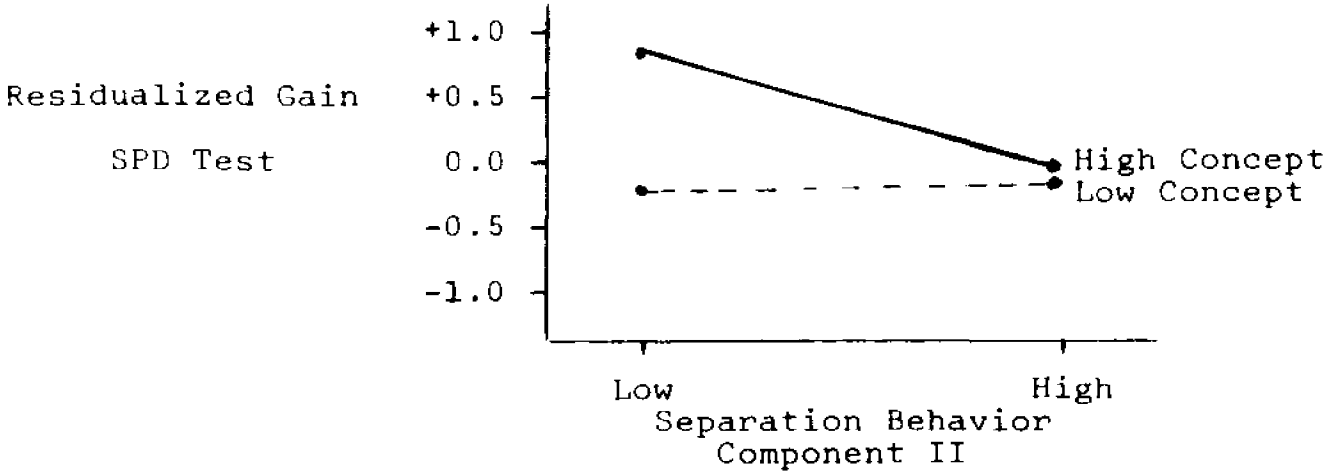

FIGURE 10

Group Mean Residualized Gain - - SPD Test

QUESTION 5:

Relationship of Later Adjustment to Initial Separation Behavior

Since there was considerable variability in the intensity of reaction to separation from the mother within the sample observed, the duration of the particular behaviors involved was investigated. This was done by obtaining the correlations between the original Separation Behavior Checklist (as well as its Components I and II) and the Pre-School Adjustment Checklist, PAC Components I and II and the PAC Greeting Item. The coefficients obtained are summarized in Table 26.

The correlation between the two tests (total scores) was .27; between the two Component I's, .28; and between the Component II's, .36. While these coefficients are all significant at $p < .01$, their magnitude suggests certain possibilities: a number of the subjects who reacted intensely to separation at the start of the school year might have settled down so that they did not show non-adjustment to the pre-school by the Spring - - this possibility is rather logical, although the reverse is not. That is, it is less likely that Subjects who were initially apparently comfortable upon separation from their mothers in the pre-school situation became "unadjusted" by the Spring, although it is possible because of boredom, frustration from difficult tasks, etc.

Another possibility is that there was less pertinent behavior to observe by the time the PAC was administered and this limited range of behavior had the effect of diminishing the magnitude of the correlations.

	2	3	4	5	6	7
1. Separation Behavior Total	.97	.56	.27	.28	.23	-.07
2. Separation Behavior Component I		.40	.27	.28	.20	-.02
3. Separation Behavior Component II			.25	.25	.36	-.33
4. PAC Total				.93	.64	.10
5. PAC Component I					.54	.20
6. PAC Component II						-.006
7. PAC Greeting Item						

TABLE 26

Intercorrelations Among Separation Behavior and Components, and Pre-School Adjustment Checklist and Components

In fact, recalling that the PAC observations were made on a participant as well as a non-participant basis (as the Separation Behavior observations had been), it must be noted that most of the variance on the PAC scores was obtained via the Instructors' rather than the Observers' ratings. That is, hardly any applicable behavior could be noted by the Observers in one-minute time samples, in contrast to similar time samples taken at the beginning of the program; the Instructors, in actual interaction with the Subjects for forty-five minutes at a time, were more able to detect instances of the types of behavior under consideration.

Further evidence that the amount of pertinent behavior available for observation had decreased by the Spring came from a comparison of the ranges of scores on the two checklists: for the Separation Behavior Checklist, the range in Raw Scores was 5 - 396, with a mean of 34.6; the transformed scores ranged from 0.7782 to 2.5988, with a mean of 1.5508. For the Pre-school Adjustment Checklist, the Raw Score Range was 2 - 81, $\bar{X}$ = 21.2; after transformation, the scores ranged from 0.3010 - 1.9112, with $\bar{X}$ = 1.3367.

The Greeting Item, which represented an additional area of observation not included in the Separation Behavior Checklist, did not relate significantly to four of the six Component or Total Score measures pertaining to the two scales. It did correlate significantly with Component II of the Separation Behavior measure ($r = .33$) and Component I of the PAC ($r = .20$).

For the Separation Behavior Checklist, Components I and II correlated .40 with each other; the comparable relationship was .54 for the PAC. On both measures, Component I had considerable overlap with the Total Scores (.97 for the SBC, .93 for the PAC). The Component II correlations with Total Scores were .56 for the SBC and .64 for the PAC. Thus, it appeared that the crying, clinging, withdrawing behavior represented by Component I had become somewhat less influential in determining the total Checklist score and the aggressive, hyperactive Component II behavior, somewhat more effective.

QUESTION 6:

Relationship of Initial Intellective Test Scores and PAC Scores

The association of mid-year adjustment to the pre-school program (PAC and its Component scores) with the pre-tests administered in the various intellectual areas covered by this investigation was evaluated with the resulting correlation coefficients shown in Tables 27 through 30.

Again, all negative coefficients were obtained, except in relation to the Greeting Item. Regarding this Item, all r's but one were not significant. The single significant relationship pertained to the Clowns Test, for which $r = .19$, $p < .05$.

The SPD and Motor Tests showed no significant relationships with PAC scores or components thereof. Of the other four tests, the PPVT and Clowns tests related to Total and Component I PAC scores at $p < .01$; the remainder of the relationships found were somewhat less substantial - - significant at $p < .05$.

Test Area	PAC/Pre	PAC/Post	Pre/Post	Partial r
Concept	-.16	-.21	.55	-.15*
Stanford Binet	-.18	-.24	.73	-.17*
PPVT	-.33	-.29	.63	-.11
Clowns	-.25	-.22	.38	-.13
SPD	-.05	-.14	.38	-.13
Motor	-.004	-.12	.33	-.12

TABLE 27

Correlations of Total PAC Scores with Gain in Intellective Areas: Zero-order Correlations From Which Partials were Derived

Test Area	I/Pre	I/Post	Pre/Post	Partial r
Concept	-.19	-.21	.55	-.13
Stanford Binet	-.18	-.25	.73	-.16*
PPVT	-.31	-.32	.63	-.16*
Clowns	-.29	-.21	.38	-.11
SPD	-.04	-.17	.38	-.14*
Motor	-.01	-.14	.33	-.15*

TABLE 28

Correlations of PAC Component I Scores with Gain

Test Area	II/Pre	II/Post	Pre/Post	Partial r
Concept	-.12	-.18	.55	-.13
Stanford Binet	-.18	-.19	.73	-.09
PPVT	-.16	-.16	.63	-.08
Clowns	-.17	-.36	.38	-.33**
SPD	-.004	-.12	.38	-.13
Motor	-.04	-.16	.33	-.16*

TABLE 29

Correlations of PAC Component II Scores with Gain

Test Area	Greet/Pre	Greet/Post	Pre/Post	Partial r
Concept	.12	.06	.55	-.01
Stanford Binet	.11	.02	.73	.09
PPVT	-.02	.04	.63	.07
Clowns	.19*	.28	.38	.23**
SPD	.01	.15	.38	.16*
Motor	.12	.11	.33	.08

TABLE 30

Correlations of PAC Greeting Item Scores with Gain

QUESTION 7:

Program Impact on Relationships Between Tests and Later Adjustment to the Program

The PAC Total and Component Scores were first correlated with the post-test scores in the intellectual areas. Then the pre-test scores were partialed out so that program impact on the relationships in the different areas could be evaluated in relation to mid-year adjustment to the program.

The resulting coefficients are shown in Tables 27 through 30.

The total PAC Score partial correlations regarding the Stanford Binet and the Concept Test were significant at p .05. The PAC Component I score partial correlations in respect to the Stanford Binet, PPVT, SPD and Motor Tests were significant at the same level. For PAC Component II scores, significant coefficients were found in relation to the Clowns Test ($p < .01$) and the Motor Battery ($p < .05$). Finally, the PAC Greeting Item was significantly related to the Clowns ($p < .01$) and the SPD ($p < .05$) tests.

These associations were contrasted with the comparable relationships regarding the Separation Behavior Checklist (see Table 31): For the Stanford Binet and the Motor Battery, the SBC relationships were consistently higher; for the Clowns Test, the reverse was true - - the PAC coefficients were consistently higher. The Concept and SPD Tests related more substantially to PAC Total and Component I scores, but

to SBC Component II scores. For the PPVT, the coefficients were higher with SBC Total and Component II scores, but with PAC Component I Scores.

Of all the Total and Component scores involved in the comparison, the Separation Behavior Checklist Component II scores appeared to be involved in the greatest number of significant relationships, indicating that, in general, the relationships involving the aggressive and hyperactive aspects of Separation Behavior reflected an impact from the program most clearly.

Total Scores:	r's with Gain	
	SBC	PAC
Stanford Binet	-.27**	-.17*
Concept	-.12	-.15*
PPVT	-.15*	-.11
Clowns	-.004	-.13
SPD	-.12	-.13
Motor	-.29**	-.12
Component I Scores:		
Stanford Binet	-.24**	-.1[illegible]*
Concept	-.11	-.1[illegible]
PPVT	-.13	-.16*
Clowns	-.05	-.11
SPD	-.07	-.14*
Motor	-.25**	-.15*
Component II Scores:		
Stanford Binet	-.19*	-.09
Concept	-.22*	-.13
PPVT	-.16*	-.08
Clowns	-.30**	-.33**
SPD	-.18*	-.13
Motor	-.30**	-.16*

TABLE 31

Comparison of Separation Behavior Checklist and Pre-School Adjustment Checklist Partial Correlations Reflecting Program Impact in the Test Areas

QUESTION 8:

Relationship of Socio-Economic Status, Number of Siblings and Ordinal Status in the Family to Initial Separation Behavior and its Components

When demographic information available on the Subjects was correlated with Separation Behavior Total and Component scores, the results summarized in Table 32 were obtained. Socio-economic Status was not significantly associated with any of the Separation Behavior measures; both Number of Siblings and Ordinal Status related to SBC Total and Component I socres at $p < .05$, but not significantly to Component II scores.

The significant correlations indicated that Subjects with more siblings and those in the position of younger sibling tended to score higher in Separation Behavior, especially its Component I elements: crying, withdrawing and clinging.

Relationship of SES, Number of Siblings and Ordinal Status to Pre-test Scores in the Intellectual Areas

The correlation coefficients describing these relationships are summarized in Table 33. Four of the six correlations involving SES lacked significance. The PPVT initial scores related to SES at $p < .05$ and SPD scores at $p < .01$. Both of these significant correlations were negative; since, in the SES index, the lower the score, the higher the status, the direction of the significant correlations indicated that

	Sep. Behav. Total	Component I	Component II
SES	.07	.08	-.05
Number of Siblings	.16*	.15*	-.10
Ordinal Status	.15*	.14*	-.13

TABLE 32

Correlations of SES, Number of Siblings, and Ordinal Status with Initial Separation Behavior and its Components

	SES	# Siblings	Ord. Status
Stanford Binet	-.09	-.11	-.06
Concept	-.10	.08	.11
PPVT	-.16*	-.20*	-.16*
Clowns	-.03	.07	.04
SPD	-.23**	-.13	-.13
Motor	-.08	.06	.09

TABLE 33

Correlations of Demographic Variables with Pre-tests

higher SES Subjects tended to score somewhat higher on the two tests involved.

Regarding the Number of Siblings, only the correlation with the PPVT was significant ($r = -.20$, $p < .05$), indicating that Subjects with fewer siblings tended to score higher on this test. Similarly, only the PPVT was found to relate to ordinal status at $p < .05$, with younger siblings tending to score lower.

Relationship of Demographic Variables to Later Adjustment to the Program

SES, Number of Siblings and Ordinal Status were correlated with the PAC Total and Component Scores and the Greeting Item. The coefficients resulting from this analysis are recorded in Table 34. Only the Greeting Item was found to correlate significantly with the three demographic variables, all at the .01 significance level. Thus, Subjects of lower socio-economic status, with more siblings, and occupying the position of younger sibling in the family tended to greet their Instructors in a more negative fashion upon returning to the pre-school after the Spring vacation recess.

Relationship of SES, Number of Siblings and Ordinal Status to Intellectual Areas: Program Impact

Partial correlations were obtained between the demographic variables and the intellectual post-tests, controlling for differences in pre-test scores and thus allowing an evaluation of the relationships regarding program impact on the

	Total	Component I	Component II	Greeting Item
SES	.14*	.08	.02	.23**
# Siblings	.02	-.04	-.02	.26**
Ordinal Status	-.008	-.07	-.05	.23**

TABLE 34

Relationship of SES, Number of Siblings and Ordinal Status to Later Adjustment to Pre-School - - PAC

relationships in the different areas. Of the tests included, only the Clowns test was significantly related to SES ($r = .29$, $p < .01$). This coefficient indicated that children of lower status tended to score higher in a task requiring persistence at a boring, pointless job, after initial differences in score were accounted for.

A change in the relationship between the Stanford Binet and Number of Siblings was found ($r = -.18$, $p < .05$), and between this variable and the PPVT ($r = -.35$) and the Clowns Test ($r = .23$); the two last coefficients were significant at $p < .01$. The negative coefficients indicated that high scorers on the Stanford Binet and PPVT post-measures (after initial differences were partialed out), had fewer siblings; the positive coefficient for the Clowns Test, on the other hand, showed that children from larger families tended to score higher on this measure.

Partial correlations for the same three tests, Stanford Binet, PPVT and Clowns, with Ordinal Status, were significant, the first two negatively at $p < .05$ and the last positively at $p < .01$. Thus, earlier born children tended to score higher on the Stanford Binet and the PPVT and lower on the Clowns Test.

The zero-order and partial correlations involved in this analysis are summarized in Table 35.

Socio-economic Status:	/Pre	/Post	Pre/Post	Partial r
Stanford Binet	-.09	-.13	.73	-.09
Concept	-.10	-.14	.55	-.10
PPVT	-.16	-.12	.63	-.03
Clowns	-.03	.26	.38	.29**
SPD	-.23	-.14	.37	-.06
Motor	.08	-.05	.33	-.09
Number of Siblings:				
Stanford Binet	-.11	-.20	.73	-.18*
Concept	.08	-.05	.55	-.11
PPVT	-.20	-.27	.63	-.35**
Clowns	.07	.24	.38	.23**
SPD	-.13	-.12	.37	-.08
Motor	.06	-.06	.33	-.04
Ordinal Status:				
Stanford Binet	-.06	-.15	.73	-.16*
Concept	.11	-.03	.55	-.11
PPVT	-.16	-.21	.63	-.15*
Clowns	.04	.25	.38	.25**
SPD	-.13	-.09	.37	-.04
Motor	.09	-.07	.33	-.04

TABLE 35

Partial Correlations Between Demographic Variables and Intellective Tests: Zero-order Correlations Used to Derive Partials

QUESTION 9:

The Dropouts

After the initial correlations between Separation Behavior and the pre-tests had been recalculated without the scores of the 12 Subjects who dropped out of the program in the course of the year, a substantial decrease in the size of the relationships with the Stanford Binet and the Clowns Test was noted (see Table 8). This decrease suggested that a restriction of range might have resulted from the removal of the 12 scores from the distribution, lowering the magnitude of the correlations for the smaller group. Therefore, the Separation Behavior Checklist scores of the dropouts were investigated to see if they were representative of the total distribution. Of the twelve Subjects, one had no Separation Behavior score because he entered the program too late to be observed, two scored below the mean, and nine above. Of these nine, three placed within one standard deviation above the mean, four between one and two standard deviations and two between two and three.

A Chi Square Analysis was performed with the cells defined by High and Low Levels of Separation Behavior and Dropping Out vs. Staying In. It resulted in $\chi^2 = 4.327$, $p < .05$. Thus, it appeared that the probability of remaining in a pre-school program of this type for the entire school season might be greater for children showing less disturbance at separating from their mothers than for those evidencing more intense separation behavior at the outset.

Furthermore, in the immediate situation, the possibility was indicated that the correlations emerging from the analysis based on the smaller sample size might have been more substantial if the full range of Separation Behavior scores had been available for inclusion.

Special Subjects

Another basis for investigating the relationship of differential progress in the program to Separation Behavior became available in the course of the school year. After several months had passed, it became apparent to those in charge of the program that certain students were having considerably more difficulty in making their way through the curriculum than others. It was thus decided to alter the usual procedure for these children by allowing them to remain with the same Instructor for twelve sessions instead of the usual six.

When the present Investigator learned of the group selected for this special treatment, the Separation Behavior scores for these Subjects were inspected, revealing that, in respect to this variable, only one placed below the mean and twelve above: five within one standard deviation above the mean, four between one and two standard deviations above the mean, and three between two and three standard deviations above the mean. A Chi Square Analysis was performed (High/Low Separation Behavior; Special/Regular Procedure), resulting in $\chi^2 = 11.995$, $p < .001$. This indicated that a fairly

substantial relationship existed between intensity of Separation Behavior at the outset and need for special help in dealing with the school program aims and requirements.

Subsequently, the PAC scores of the 13 "Special Procedure" Subjects were investigated to see if their difficulties in progressing through the curriculum were associated with an apparent lack of adjustment to the program after several months of attendance. Although 11 of the 13 PAC scores were above the mean, they were considerably less extreme than the Separation Behavior scores had been (ten in the first standard deviation above the mean). This could be an effect of regression toward the mean or due to the degree of sensitivity of the PAC measure in contrast to the subtlety and relative rarity of the behaviors available for observation at that point in the school year. Or it is possible that lack of adjustment had little to do with the poor progress of these Subjects.

At any rate, the Separation Behavior measure predicted with fair efficiency Subjects making such poor progress that they required special attention.

Data from the Harlem Center Longitudinal Study

Another way of looking at the interaction between intellectual and motivational variables was to compare the performances of the Subjects coming to the Center for training with those of a control group not attending the program. This information was available from the longitudinal study referred to earlier.

It would be logical to assume that the test areas showing the greatest difference between the experimental and control groups were those areas most sensitive to the pre-school experience.

A Multiple Analysis of Covariance was performed in which the influence of the pre-test scores on the respective tests was accounted for. This analysis resulted in significant differences between the experimental and control groups at p .05 for the Concept Test (F = 4.03), the PPVT (F = 4.34), the Clowns Test (F = 5.69) and the SPD Test (F = 4.91). On the Concept Test, the PPVT and the SPD Test, the experimental group scored higher; on the Clowns Test, the reverse was true. This measure of persistence at a pointless task was apparently tolerated better by Subjects not exposed to the program. Although the underlying reasons for this are not clear, one possibility is that the program gives the attendees a greater sense of goal direction and that those who are more goal directed are more easily bored if the goal is obscure or absent.

The F's for the Stanford Binet and the Motor Battery were less than 1 and not significant; therefore, these areas could be assumed to be less responsive to the pre-school program.

These comparisons between the school and control groups, indicating the areas of greatest difference in gain, may also relate to the Zigler & Butterfield (1968) position, that the differences found are associated with motivational rather than cognitive factors. That is, such a position would be supported

if those areas in which the greatest difference in gain were found between the school and control groups were the same areas in which the initial scores were most highly related to initial Separation Behavior for the school sample.

Table 36 summarizes the differences (F's as noted above) and correlations (for both the original sample and the ultimate sample after dropouts' scores were eliminated) involved in this comparison; all are listed in rank order. Appropriate Spearman rho's were computed between the ranked F's and r's. None of these calculations produced a significant correlation; thus, it is not possible to conclude from this evidence that gains in performance associated with participation in the pre-school program primarily reflect alterations in motivational factors.

F's (1)	r's (N = 121) (2)	r's (N = 109) (3)
Clowns 5.69*	Stan. Binet -.54**	Stan. Binet -.40**
SPD 4.91*	Clowns -.34**	Concept -.29**
PPVT 4.32*	Concept -.29**	PPVT -.23**
Concept 4.03*	PPVT -.23**	Clowns -.20*
Stan. Binet (n.s.)	SPD -.20*	SPD -.19*
Motor (n.s.)	Motor -.09 (n.s.)	Motor -.10 (n.s.)

** = p .01
* = p .05

TABLE 36

(1) F's resulting from Covariance Analysis contrasting School and Control Groups on Post-tests with influence of Pre-tests Accounted for.

(2) Correlations of Separation Behavior with Pre-tests for Original Sample of 121 Subjects.

(3) Correlations of Separation Behavior with Pre-tests for Sample of 109 Subjects after Dropouts' Scores were eliminated.

CHAPTER IV

CONCLUSIONS

From the foregoing data and analyses, one must conclude that the child who starts a pre-school program with a relatively good background of concept knowledge will tend to gain more from the program than his less knowledgeable colleague. Apparently, those subjects who are at a lower level at the outset do not profit enough from the added stimulation provided to catch up to or surpass the higher initial performers. (This, of course, does not imply a lack of gain for any group of subjects in respect to the intervention experience; it simply refers to differential gains made by the various groups.)

Furthermore, it has been shown that three-year-olds who have a good deal of difficulty in separating from their mothers to participate in the pre-school program, perform less well all along the line: their pre-test, post-test and gain scores are lower than those of subjects who adjust easily to the separation experience. This is in line with other findings in the literature (e.g., Sontag, Baker & Nelson (1958), and supports the idea of a negative association between attachment and exploratory behaviors (e.g., Ainsworth & Wittig (1970)).

Regarding the position that the changes resulting from early intervention programs are basically motivational rather than cognitive (Zigler & Butterfield (1968)), it is not upheld by the data of the present investigation. That is, within this situation, the High Separation Behavior Subjects

definitely did not gain more than the Lows on this variable.

Also, one might consider the High Separation Low Concept group as possibly having been underassessed initially due to discomfort in the testing situation. If they were actually underassessed and, if the pre-school experience eliminated or tempered the debilitating motivational factors involved, these subjects should have demonstrated the most gain in comparison to the other groups. However, the High Separation Low Concept subjects gained least in the Stanford Binet, Concept, Clowns and Motor areas, were second and third in two analyses in respect to gain on the PPVT, and were tied for last with the Low Separation Low Concept Group on the SPD.

Another possibility exists: that low test performance and high Separation Behavior may both simply reflect a degree of immaturity. It is certainly conceivable that children whose developmental rates are accelerated compared with their colleagues' may do better on tests and evidence less disturbance at separation just as a function of their greater maturity. If this were so, one might infer that the timing of intervention (at least this particular kind of intervention) ought to be varied, with children being included in enrichment programs on a developmental rather than a chronological basis.

However, it must be noted that the correlations between the various test scores and Separation Behavior varied from close to zero to .40. While many of them were significant with the N of 109 subjects, a maximum of 16% of the variance involved is accounted for, suggesting that low test performance

and difficulty at separation are more than dual indicators of low developmental level. This is shown more directly by the fact that many of the children in the sample scored low on the tests as well as on the Separation Behavior measure, and others were high on both kinds of variable.

It appears that, under the circumstances of this study, Separation Behavior has functioned more as a personality trait than a situational variable, if one considers a year's pre-school experience as a sequence of situations. That is, initial Separation Behavior was similarly related to concurrent measures (pre-tests), to later behavior (post-tests) and to estimates of progress in the program.

If it is as stable as it appears, and regardless of whether or how it is subsequently shown to be associated with Attachment Behavior, its antecedents are clearly worth pursuing because of their possible potential effects on the child's entire school career.

The current results have certain implications regarding the timing of intervention as well as its locus. That is, if at age three, those who perform less well at the outset of a pre-school program also <u>gain</u> less well than those subjects who perform at a relatively high level at the beginning, the effort to compensate for their initial deficit must be considered a failure. Perhaps still earlier intervention is indicated. But if gain in certain areas is significantly related to ease or difficulty of separation from the mother, it is certainly possible that a program which brings the two-year-old or younger subject into a school environment

out of his home and away from his mother may engender more intense separation difficulties for certain individuals and, along with them, even smaller relative gains. Thus, it might be profitable to explore other possibilities in terms of location and modus operandi: for example, training mothers to use enrichment materials and methods to provide pertinent stimulation for their children at home; or bringing small groups of youngsters with their mothers into a pre-school for participation in an enrichment program with a trained teacher.

It would also be worthwhile to consider some sort of training to enable a young child to overcome or avoid separation difficulties: desensitization training might start at an early age, or a stimulus generalization paradigm might be followed so that the child's confidence and ease in the presence of his mother might generalize to other adults, specifically teachers. Furthermore, interest in novel situations and stimuli, and exploratory behavior could be encouraged and reinforced in order to maximize the child's pleasure in the pre-school situation and perhaps to minimize his proximity seeking responses directed to the mother.

These are only a few of the possibilities; Sesame Street clearly illustrates the kind of coverage and appeal available through the mass media.

Finally, one must conclude that the intervention situation is truly complex, and the individuals who enter it, even more so. Not only circumstantial variables such as timing,

curriculum, etc. are important. A careful consideration of subject-related issues like the effects of separation behavior and initial level of knowledge is mandatory before starting children in early intervention programs.

A P P E N D I X

☐ ADAPTATION or
☐ ASSESSMENT

NAME _____
DATE _____ SESSION# _____
INSTRUCTOR _____

1. GENERAL ACTIVITY

a) child working in room, door closed, mother outside ---------- ☐
b) child playing freely in room, door closed, mother outside---------- ☐
c) child not working in room, attempting to leave, door closed ---------- ☐
d) child remains in room when mother visible at open door ---------- ☐
e) child remains in room when mother is in room ---------- ☐
f) some physical contact between mother and child ---------- ☐
g) child clings to mother ---------- ☐

2. DID CHILD LEAVE ROOM?

☐ For bathroom
☐ Other _____
☐ Did not leave

3. INTENSITY OF CRYING

☐ TANTRUM - includes motor behavior such as thrwwing self on floor.
☐ INTENSE CRYING - so hard and with such disturbance, child cannot speak nor attend to instructor speaking to him.
☐ MEDIUM INTENSITY - steady hard crying, less disturbance.
☐ LOW INTENSITY - quiet steady crying or intermittent louder crying
☐ NONE

4. ANGRY BEHAVIOR (hitting kicking, yelling, pushing, spitting, etc.)

☐ Toward Instructor
☐ Toward Mother
☐ Toward Equipment, Etc.

5. WITHDRAWING BEHAVIOR (thumbsucking, etc.)

☐ Constant
☐ Frequent
☐ Occasional
☐ None

6. RESTLESSNESS, HYPERACTIVITY

☐ Constant
☐ Considerable
☐ Occasional
☐ None

COMMENTS ON SESSION: _____

_____

_____

PRESCHOOL ADJUSTMENT CHECKLIST

☐ Training

☐ Discovery

Child_____

Date_____ Time_____

Instructor_____

1. How did child greet instructor? (check one alternative)
   a. very warm and enthusiastic, eager to join instructor _____
   b. somewhat eager..... _____
   c. neither eager nor reluctant..... _____
   d. somewhat reluctant..... _____
   e. very reluctant to join instructor,..... _____

1.A. How many times have you seen this child (in this sequence)?..... _____

2. General Activity

   a. child working (T) or playing (D) in room, door closed..... ☐

   Involvement
   (1) actively participating, absorbed, cooperating..... _____
   (2) medium participation, concentration, cooperation..... _____
   (3) passively accepting, attention wandering, not cooperating _____

   Affect
   (1) showing enjoyment..... _____
   (2) showing neither enjoyment nor negative affect..... _____
   (3) showing boredom, annoyance or distress..... _____

   b. child not working nor playing in room -- just there..... ☐

   c. child verbalizing wish to leave or attempting to leave..... ☐

   d. child out of room: for bathroom..... ☐
   for other reason (specify)..... ☐

3. Intensity of Crying

   a. Tantrum -- includes motor behavior such as throwing self on floor..... _____
   b. Intense crying -- so hard and with such distrubance, child cannot speak nor attend to instructor speaking to him..... _____
   c. Medium intensity -- steady hard crying, less disturbance..... _____
   d. Low intensity -- steady quiet crying or intermittent louder crying..... _____
   e. None..... _____

4. Angry Behavior
   Toward Instructor _____
   Toward Others (specify) _____
   Toward Equipment _____

5. Withdrawing Behavior
   a. Constant..... _____
   b. Frequent..... _____
   c. Occasional... _____
   d. None..... _____

6. Restlessness, Hyperactivity
   a. Constant..... _____
   b. Considerable _____
   c. Occasional.. _____
   d. None..... _____

Comments on session: _____

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