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A research project was conducted to study the effects of an 8-week prekindergarten enrichment program and of two 15-month preschool enrichment programs. Pretest and posttest scores of experimental and control kindergarten children (a sample of 100 out of 1,000 subjects) showed that both groups made significant gains in all ability categories o f the Caldwell Preschool Inventory (CPI). The experimental group made significantly greater gains in numerical concept activation. In the preschool study (100 children), subjects in both experimental groups made greater gains in verbal ability (Peabody Picture Vocabulary Test) than the control group. On the CPI, children in one program gained in areas of personal social responsiveness and sensory concept activation, while children in the second program gained in both areas of concept activation, sensory and numerical. Preschool children in both programs made greater achievement gains than did control children. It is possible that greater motivation to learn was fostered by the enrichment program. About 2/3 of this report is made up of appendixes of tables and of forms used in the study. (MS)

PRE-SCHOOL RESEARCH AND EVALUATION PROJECT

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INTRODUCTION

The preschool research and evaluation project was designed as a study of culturally disadvantaged children of preschool age, who were participating in instructional programs initiated in Oklahoma City, Oklahoma, during the summer of 1965. These programs consisted of one eight-weeks summer program for pre-kindergarten children, serving approximately 1000 children, and two fifteen-months programs for younger children, serving approximately 100 children.

The research concerned with the pre-kindergarten program for five year old children and the research concerned with the preschool programs for three and four year old children were similar in design but were treated as separate studies. Both were essentially descriptive and exploratory in nature. Information about personal-social characteristics and home background was obtained for the children in both studies; and various tests of intelligence and achievement provided data for a description of the children's progress during the time interval of the research. Four tests designed to measure characteristics related to creative expression were also administered to the children. For optimal development, as children acquire knowledge and skill, they must use these in creative learning; and for disadvantaged children, who enter school deprived in basic skills and knowledge, the probability is that they may also lack the freedom and/or ability to learn creatively.

The following illustrative and descriptive data are appended to this report: (A) Tables of descriptive data and statistical analyses. (B) Descriptions of the tests used in the research. (C) The Interview Schedule used in obtaining personal-social and home background information. (D) Descriptions of the enrichment programs. (E) Edited anecdotal records of two children, one from each of the preschool enrichment programs for three and four year old children. (F) Examples of profile bar graphs which indicate the relative position of a child in the research group at the time of pretest and posttest.

EVALUATION OF PRE-KINDERGARTEN ENRICHMENT PROGRAM

FOR FIVE YEAR OLD CHILDREN

Approximately 1000 children were enrolled in a pre-kindergarten enrichment program in Oklahoma City during the summer of 1965. The children attended 21 different schools, all located in areas designated as culturally deprived. From one classroom in each school, five children were selected randomly for inclusion in the research; and the planned testing was completed with approximately 90 of these children during the last weeks of the enrichment program (July 1965). These children constituted the experimental group.

A control group of children was selected early in the school year (October 1965). These children were selected from the kindergarten classrooms in which the experimental children were enrolled. Children who matched the experimental group in age and sex, but who had not attended the summer enrichment program, were selected for the control group. The initial testing for these children was done early in the kindergarten year and was less extensive than the testing done with the experimental children.

Retesting of both groups of children, experimental and control, took place during the last two months of the school year. By that time the number of children still available for the research was unavoidably reduced, largely because of families moving from the area.

Comparison of Experimentals

with the Population

All of the children participating in the pre-kindergarten enrichment program were tested with two scales which were a part of the national Head Start research program. These were the Behavior Inventory and the Caldwell Preschool Inventory. The results of these two inventories and personal-social information, available for most of the children, were used as the basis for a comparison of the experimental group with the total population. This comparison was made in order to determine whether the sample drawn at the time of pretesting was representative of the total group of children enrolled in the enrichment program. Neither test results nor personal-social information was available for all children; nevertheless, for each variable considered, there were data for approximately 90 children in the sample and approximately 900 children in the total population.

Personal-Social and Home Background Information

The sample group of children was compared with the remainder of the population on the following variables: age, sex, race, economic category of the family, status of the father (i.e., in the home or not), and number of children in the family. The results of Chi-square analyses are presented in Table I. On only two variables, race and economic category, were significant differences noted between the sample and the population.

The ratio of Negroes to other races was significantly smaller in the sample than in the population, ($\chi^2 = 9.83$; $p<.01$). This disparity is

understandable inasmuch as only one classroom was sampled in each school and "all Negro" schools had more multiple classes than did "mixed" schools.

In the economic category, a significant difference was also found between the sample and the population, ($\chi^2 = 12.38$; $p < .02$). The ratio of parents receiving aid for dependent children (ADC) was significantly smaller for the sample than for the population. However, when ADC parents were combined in the category with parents whose income was less than $3000, no significant differences were observed, therefore, even though state aid in the sample was not representative, the family income in the sample was representative of the population.

Behavior Inventory

The Behavior Inventory, which was a part of the Head Start research and evaluation program, consists of 50 statements of child behavior. A child's teacher completes the Inventory by checking the extent to which each statement is descriptive of the child: (++) very much like, (+) somewhat like, (-) very little like, and (--) not at all like. For the purpose of comparing the sample with the remainder of the population, a simple frequency distribution by response categories was used as the basis for a Chi-square analysis of the Behavior Inventory data. This analysis is presented in Table II. No significant differences were found; and in terms of this rather crude analysis of Behavior Inventory data, the sample was representative of the population.

Caldwell Preschool Inventory

The Caldwell Preschool Inventory, also a part of the Head Start research and evaluation program, consists of items representative of the following ability categories: I. Personal Social Responsiveness; II. Associative Vocabulary; III. Concept Activation: Numerical; and IV. Concept Activation: Sensory. For the purpose of comparing the sample with the remainder of the population, a simple frequency distribution by ability categories (subtests) was used as the basis for a Chi-square analysis of the Inventory data. This analysis is presented in Table III. No significant differences were found; and in terms of the abilities measured by the Caldwell Preschool Inventory, the sample was representative of the population.

Analysis of Test Data for Experimental and Control Groups

The Caldwell Preschool Inventory was the only test administered on a pretest-posttest basis to both groups of children, the experimental and the control. Approximately one fifth of these children obtained a maximum score on at least one of the ability categories (subtests) at the time of the pretest. This posed a serious problem inasmuch as limits of the Inventory for these particular children would have distorted any study of the changes which occurred during the kindergarten year. To eliminate this problem, only those children whose test scores were 75 or less were retained in the study. (The highest possible score on the Inventory, as used in this research, was 97.) Thus, the final sample consisted of 45 children in the experimental group and 34 children in the control group.

The Preschool Inventory is essentially an achievement test and should indicate gains relative to increased maturity; therefore, an increase in all scores was expected during the kindergarten year. A Chi-square analysis of the changes in scores from pretest to posttest indicated significant increases in all of the ability categories for the experimental and control groups combined. For the Inventory as a whole, $\chi^2 = 34.856$; $p<.001$. (See Tables IV and V.)

A major question still to be answered was whether the experimental children made greater gains than did the control children. For the Inventory as a whole, the pretest-posttest gain for the experimental group was +16, and for the control group it was +10. A Chi-square analysis indicated that the experimental group made significantly greater gains than did the control group, ($\chi^2 = 4.757$; $p<.05$). An analysis of the subtest data indicated a difference between the two groups in only one ability category. The experimental children made significantly greater gains in numerical concept activation than did the control children, ($\chi^2 = 6.084$; $p<.02$). Differences in Associative Vocabulary approached significance with the experimental children tending to make the greater gains, ($\chi^2 = 3.515$, $p<.10$. See Table VI).

Two additional tests were administered to the experimental and control children at the end of the kindergarten year. These were the Lee Clark Reading Readiness Test and the Peabody Picture Vocabulary Test. There was no significant difference in the performance of the two groups of children on either of these tests. (See Table VII.)

Creativity Tests Administered to the Experimental Children

Four tests designed to measure characteristics related to creative expression were administered to the children in the experimental group on a pretest-posttest basis. Testing included the measurement of originality, curiosity, freedom to use conforming and nonconforming behavior, and willingness to try difficult tasks. Pretest and posttest data are presented in Table VIII, and descriptions of the four instruments are presented in Appendix B.

On each of the creativity tests, the scores for some of the children changed markedly from pretest to posttest; however, there was no significant change for the group as a whole. For example, on the test measuring freedom to use conforming and nonconforming behavior, 23 children remained the same or became more free, and 22 children became less free.

Summary

1. Significant gains were made in all ability categories of the Caldwell Preschool Inventory by experimental children who had participated in a pre-kindergarten enrichment program and by control children who had not participated in the enrichment program. In one ability category, that of numerical concepts, the experimental children made significantly greater gains than did the control children; and in associative vocabulary, the experimental children tended to make greater gains.

2. There was no significant difference in the performance of the experimental and control children on the Lee Clark Reading Readiness Test at the end of the kindergarten year.

3. There was no significant difference in the performance of the experimental and control children on the Peabody Picture Vocabulary Test at the end of the kindergarten year.

4. Tests measuring originality, curiosity, freedom to use conforming and nonconforming behavior, and willingness to try difficult tasks, were administered to the experimental children on a pretest-posttest basis. On each of these tests, the scores for some children changed markedly during the kindergarten year; but there was no significant change for the group as a whole.

EVALUATION OF PRESCHOOL ENRICHMENT PROGRAMS

FOR THREE AND FOUR YEAR OLD CHILDREN

Approximately 100 children were enrolled in two fifteen-months preschool enrichment programs for children three and four years old, initiated in Oklahoma City during the summer of 1965. One program was operated by the public school system (Program-PS), and the other program was privately operated and included Montessori training (Program-M). Both programs served an area of Oklahoma City designated as culturally deprived. The children enrolled in these two enrichment programs constituted two experimental groups. Control children, not in an enrithment program, were selected from an adjacent urban area and a more rural area, both of which were designated as culturallly deprived.

During the fifteen months covered by this research report, some children in each of the groups were lost to the study. Family mobility accounted for many of the losses; but most interesting was the fact that parents of control children became interested in the enrichment programs and actually enrolled their children in privately operated groups. Automatically, these children had to be eliminated from the present research.

The initial testing of the three and four year old children took place during the summer and early fall of 1965. In this stage of the research, the number of children tested included 45 children in Program-PS, 47 children in Program-M, and 49 children in the control group.

Personal-social characteristics and home background information was obtained during home interviews. These interviews were conducted throughout the year and ultimately provided data for 36 children in Program-PS, 37 children in Program-M, and 31 children in the control group. The number of children retained in the research was reduced accordingly.

The posttest portion of the research began in May 1966 and was completed in approximately ten weeks. During this stage of the work, still more children, those who could not be located for retest, were lost to the research. The final number of children for whom complete pretest and posttest data were available, included 33 children in Program-PS, 36 children in Program-M, and 28 children in the control group.

Brief descriptions of the two enrichment programs are presented in Appendix D, and progress reports for two specific children are presented in Appendix E.

Personal-Social and

Home Background Information

Date related to personal-social characteristics and home background information for children in the three groups, two experimental and one control, are presented in Table IX. Comparisons among the three groups were made using Chi-square analyses.

Sex. There was no significant difference in the numbers of boys and girls in the three groups.

Number in Family. Differences in the number of family members in the three groups approached significance, (χ^2 = 11.299; p<.10). A comparison of the two experimental groups indicated that the children in Program-M were from families with fewer members than were the children in Program-PS, (χ^2 = 8.33; p<.05).

Parents in Home. Data concerning the presence of both parents in the home or only the mother, indicated a significant difference among the three groups. The father was absent in more homes in Program-M than in the other two groups, (χ^2 = 11.172; p<.01).

Economic Category. Significant differences existed among the three groups, (χ^2 = 13.136; p<.02). Fewer families with incomes over $3000 were represented in Program-M, and fewer families receiving welfare assistance were represented in the control group.

Source of Income. The number of families receiving some welfare assistance was significantly greater in the two experimental groups than in the control group, (χ^2 = 9.545; p<.01). Differences between the urban and rural families in the control group may account for this difference.

Mothers' Occupation. No significant difference among the groups was indicated by the mothers' occupations.

Fathers' Occupation. No valid data was available for this item.

Mothers' Education. The mothers of children in Program-M had significantly more formal education than did the mothers of children in the other two groups, (χ^2 = 10.286; p<.05).

Fathers' Education. No significant difference among the three groups was indicated by the fathers' education. Almost half of the fathers in the three groups were high school graduates.

Type of Dwelling. For all three groups the majority of the families lived in either a duplex or a house. Significantly more of the children in Program-M lived in a duplex, (χ^2 = 12.362; p<.02).

Home Ownership. Significantly more of the children in the control group came from families who owned or were buying their own homes, (χ^2 = 17.459; p<.001). This difference is accounted for by a significant difference between the urban and rural families represented in the control group. Most of the rural families owned or were buying their homes.

Age of Dwelling. The homes of the children in the two experimental groups were significantly older than the homes of the children in the control group, (χ^2 = 12 141; p<.01). An examination of the differences which existed within the control group, indicated that the homes in the rural area were newer than those in the urban area. (This difference within the control group was significant beyond the .0001 level!)

Exterior Building Material. No significant difference among the three groups was indicated in this category.

Number of Rooms. No significant difference among the three groups was indicated in this category. Some families represented in each group lived in two-room dwellings and some lived in homes with six or more rooms.

Condition of the Living Area. The condition of the living area in the home was judged as average or above, below average, or inferior. In this category, significantly more of the control group homes were judged as inferior, ($\chi^2 = 10.975$; $p<.05$). Again, a comparison of the urban and rural homes in the control group indicated that the rural homes were responsible for this significant difference. The urban homes were similar to those of the two experimental groups.

Care of Home. In this category, the homes were again judged as average or above, below average, or inferior. A significant difference among the groups indicated that more homes of the control children were judged inferior insofar as housekeeping standards were concerned, ($\chi^2 = 14.836$; $p<.01$). Differences between the urban and rural homes in the control group again indicated that the urban homes were similar to those of the two experimental groups and the rural homes were less well cared for.

Throughout this comparison of home background information for the three groups, differences within the control group were apparent. The rural families were markedly different from the other families, experimental and control. This was particularly true in categories related to home living conditions. In addition, fewer of these families were receiving welfare aid. These differences are indicative of weaknesses in the selection of the control group, and they may or may not have a bearing on the children's performance on the various research tests.

Comparison of Experimental and Control Groups on the Basis of Pretest Data

Tests which can be described as intelligence tests, achievement tests, and tests measuring characteristics related to creative expression, were administered to the three groups of children. With the exception of the Stanford-Binet Intelligence Test, the initial tests were administered during the summer and early fall of 1965, and the administration of the posttests was completed ten to twelve months later. The medians and ranges of pretest and posttest scores are presented in Tables X, XI, and XII. (Scores for Program-PS are in Table X; scores for Program-M are in Table XI, and scores for the control group are in Table XII.)

In order to determine whether any significant differences existed among the three groups of children when the research was initiated, pretest data for the three groups were analyzed. Chi-square results for these analyses are presented in Table XIII.

Age. At the time of pretesting, the median age for the children in Program-M was 3 years 8 months; while the median age for the children in Program-PS and the children in the control group was 4 years 1 month; nevertheless,

statistically, there was no significant difference in the distribution of children by age in these three groups, (χ^2 = 2.336; n.s.).

Intelligence Tests. Results of the Stanford-Binet Intelligence Test indicated a wide range of IQ's for the children in each of the three groups, and a median IQ of 97 for Program-PS, 98 for Program-M, and 94 for the control group. The IQ's for the three groups were not significantly different. Similarly, the pretest scores for the Peabody Picture Vocabulary Test were essentially the same for the three groups.

Caldwell Preschool Inventory. Essentially, the Preschool Inventory is an achievement test consisting of subtests which measure the following ability categories: (I) Personal-Social Responsiveness; (II) Associative Vocabulary; (III) Concept Activation: Numerical; and (IV) Concept Activation: Sensory. For two of these subtests there were significant differences in the scores of the experimental and control groups. The children in Program-M scored significantly lower in Associative Vocabulary, (χ^2 = 7.543; $p<.05$); and they also scored significantly lower in numerical concept activation, (χ^2 = 14.419; $p<.001$). In view of this significant difference in pretest scores, a comparison of posttest scores must be interpreted with caution.

Creativity Tests: The four tests designed to measure characteristics related to creative expression include measurements for originality, curiosity, freedom to use conforming and nonconforming behavior, and willingness to try difficult tasks. An analysis of the pretest scores for the three groups of children indicated no significant differences in any of these characteristics.

Comparison of Experimental and Control Groups on Posttest Data

The Peabody Picture Vocabulary Test, the Caldwell Preschool Inventory, and the four creativity tests were administered on a pretest-posttest basis. Pretest scores showed differences among the groups on only two of the Preschool Inventory subtests. However, the posttest scores showed major differences on the vocabulary test and on the Preschool Inventory, but not on the creativity tests.

Posttest scores on the Peabody Picture Vocabulary Test (raw scores) were 44 for Program-PS, 39 for Program-M and 36 for the control group. A Chi-square analysis indicated a significant difference among the three groups, (χ^2 = 16.449; $p<.001$).

Median posttest scores for the Preschool Inventory were 64 for Program-PS, 55 for Program-M, and 49 for the control group. A Chi-square analysis indicated a significant difference among the groups, (χ^2 = 10.963; $p<.01$). On each subtest, except numerical concept activation, differences among the groups were also significant. For this one subtest, the apparent similarity of the three groups resulted from marked differences in score changes from pretest to posttest.

Changes in Scores from Pretest to Posttest

The changes in scores from pretest to posttest were examined in two ways.

(1) Changes for each group were examined without taking into consideration the changes of individual children. For example, on the vocabulary test, the median pretest score for children in Program-PS was 26 and their median posttest score was 44. The group as a whole changed significantly, (χ^2 = 16.298; $p<.001$). On the other hand, for this same group, the actual changes in score for individual children ranged from 00 to +32, with a median change of +22. The actual changes of individual children are not indicated by the median scores for the group.

(2) Direct comparisons of the score changes which occurred in each of the three groups was possible by examining the changes made by individual children. For example, on the vocabulary test, the median change for individual children in Program-PS was +22, for children in Program-M was +16, and for the children in the control group was 00. A comparison of the three groups, using the score changes of individual children, indicated that there was no significant difference between the two experimental groups, but that each of these groups was significantly different from the control group. (For Program-PS, χ^2 = 21.861; $p<.001$; and for Program-M, χ^2 = 13.331; $p<.001$.)

The Chi-square analysis of changes in scores from pretest to posttest by groups is presented in detail in Table XIV. Medians and ranges of score changes for individual children by groups are presented in Table XV; and the Chi-square analysis of these changes is presented in detail in Table XVI.

Peabody Picture Vocabulary Test

Pretest-posttest scores on the vocabulary test indicated gains for both experimental groups, significant at the .001 level, and no change for the control group. Changes in the scores of individual children were significantly greater in the two experimental groups than in the control group.

Caldwell Preschool Inventory

In total score and in all subtest scores, increases from pretest to posttest were significant at the .01 or .001 level for both experimental groups. For the control group, there were no significant changes, except in associative vocabulary (Subtest II) in which the change was significant at the .001 level. In this one ability category, score changes for all three groups were similar. This finding was supported in an analysis of the changes of individual children, which indicated no real difference between the two experimental groups nor between the experimental groups and the control group insofar as associative vocabulary was concerned.

In the area of sensory concept activation (Subtest IV), the two experimental groups made gains which were significant at the .001 level, while the control group made no gains.

Creativity Tests

Chi-square analysis of changes in scores on the creativity tests indicated significant changes for originality, curiosity, and freedom to use conforming and nonconforming behavior, but not for willingness to try difficult tasks. An examination of the pretest and posttest scores indicated significant gains on the originality test for the two experimental groups, but no change for the control group. On the curiosity test the reverse was true with a significant change for the control group but not for the two experimental groups. On the conformity-nonconformity test, the children in Program-M made the significant change, and the children in Program-PS made no change.

The differences in pretest and posttest scores which were evident on some of the creativity tests must be interpreted with extreme caution. On all of the tests there were some children in each group who showed no change in score from pretest to posttest and other children who showed extremely large changes in score.

The data derived from the four creativity tests do not offer any conclusive evidence about the encouragement of creative expression, but these data do serve to raise questions and suggest hypotheses.

Summary

1. Two groups of three and four year old children who participated in preschool enrichment programs were compared with a control group of children not in an enrichment program. An analysis of home background information for these three groups indicated that approximately half of the control children, those living in a rural area, had markedly different home living conditions than did the other children. These differences are indicative of weaknesses in the selection of the control group. Such differences do require that the research be interpreted with caution.

2. At the time of pretesting, there was no statistically significant difference in the ages of the children in the experimental and control groups.

3. An analysis of the results of all pretests indicated that there were no differences among the three groups of children at the time of pretesting, with the exception of two ability categories measured by the Caldwell Preschool Inventory. The children in one experimental program, Program-M, did score significantly lower in Associative Vocabulary (Subtest II) and in Numerical Concept Activation (Subtest III). This difference in initial ability requires that posttest results be interpreted with caution. In all other areas of achievement and intelligence which were measured, and in the characteristics related to creative expression, there were no differences among the three groups.

4. An analysis of posttest scores indicated marked differences among the three groups in all areas of intelligence and achievement, except in one ability category, Numerical Concept Activation, in which the Program-M children had been significantly handicapped at the time of pretesting.

No significant differences among the groups were evident from the posttest scores on the creativity measures; however, the scores on the Originality test tended to be higher than at the time of pretesting.

5. Separate analyses of the pretest-posttest data for the three groups indicated that the two experimental groups made significant gains in all areas of intelligence and achievement; whereas the control group made a significant gain in only one area, that of Associative Vocabulary (Subtest II of the Caldwell Preschool Inventory).

6. An analysis of the pretest-posttest scores on the creativity measures indicated a different pattern for each of the three groups, with the exception of Willingness to Try Difficult Tasks, in which there was no significant change for any group.

The children in Program-PS showed a gain in Originality, tended to gain in Curiosity but not significantly, and showed no change in Conformity-Nonconformity.

The children in Program-M showed a significant gain in Originality, no change in Curiosity, and were significantly less free in their use of conforming and nonconforming behavior.

The children in the control group showed no gain in Originality. (The difference between the control and experimental children in this area is of

particular interest because the Originality test does require verbal responses even though scores in originality are not related to actual verbal ability.) The control children made a significant gain in Curiosity. (This gain is of particular interest because the children in the two experimental groups did not show a gain in this area.) The control children tended to show less freedom in their use of conforming and nonconforming behavior than they did at the time of pretesting.

In summary, the two experimental groups made gains in Originality and the control group did not; the control group made gains in Curiosity and the experimental groups did not; in Conformity-Nonconformity, one experimental group changed significantly and the other did not; and in Willingness to Try Difficult Tasks, none of the three groups showed a change from pretest to posttest.

7. The changes in the scores of individual children from pretest to posttest provided another means of comparing the experimental and control groups.

Children in both experimental groups made significantly greater gains in verbal ability (PPVT) than did the children in the control group.

On the Caldwell Preschool Inventory, the children in Program-PS made significantly greater gains than the control children Personal-Social Responsiveness (Subtest I) and in Sensory Concept Activation (Subtest IV); and the children in Program-M made significantly greater gains than the control children in both areas of Concept Activation, Numerical and Sensory (Subtests III and IV).

In none of the creativity measures were any differences among the three groups apparent when changes in the scores of individual children were examined.

A comparison of the two experimental groups indicated no significant differences in any of the areas in which the children were tested.

SUMMARY AND IMPLICATIONS

The preschool research and evaluation project was designed as a study of culturally disadvantaged children of preschool age, who were participating in instructional programs initiated in Oklahoma City, Oklahoma, during the summer of 1965. These programs consisted of one eight-weeks summer program for pre-kindergarten children, serving approximately 1,000 children, and two fifteen-months programs for younger children, serving approximately 100 children.

The research concerned with the pre-kindergarten program for five year old children and the research concerned with the preschool programs for three and four year old children were similar in design but were treated as separate studies. Both were essentially descriptive and exploratory in nature. Information about personal-social characteristics and home background was obtained for the children in both studies; and various tests of intelligence and achievement provided data for a description of the children's progress during the time interval of the research. Four tests designed to measure characteristics related to creative expression were also administered to the children. For optimal development, as children acquire knowledge and skill, they must use these in creative learning; and for disadvantaged children, who enter school deprived in basic skills and knowledge, the probability is that they may also lack the freedom and/or ability to learn creatively.

Pre-Kindergarten Enrichment Program

An analysis of pretest and posttest scores of experimental and control kindergarten children showed that both groups made significant gains in all ability categories of the Caldwell Preschool Inventory; however, in numerical concept activation, the experimental group made significantly greater gains than did the control group; and in associative vocabulary, the experimental group tended to make greater gains.

On the Lee Clark Reading Readiness Test, and on the Peabody Picture Vocabulary Test, both of which were administered only at the end of the kindergarten year, there was no difference in the performance of the two groups.

On the tests designed to measure characteristics related to creative expression, which were administered only to the experimental group, the scores of some children changed markedly from pretest to posttest, but there was no significant change for the group as a whole.

Enrichment Programs for Three and Four Year Old Children

Two groups of three and four year old children who participated in preschool enrichment programs were compared with a control group of children not in an

enrichment program. Pretest scores showed that the groups were comparable in all areas of intelligence, achievement and creative expression, except for two areas in which the children in one enrichment program were significantly handicapped. This handicap was reflected in posttest scores; and therefore, posttest scores alone were of little value in comparing the three groups.

Separate analyses of the pretest-posttest data for the three groups indicated that the two experimental groups made significant gains in all areas of intelligence and achievement; whereas the control group made a significant gain in only one area, that of associative vocabulary (Subtest II of the Caldwell Preschool Inventory).

On the creativity measures, a different pattern of change existed for each of the three groups of children. The two experimental groups made gains in originality and the control group did not; the control group made gains in curiosity and the experimental groups did not; in freedom to use conforming and nonconforming behavior, one experimental group changed significantly and the other did not; and in willingness to try difficult tasks, none of the three groups showed a change from pretest to posttest.

Changes in the pretest-posttest scores of individual children in the three groups presented another picture. A comparison of the two experimental groups indicated no significant differences in any areas in which the children were tested; but there were differences between the experimental groups and the control group.

(1) Children in both experimental groups made significantly greater gains in verbal ability (PPVT) than did the children in the control group. (2) On the Preschool Inventory, the children in Program-PS made significantly greater gains in personal-social responsiveness and in sensory concept activation; and the children in Program-M made significantly greater gains in both areas of concept activation, sensory and numerical. (3) In none of the creativity measures were any differences among the groups apparent when changes in the scores of individual children were examined, i.e., in each group there were children who made gains or losses and others who remained the same from pretest to posttest.

Implications

At the end of the kindergarten year, children who had been in the pre-kindergarten enrichment program demonstrated significantly greater achievement in one ability category, that of numerical concept activation. There is the possibility that this difference resulted from greater motivation to learn, acquired during the enrichment program. This is a quality which enrichment programs hope to encourage; and this is an area in which extensive research is needed.

Definite evidence of the value of early enrichment programs was provided by the fact that the three and four year old children in Program-PS and Program-M made significantly greater gains than did the control children in all areas of achievement that were tested.

Changes in characteristics related to creative expression presented a rather complex picture. Changes which occurred in the two enrichment programs were not the same, and the control children made some changes which the experimental children did not make.

These findings indicate that the acquisition of knowledge and skills may or may not be accompanied by changes in characteristics which enable a child to learn creatively and to express himself creatively. More extensive research studies are needed of the relationship between creative expression and factors affecting children in their early years.

Many questions arise as one speculates about the findings of the present study. For example: (1) Are there qualities in so-called "deprivation" that encourage curiosity? The control children gained in this area. (2) How can a child become less free in his use of conforming and nonconforming behavior and yet increase in originality? For one group this was the pattern. (3) Do the influences which encourage the development of certain characteristics related to creative expression affect the child adversely in other areas?

The relationship between subjective and objective pictures of young children should serve to raise questions which will prompt research designed to increase our understanding of the forces in early childhood which enable a child to develop to his greatest potential, to live creatively, and to adapt effectively in this rapidly changing world.

APPENDIX A

TABLE I

PERSONAL-SOCIAL AND HOME BACKGROUND INFORMATION: CHI-SQUARE ANALYSIS OF DATA FOR THE EXPERIMENTAL GROUP AND THE TOTAL GROUP OF CHILDREN IN THE PRE-KINDERGARTEN PROGRAM*

Variable	Distribution of Sample	χ^2	p
Age	N=89		
Below 5:0	30	0.93	n.s.
5:0 and above	59		
Sex	N=89		
Male	43	3.51	< .10
Female	46		
Race	N=89		
Negro	54	9.83	< .01
Other	35		
Economic Category	N=82		
Welfare	11	12.38	< .02
Below $3000	32		
$3000-$3999	16		
$4000-$4999	12		
$5000 or above	11		
Status of Father	N=85		
In Home	63	0.06	n.s.
Not in Home	22		
Number of Children	N=83		
1	04	2.86	n.s.
2-3	27		
4-6	32		
7-9	16		
10 or more	04		

*In the Chi-square analysis, the sample was compared with the remainder of the population in the pre-kindergarten program.

TABLE II

BEHAVIOR INVENTORY: CHI-SQUARE ANALYSIS OF FREQUENCY DISTRIBUTION BY RESPONSE CATEGORIES FOR THE EXPERIMENTAL GROUP AND THE TOTAL GROUP OF CHILDREN IN THE PRE-KINDERGARTEN PROGRAM*

Response Categories and Frequency Intervals	Sample Group	Remainder of Population	χ^2	p
Very Much Like				
01-05	24	212	4.083	n.s.
06-11	28	320		
12-17	29	189		
18+	07	064		
Somewhat Like				
01-08	10	104	4.745	< .20
09-14	20	247		
15-20	33	273		
21+	25	161		
Very Little Like				
01-08	16	123	0.566	n.s.
09-14	28	265		
15-20	29	248		
21+	15	149		
Not at All Like				
01-05	21	205	2.302	n.s.
06-11	39	285		
12-17	20	214		
18+	08	081		

*In the Chi-square analysis, the sample was compared with the remainder of the population in the pre-kindergarten program.

TABLE III

CALDWELL PRESCHOOL INVENTORY: CHI-SQUARE ANALYSIS OF FREQUENCY DISTRIBUTION BY SUBTESTS FOR THE EXPERIMENTAL GROUP AND THE TOTAL GROUP OF CHILDREN IN THE PRE-KINDERGARTEN PROGRAM*

Inventory	Sample Group	Remainder of Population	χ^2	p
Subtest I				
Above median	31	255	1.551	< .20
At or Below Median	58	356		
Subtest II				
Above Median	21	152	0.067	n.s.
At or Below Median	68	459		
Subtest III				
Above Median	35	247	0.042	n.s.
At or Below Median	68	459		
Subtest IV				
Above Median	43	271	0.498	n.s.
At or Below Median	46	340		
TOTAL				
Above Median	38	272	0.100	n.s.
At or Below Median	51	339		

*In the Chi-square analysis, the sample was compared with the remainder of the population in the pre-kindergarten program.

TABLE IV

CALDWELL PRESCHOOL INVENTORY: DATA FOR EXPERIMENTAL AND CONTROL GROUPS OF KINDERGARTEN CHILDREN

Inventory Subtest	Experimental (N=45)		Control (N=34)	
	Median	Range	Median	Range
I. Personal-Social Responsiveness				
Pretest	22	15 to 26	21	13 to 24
Posttest	24	12 to 26	23	13 to 26
Change	+02	-07 to +08	+03	-04 to +10
II. Associative Vocabulary				
Pretest	15	03 to 25	15	07 to 23
Posttest	20	10 to 30	19	13 to 25
Change	+06	-04 to +21	+04	-06 to +10
III. Concept Activation: Numerical				
Pretest	09	02 to 19	11	00 to 17
Posttest	13	07 to 19	12	06 to 18
Change	+04	-06 to +13	+02	-05 to +10
IV. Concept Activation: Sensory				
Pretest	15	05 to 20	16	09 to 21
Posttest	19	13 to 22	20	14 to 22
Change	+05	-02 to +11	+03	00 to +11
TOTAL				
Pretest	62	39 to 75	63	38 to 75
Posttest	78	39 to 93	75	37 to 88
Change	+16	-04 to +33	+10	-03 to +27

TABLE V

CALDWELL PRESCHOOL INVENTORY: CHI-SQUARE ANALYSIS OF PRETEST AND POSTTEST DATA FOR KINDERGARTEN CHILDREN

(N = 79)

Inventory	Median Score		χ^2	p
	Pretest	Posttest		
Subtest I	21	24	10.164	< .01
Subtest II	15	20	14.584	< .001
Subtest III	10	13	16.686	< .001
Subtest IV	15	20	49.208	< .001
TOTAL	63	76	34.856	< .001

TABLE VI

CALDWELL PRESCHOOL INVENTORY: CHI-SQUARE ANALYSIS OF DATA FOR EXPERIMENTAL AND CONTROL GROUPS OF KINDERGARTEN CHILDREN

Inventory	Median Change		χ^2	p
	Experimental (N=45)	Control (N=34)		
Subtest I	+02	+03	0.528	n.s.
Subtest II	+06	+04	3.515	< .10
Subtest III	+04	+02	6.084	< .02
Subtest IV	+05	+03	2.549	< .20
TOTAL	+16	+10	4.757	< .05

TABLE VII

READING READINESS AND VERBAL ABILITY: CHI-SQUARE ANALYSIS OF DATA FOR EXPERIMENTAL AND CONTROL GROUPS OF KINDERGARTEN CHILDREN

	Experimental (N=45)	Control (N=34)	χ^2
Lee Clark Reading Readiness			
Median	46	41	1.649
Range	13-60	16-57	(n.s.)
Peabody Picture Vocabulary Test			
Median	53	50	0.354
Range	34-63	30-63	(n.s.)
Age in months			
Median	70	70	0.101
Range	64-78	66-82	(n.s.)

TABLE VIII

CREATIVITY TESTS: PRETEST AND POSTTEST DATA FOR EXPERIMENTAL GROUP OF KINDERGARTEN CHILDREN

(N = 45)

Creativity Test	Median	Range
Originality		
Pretest	15	06 to 34
Posttest	15	07 to 32
Change	+01	-20 to +15
Curiosity - Preference for the Novel		
Pretest	08	00 to 20
Posttest	10	00 to 20
Change	+02	-20 to +20
Conformity-Nonconformity		
Pretest	+12	-40 to +40
Posttest	+12	-40 to +40
*Change	00	-18 to +42
Willingness to Try Difficult Tasks		
Pretest	17	03 to 36
Posttest	19	06 to 32
Change	00	-18 to +23

*On the Conformity-Nonconformity test, 23 children remained the same or became more free, and 22 children became less free.

TABLE IX

PERSONAL-SOCIAL AND HOME BACKGROUND INFORMATION: CHI-SQUARE ANALYSIS OF DATA FOR TWO EXPERIMENTAL GROUPS AND ONE CONTROL GROUP OF PRESCHOOL CHILDREN

Variable	Program-PS	Program-M	Control	χ^2	p
Sex:					
Male	19	18	13	0.790	n.s.
Female	17	19	18		
Number in Family					
2-4	07	18	06	11.299	<.10
5-6	13	11	14		
7-8	07	05	05		
9 or more	09	03	06		
Parents in Home					
Both Parents	15	08	19	11.172	<.01
Mother	20	29	12		
Economic Category					
Welfare	18	19	07	13.136	<.02
Under $3000	05	12	08		
Over $3000	13	06	16		
Source of Income					
Some Welfare	21	22	08	9.545	<.01
No Welfare	15	15	23		
Mother's Occupation					
Manual	09	09	10	3.323	n.s.
Not in Market	22	19	18		
Other	05	09	03		
Father's Occupation					
No valid data					
Mother's Education					
Jr. High or less	10	02	10	10.268	<.05
Grade 10-11	15	18	08		
Grade 12+	11	17	13		

TABLE IX (Continued)

Variable	Program-PS	Program-M	Control	χ^2	P
Father's Education					
Jr. High or less	04	03	08	6.713	<.20
Grade 10-11	11	08	10		
Grade 12+	15	24	13		
Type of Dwelling					
Duplex	06	11	01	12.362	<.02
Apartment	02	08	06		
House	28	18	24		
Home Ownership					
Owned or buying	04	04	15	17.459	<.001
Renting	32	33	16		
Age of Dwelling					
Pre War II	29	24	16	12.141	<.01
Post War II	02	07	13		
Exterior Building Material					
Wood	32	27	21	4.653	<.10
Other	04	10	10		
Number of Rooms					
2 or 3	05	09	08	7.653	<.20
4 or 5	15	22	13		
6 or more	16	06	10		
Condition of Living Area					
Average or Above	12	13	07	10.975	<.05
Below Average	20	19	11		
Inferior	04	05	13		
Care of Home					
Average or Above	13	14	03	14.837	<.01
Below Average	18	18	14		
Inferior	05	05	14		

TABLE X

PRESCHOOL ENRICHMENT PROJECT: DESCRIPTIVE DATA FOR CHILDREN PARTICIPATING IN PROGRAM-PS

(N = 33)

	Pretest		Posttest	
	Median	Range	Median	Range
Age - expressed in years and months	4:1	2:10 - 4:10		
Intelligence Tests				
Stanford-Binet (1960 Revision)	97	69 - 140		
PPVT - Peabody Picture Vocabulary Test	26	11 - 43	44	31 - 54
Preschool Inventory				
Subtest I - Personal-Social Responsiveness	15	09 - 20	22	16 - 25
Subtest II - Associative Vocabulary	09	02 - 13	17	11 - 24
Subtest III - Concept Activation: Numerical	07	01 - 13	10	05 - 19
Subtest IV - Concept Activation: Sensory	11	05 - 18	16	09 - 20
Total Score	41	25 - 60	64	44 - 83
Creativity Tests				
Originality	12	00 - 26	17	08 - 34
Curiosity - Preference for the Novel	09	00 - 20	13	00 - 20
*Conformity-Nonconformity				
a. Freedom of responses	12	00 - 34	16	00 - 40
b. Freedom and direction of responses	+10	-16 to +30	+12	-16 to +40
Willingness to Try Difficult Tasks	18	07 - 38	18	08 - 32

*A child's freedom to use conforming and nonconforming behavior in his responses is indicated by the size of the score; lower scores indicate greater freedom. The sign indicates the direction of the response, "+" for conforming, and "-" for nonconforming.

TABLE XI

PRESCHOOL ENRICHMENT PROJECT: DESCRIPTIVE DATA
FOR CHILDREN PARTICIPATING IN PROGRAM-M

(N = 36)

	Pretest		Posttest	
	Median	Range	Median	Range
Age - expressed in years and months	3:8	2:9 - 4:9		
Intelligence Tests				
Stanford-Binet (1960 Revision)	98	69 - 127		
PPVT - Peabody Picture Vocabulary Test	23	08 - 50	39	19 - 52
Preschool Inventory				
Subtest I - Personal-Social Responsiveness	15	05 - 23	19	11 - 26
Subtest II - Associative Vocabulary	05	00 - 12	14	07 - 24
Subtest III - Concept Activation: Numerical	04	00 - 11	08	05 - 16
Subtest IV - Concept Activation: Sensory	10	02 - 19	15	08 - 20
Total Score	33	12 - 56	55	35 - 81
Creativity Tests				
Originality	12	00 - 31	15	09 - 35
Curiosity - Preference For the Novel	08	00 - 20	11	00 - 20
*Conformity-Nonconformity				
a. Freedom of responses	08	00 - 34	18	00 - 40
b. Freedom and direction of responses	+06	-12 to +34	+18	-10 to +40
Willingness to Try Difficult Tasks	19	08 - 36	17	07 - 37

*A child's freedom to use conforming and nonconforming behavior in his responses is indicated by the size of the score; lower scores indicate greater freedom. The sign indicates the direction of the response, "+" for conforming, and "-" for nonconforming.

TABLE XII

PRESCHOOL ENRICHMENT PROJECT: DESCRIPTIVE DATA FOR CHILDREN IN THE CONTROL GROUP

(N = 28)

	Pretest		Posttest	
	Median	Range	Median	Range
Age - expressed in years and months	4.1	3:3 - 4:7		
Intelligence Tests				
Stanford-Binet (1960 Revision)	94	56 - 140		
PPVT - Peabody Picture Vocabulary Test	36	16 - 58	36	16 - 56
Preschool Inventory				
Subtest I - Personal-Social Responsiveness	15	11 - 22	18	12 - 23
Subtest II - Associative Vocabulary	09	01 - 15	15	06 - 24
Subtest III - Concept Activation: Numerical	08	05 - 14	08	02 - 17
Subtest IV - Concept Activation: Sensory	12	02 - 19	11	06 - 18
Total Score	43	29 - 66	49	38 - 81
Creativity Tests				
Originality	12	00 - 23	13	09 - 30
Curiosity - Preference for the Novel	08	00 - 20	18	00 - 20
*Conformity-Nonconformity				
a. Freedom of responses	10	00 - 26	18	00 - 38
b. Freedom and direction of responses	+02	-25 to +20	+18	-02 to +38
Willingness to Try Difficult Tasks	18	09 - 34	18	01 - 29

*A child's freedom to use conforming and nonconforming behavior in his responses is indicated by the size of the score; lower scores indicate greater freedom. The sign indicates the direction of the response, "+" for conforming, and "-" for nonconforming.

TABLE XIII

CHI-SQUARE ANALYSIS OF PRETEST AND POSTTEST DATA FOR THREE GROUPS OF CHILDREN: PROGRAM-PS, PROGRAM-M, AND THE CONTROL GROUP

	Pretest		Posttest	
	χ^2	p	χ^2	p
Age	2.336	n.s.		
Intelligence Tests				
Stanford-Binet	3.694	<.20		
PPVT - Peabody Picture Vocabulary Test	1.463	n.s.	16.449	<.0001
Preschool Inventory				
Subtest I	0.206	n.s.	11.971	<.01
Subtest II	7.543	<.05	6.057	<.05
Subtest III	14.419	<.001	4.201	<.20
Subtest IV	3.250	<.20	9.071	<.02
Total Score	4.152	<.20	10.963	<.01
Creativity Tests				
Originality	0.090	n.s.	5.771	<.10
Curiosity	0.095	n.s.	3.475	<.20
Conformity-Nonconformity				
a. Freedom of responses	1.538	n.s.	1.673	n.s.
Willingness to Try Difficult Tasks	0.130	n.s.	0.955	n.s.

TABLE XIV

CHI-SQUARE ANALYSIS OF CHANGES IN SCORES FROM PRETEST TO POSTTEST BY GROUPS: PROGRAM-PS, PROGRAM-M, AND THE CONTROL GROUP

	Total		Program-PS		Program-M		Control	
	χ^2	p	χ^2	p	χ^2	p	χ^2	p
PPVT - Peabody Picture Vocabulary Test	18.996	<.001	16.298	<.001	16.200	<.001	0.082	n.s.
Preschool Inventory								
Subtest I	19.732	<.001	22.204	<.001	9.452	<.01	1.244	n.s.
Subtest II	85.554	<.001	32.060	<.001	37.036	<.001	18.379	<.001
Subtest III	19.144	<.001	8.800	<.01	16.086	<.001	0.650	n.s.
Subtest IV	12.974	<.001	10.242	<.01	9.394	<.01	0.078	n.s.
Total Score	55.804	<.001	33.030	<.001	26.888	<.001	6.857	<.01
Creativity Tests								
Originality	14.010	<.001	8.800	<.01	5.512	<.02	1.166	n.s.
Curiosity	10.980	<.001	3.013	<.10	0.912	n.s.	10.338	<.01
Conformity-Nonconformity Freedom of responses	11.938	<.001	1.146	n.s.	6.726	<.01	3.614	<.10
Willingness to Try Difficult Tasks	0.084	n.s.						

TABLE XV

CHANGES IN THE SCORES OF INDIVIDUAL CHILDREN FROM PRETEST TO POSTTEST BY GROUPS

	Change in Score	
	Median	Range
PPVT		
Program-PS	+22	00 to +32
Program-M	+16	-05 to +30
Control	00	-17 to +15
Preschool Inventory		
Subtest I		
Program-PS	+05	+01 to +11
Program-M	+04	-01 to +14
Control	+02	-06 to +10
Subtest II		
Program-PS	+08	+01 to +15
Program-M	+08	+04 to +17
Control	+06	-02 to +16
Subtest III		
Program-PS	+03	-02 to +10
Program-M	+04	-02 to +10
Control	+02	-08 to +08
Subtest IV		
Program-PS	+04	-01 to +10
Program-M	+04	-03 to +13
Control	-01	-08 to +07
Total		
Program-PS	+23	+08 to +34
Program-M	+23	+06 to +38
Control	+10	-05 to +44
Creativity Tests		
Originality		
Program-PS	+05	-12 to +25
Program-M	+04	-07 to +25
Control	+01	-10 to +16

TABLE XV (Continued)

	Change in Score	
	Median	Range
Curiosity		
Program-PS	+01	-20 to +20
Program-M	+01	-19 to +20
Control	+05	-11 to +19
Conformity-Nonconformity		
Program-PS	+12	-34 to +38
Program-M	+04	-26 to +50
Control	+20	-16 to +44
Willingness to Try Difficult Tasks		
Program-PS	-02	-19 to +18
Program-M	-03	-17 to +17
Control	-03	-05 to +15

TABLE XVI

CHI-SQUARE ANALYSIS OF CHANGES IN THE SCORES OF INDIVIDUAL CHILDREN BY GROUPS: PROGRAM-PS, PROGRAM-M, AND THE CONTROL GROUP

	PS::M::C		PS::C		M::C		PS : M	
	χ^2	p	χ^2	p	χ^2	p	χ^2	p
PPVT - Peabody Picture Vocabulary Test	24.374	<.001	21.861	<.001	13.331	<.001	0.272	n.s.
Preschool Inventory								
Subtest I	5.000	<.10	4.892	<.05	1.514	n.s.	1.233	n.s.
Subtest II	2.621	<.20	2.232	n.s.	1.867	n.s.	0.019	n.s.
Subtest III	6.945	<.05	1.261	n.s.	6.630	<.02	2.382	n.s.
Subtest IV	27.362	<.001	22.407	<.001	54.690	<.001	0.000	n.s.
Total	19.087	<.001	16.229	<.001	15.237	<.001	0.036	n.s.
Creativity Tests								
Originality	3.048	<.10	2.552	n.s.	0.124	n.s.	1.837	n.s.
Curiosity	1.164	n.s.						
Conformity-Nonconformity Freedom of responses	3.550	<.20						
Willingness to Try Difficult Tasks	1.782	n.s.						

APPENDIX B

TESTING PROGRAM

The children in the pre-kindergarten enrichment program and the children in Program-PS and Program-M were tested at their respective schools. Children in the control group were taken to a neighborhood school for the Binet intelligence test and the creativity tests, and the remainder of the testing was done in their homes by the interviewer who obtained the personal-social and home background information.

Stanford-Binet Intelligence Test, 1960 Revision

This test was administered to all children in the three and four year old groups, i.e., Program-PS, Program-M, and the control group.

Peabody Picture Vocabulary Test

This test was administered on a pretest-posttest basis to all children in the three and four year old groups, and was administered as a posttest to the kindergarten children, experimental and control.

Lee Clark Reading Readiness Test

This test was administered as a posttest to the kindergarten children, experimental and control.

Behavior Inventory

This inventory, designed for Head Start research, was completed by the teachers in the pre-kindergarten enrichment program. The results were rather crudely categorized for use in comparing the selected sample of pre-kindergarten children with the total population of children enrolled in the summer enrichment program.

Caldwell Preschool Inventory

This inventory, developed for Head Start research, was administered to the children in the pre-kindergarten enrichment program in its original form. The results were then rescored in keeping with the revisions made by Dr. Caldwell after its initial use in the national Head Start programs. The shortened form was then used for posttesting.

This inventory was administered on a pretest-posttest basis to experimental and control children in the research with three and four year olds and in the research with kindergarten children.

Creativity Tests

Four tests designed to measure characteristics related to creative expression were administered on a pretest-posttest basis to the kindergarten experimental children and to the three and four year old children in Program-PS, Program-M, and the control group.

These tests included the measurement of originality, curiosity, freedom to use conforming and nonconforming behavior, and willingness to try difficult tasks.

CALDWELL PRESCHOOL INVENTORY

The Caldwell Preschool Inventory is essentially an achievement test which was developed for use in the national Head Start research during the summer of 1965. The inventory consists of items representative of the following factors or ability categories:

Subtest I. Personal-Social Responsiveness

This factor appears to involve knowledge about the child's own personal world (name, address, parts of body, friends) and his ability to establish rapport with and respond to the communications of another person (carrying out simple and complicated verbal instructions given by an adult). Perhaps more than any other factor, it represents the type of eminently practical ability which the Inventory was originally designed to assess.

Subtest II. Associative Vocabulary

This factor requires the ability to demonstrate awareness of the connection of a word by carrying out some action or by associating to certain intrinsic qualities of the underlying verbal concept. Item units having high loading include simple labeling of geometric figures, supplying verbal or gestural labels for certain functions, actions, events, and time sequences, and being able to describe verbally the essential characteristics of certain social roles. It is of interest to note that many of the specific deficits frequently attributed to culturally deprived children cluster in this factor.

Subtests III and IV. Concept Activation: Numerical and Sensory

This is the factor that accounted for the greatest amount of common variance. The concepts involved seem to represent two major categories: ordinal or numerical relations, and sensory attributes such as form, color, size, shape, and motion. The activation involves either being able to call on established concepts to describe or compare attributes (relating shapes to objects, color-names to objects or events) or to execute motorically some kind of spatial concept (reproduction of geometric designs or drawing the human figure). High scores on this factor involve being able to label quantities ("How many" questions), to make judgments of more or less, to recognize seriated positions (first, last, middle), to be aware of certain sensory attributes (shape, size, motion, color), and to be able to execute certain visual-motor configurations.

CREATIVITY TESTS

Instruments for use with preschool children in the study of creative ability have been develop under the sponsorship of the Oklahoma State University Research Fou.. ..ion (State Project No. 128) and the U. S. Office of Education (Cooperative Research Project 1967 and 2470). The principal investigator for these projects has been Elizabeth K. Starkweather, Ph.D., Associate Professor, Oklahoma State University. The instruments are designed to measure characteristics which are known to be related to creative ability in adults and for which there is behavioral evidence in early childhood. Specifically, these characteristics are originality, curiosity, freedom to use conforming and nonconforming behavior, and willingness to try difficult tasks. For each characteristic a task has been designed which is of inherent interest to young children, which is easily understood by them, and which requires a simple response that can be scored objectively.

Originality -- The creative individual is able to respond in an adaptive and an unusual manner. His originality may be accepted as a valid indicator of his creative ability.

The instrument designed to measure this characteristic in preschool children is composed of two identical sets of ten different styrofoam forms, one set painted red and the other blue. The child responds to one pair of like forms at a time, first telling what his piece might be and then telling what the experimenter's piece might be. The ten different forms are presented in this manner twice, making a total of 40 responses. Each child's originality score is a numerical count of the number of different responses he gives, with high scores indicating the more original children.

The validity and internal consistency of the instrument and the interjudge reliability in scoring were acceptable as demonstrated by statistical analyses of data gathered during the development of the instrument. The instrument has demonstrated age differences but no sex differences in originality and has proven successful in use with children ranging in age from three and a half to six years of age.

Curiosity -- Curiosity is the capacity to wonder, the tendency to seek novel percepts and it is accepted as an intellectual characteristic of the creative individual.

The instrument designed to measure this characteristic in preschool children is focused on "preference for the novel", or the acquisition of new information. Paired designs, one familiar and the other a "surprise" or novel design, are offered to the child. He then constructs a booklet of designs by choosing one of each pair. The scoring of this task is a simple numerical count of the number of novel designs chosen. A comparison of experimental and control groups of children has indicated that this task does measure children's preference for the novel. The reliability of the task has also been demonstrated statistically. Data gathered during the development of the instrument indicated neither sex differences nor age differences in curiosity The instrument has been used successfully with children from three to six years of age.

Conformity-nonconformity -- The creative individual is willing to be different; he may conform or not of his own free will.

The instrument for the measurement of this characteristic is a form board task, designed to measure conforming and nonconforming behavior in an impersonal situation. The opportunity to conform is provided by line drawings placed behind the form boards. The picture pieces for each board are paired, and the child chooses one from each pair; one picture is similar to the line drawing and the other is not, thus offering the child an opportunity to conform or not. During a second administration of the form boards the line drawings are changed, so that a conforming response from the first session becomes a nonconforming response during the second session. The child makes a total of 40 responses; and his score is the difference between the number of conforming and the number of nonconforming responses that he made, thus indicating his freedom in making his choices, and indicating whether a lack of freedom was in the direction of conformity or nonconformity.

The reliability of this instrument has been demonstrated statistically. The form boards have been used with children ranging from three to six years of age. The task has discriminated between those children who respond freely according to their own preferences and those who are influenced by the opportunity to conform. Neither age differences nor sex differences have been apparent.

Willingness to Try Difficult Tasks-- The creative individual is challenged by a calculated risk. The instrument for the measurement of this characteristic is a target game, dependent upon gross motor coordination. A ball is rolled to a target which is designed somewhat like a jack-in-the-box. When the target is struck, a surprise picture is released. This surprise element is an important factor in maintaining the child's interest throughout the game.

The task is adjusted for ability by setting the range of distances so that the targets can be both easy and difficult relative to each child's demonstrated skill. The child makes 20 choices between easy and difficult targets. His successes and failures are recorded and are used in determining whether he chose to play the game at an easy or difficult level relative to his own ability. The scoring of this task takes into consideration the skill with which the child actually plays the game, and thereby offers an additional adjustment for ability. The B+D-S score is figured was the number of balls the child uses (B), and the number of times he chooses the difficult (D) in relation to the number of successes (S) he experiences while playing the game.

The reliability of the instrument has been demonstrated statistically. The target game has been used with children from two and a half to seven years of age. The increased skill of older children makes the target game inappropriate for them. Age differences and sex differences have been demonstrated in willingness to try difficult tasks.

APPENDIX C

OSU RESEARCH FOUNDATION
"HEADSTART" PROJECT
INTERVIEW SCHEDULE

Child's Name_____ School_____

FAMILY HISTORY

A. Mother

1. Name_____ 2. Age_____
Last First Middle

3. Education 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 Higher(specify)_____

4. Current address_____

5. If deceased, how long?_____

B. Father

1. Name_____ 2. Age____

3. Education 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 Higher(specify)_____

4. Current Address_____

5. If deceased, how long?_____

C. General Information

1. Number of children in the home_____ Total persons in home_____

2. With whom does child live? Both parents_____ Mother_____ Father_____

Other_____

3. Remarks_____

EMPLOYMENT AND OTHER INCOME

A. Mother (if living in the home)

1. Is mother employed: Full time____ Part time____ Occasionally____ No____

2. Type of work_____

Professional____ Clerical ____ Service or household ____ Other _____

3. Average monthly income_____

B. Father (if living in the home)

1. Is father employed: Full time___ Part time___ Occasionally___ No _____

2. Type of work _____

Professional____ Clerical ____ Service or household____ Laborer _____

3. Average monthly income_____

C. Other sources of monthly income contributing to support of child.

OASDI_____ VA Benefits_____ Child support_____

Public Assistance (type)_____(amount)_____

Other_____

Remarks_____

D. Total income during the past year (1964)

Under $1,000 ___	$3,000-$3,999 ___	$6,000-$6,999___	$9,000-$9,999 ___
$1,000-$1,999___	$4,000-$4,999 ___	$7,000-$7,999___	Over $10,000 ___
$2,000-$2,999___	$5,000-$5,999 ___	$8,000-$8,999___	Don't know ___

LIVING CONDITIONS (Interviewer's appraisal)

A. Type of dwelling:

1. Room___ 2. Duplex___ 3. Apt.___ 4. House___ 5. Other_____

6. Number of rooms_____

B. Home status:

1. Buying___ 2. Renting ___ 3. Owned ___ 4. Approximate value_____

C. Exterior building material:

1. Masonry___ 2. Wood ___ 3. Non-wood shingle ___ 4. Asphaltic siding___

5. Other_____

D. Approximate age:

1. Nearly new (1960-present)___ 2. Post-war (1946-1959)___ 3. Older _____

E. Condition:

	Building Maintenance	Care of Premises
1. Superior (Excellent)	___	___
2. Above average (Good)	___	___
3. Below average (Fair)	___	___
4. Inferior (Poor)	___	___

F. Other data on dwelling_____

_____

REMARKS CONCERNING VALIDITY OF INTERVIEW

Information provided by: Mother ___ Father ___ Other _____

Interviewer_____

APPENDIX D

THE ENRICHMENT PROGRAMS

The present research was concerned with three enrichment programs initiated in Oklahoma City, Oklahoma, during the summer of 1965. Here, a brief description of each program is provided, primarily for the reader's orientation. At no time was an attempt made to evaluate any one of the programs per se, or to compare them. The research was focused on the children, with specific emphasis on their behavior in certain test situations. Hopefully, as the results of this study are discussed with the teachers and others interested in preschool enrichment, the questions and suggestions that come forth will give rise to hypotheses and thus lend direction to future research.

Pre-Kindergarten Enrichment Program

A pre-kindergarten program was conducted by the Oklahoma City Public School System during the summer of 1965. The program was designed for five year old children from disadvantaged sections of the city; and the purpose was to provide these children with varied opportunities for acceptable communications, group participation, and activities that would contribute significantly to the children's readiness for kindergarten experiences. The duration of the program was eight weeks.

Twenty-one different schools were represented in the program; and in the research described in this report, an attempt was made to include a sample of children from each school.

Enrichment Programs for Three and Four Year Old Children

Program-PS

Program PS, as it is designated in this report, was operated by the public school system in Oklahoma City. Approximately 50 children were enrolled in the program, half of them attending a morning session and half attending an afternoon session.

A large room, approximately 15' x 30', in Woodson Elementary School was provided for this program. The physical arrangement of the room offered the children a variety of interest centers: a housekeeping center, a library, an area for painting and one for water play, centers for table work, blockbuilding, music and science activities. One day a week, weather permitting, a trip was planned (e.g., to a farm to ride horses and see saddles, to a dairy to see how milk and ice cream are prepared, to the zoo, to the airport.)

The staff consisted of one full-time teacher, one full-time aide, and one university student (an education major) who worked during the afternoon program.

Parents were encouraged to visit the school and see the program in action. In addition to these visits and the usual contacts when the children were arriving or leaving, there were individual conferences with parents at the school and some home visits. At the end of the school year, an informal program was conducted for the parents.

Program-M

Program-M, as it is designated in this report, was a privately operated school for three and four year old children. Officially, it was known as Children's House, and it had an enrollment of approximately 50 children. Of these, 20 were in day care, 15 were in a morning program, and 15 were in an afternoon program.

Children's House was a two-story frame building, which had been renovated especially for this program. Each room in the house was geared to a specific interest or pursuit. There was a science room, an art room, a language room, a sensorial room, and a room planned for helping the children learn to care for themselves and their environment. Outside there was a fenced play area with climbing equipment and swings, a sandbox, boards and barrels, a wagon and similar outdoor equipment. During the spring, space was provided in this outdoor area for planting a flower bed and vegetable garden.

The staff at Children's House consisted of eight teachers, four of whom were on duty during the mornings and four in the afternoons. A six-week summer training program was conducted for these teachers during the summer of 1965 in preparation for the opening of Children's House. Two of the teachers were college graduates and had additional training in the Montessori Method.

Children's House provided orientation sessions for parents, one a week for six weeks in the fall. These were geared to explaining the principles of children development and explaining the ways in which the home can help and compliment the work of the school. At intervals throughout the year, Parents Meetings were held. Beyond these, rather formal contacts, the parents were encouraged to visit the school, watch the program in action, and talk with the teachers as often as possible.

APPENDIX E

EDITED ANECDOTAL RECORDS OF TWO CHILDREN

Informal progress reports of two children are presented in this section of the research report. One of these children attended Program-PS, and the other attended Program-M. The information for these reports was obtained from interviews with the teachers at the end of the school year and from records which had been kept during the year.

No attempt has been made to give a "professional" account of the children's progress; but rather the attempt has been to picture these children for the reader and to permit speculation about the influences in the lives of young children. Bar-graph profiles of the children's performance on the various tests offer an objective picture of some changes which occurred during the school year. The study of objective profiles and verbal pictures, such as those presented here, can prompt questions and suggest hypotheses which may serve as the basis for future research. Admittedly, the present study was was descriptive and exploratory. Much more research is needed, research planned to answer specific questions, if we are to increase our understanding of the influences early in a child's life which set the stage for his developing his capacities to the fullest extent.

K.K.S. - A Child in Program-PS

K.K.S. was the smallest and youngest child in the group when he entered Program-PS in the summer of 1965. His age was three years and three months. K.K.S. was also one of the best cared-for children in the group, in terms of dress, cleanliness, and nutrition. He was a most energetic child, at first running almost constantly and frequently exerting himself to the point of exhaustion. A most complicating factor in this whole picture was K.K.S.'s refusal to eat. This was true at home as well as at school; and on two occasions during the first summer, he was hospitalized reportedly because of anemia and insufficient food combined with this high energy output.

In addition to his constant physical activity, K.K.S. talked a great deal; and his speech was more clear than that of most of the other children.

K.K.S. entered nursery school with the ability to become extremely involved in anything that he was doing. He quickly learned the routines, such as putting up his mat after rest and disposing of his milk carton after snack-time, and these routines became second nature to K.K.S. before they were learned by the other children.

K.K.S. was an imaginative child and a child filled with curiosity. He did his own thinking and he resisted attempts to change him or redirect him once he had made up his mind about something. He never had difficulty making choices, and he was most emphatic about his choice once he made it.

In his dramatic play, K.K.S. frequently showed his independent thinking, i.e., showed that he was viewing an activity or story from his own point of view undisturbed by the points of view expressed by others. For instance, several children dramatized Little Miss Muffet, and in each instance the spider-character tiptoed up behind her and scared her away. But not K.K.S. He fetched an extra chair and "sat down beside her" and waited patiently for her to be frightened away by his mere presence.

When the fall term of nursery school began, there were more children in the group who were aggressive and ready to defend themselves. The result was that energetic and active K.K.S.was rather frequently blocked in his play and dissolved into angry tears. However, he had friends, and among them was one special friend who was his "partner" much of the time. This freidnship seemed to serve both children well. The other little boy's ability to make choices was usually dependent upon the choices made by K.K.S.; and on the other hand, the other little boy was the larger of the two and he used this size factor to keep K.K.S. in line when necessary.

Temper tantrums began in the fall and increased in frequency and intensity. These occurred when K.K.S. was refused something or when he was frustrated by his own inability to do something that he wanted to do. For example, when he was stringing beads and accidentally spilled them on the floor, the result was a temper tantrum. From appearances, these tantrums seemed to be anger that he was directing against himself.

As the winter progressed, K.K.S. began to show an interest in trying new tasks, and he wanted to finish them even though many times he wanted help in doing them, and he was genuinely thrilled over the "products" that he made. Once he had made something, he wanted it left on display for everyone

to see for an indefinite length of time. This was his reaction to such varied activities as washing furniture and making patterns with colored pegs.

K.K.S. continued to be emphatic about his likes and dislikes and to resist interference where his preferences were concerned. For example, one child tried to take his favorite book away from him, and his reaction was, "Gimme. I already want it. I always do. I always want it!"

As the summer session began in 1966, K.K.S. was a much calmer child and was less openly frustrated. His temper tantrums continued, but were much less frequent; and when he did have a tantrum, he could be easily directed to some activity as soon as the tantrum seemed to subside. In these instances he seemed to forget his fury and become absorbed in the new work.

K.K.S. continued to be more restless and inattentive than the other children, even though his ability to concentrate had increased considerably during the previous winter. K.K.S. ended the year as an active child, but a more calm child, one who had retained the positive qualities with which he had entered nursery school, such as confidence in himself and the ability to think for himself and make decisions.

Comments on K.K.S.'s Bar-Graph Profile

K.K.S.'s profile shows that at the time of pretesting, he was, in several respects, more capable for his age than were other children in the program. His language development was particularly good. He scored high in originality and he demonstrated a great deal of freedom in his use of conforming and nonconforming behavior. His demonstration of these qualities was not surprising in view of his great imagination and his ability to make decisions independently and stick to his decisions. At the time of posttesting, K.K.S. had made marked gains well beyond what one would have expected for his age, in all areas of achievement (PPVT and Preschool Inventory). His responses on the creativity measures indicated less originality and less freedom in using conforming and nonconforming behavior. However, he showed a marked increase in his willingness to try difficult tasks.

Care must be taken not to draw conclusions from the changes in this child's responses to the creativity tests. Value judgments are not warranted. Instead, this evidence from objective testing should help one to understand this child and to appreciate the adjustments which he has made during this year of his life. In fact, the changes which are evident in the profile may help us to understand the kind of effort that K.K.S. has put forth as he has developed more socially acceptable behavior. In the long run, a study of the relationship between subjective and objective pictures of children, such as that in the present report, should prompt research which can increase our understanding of the forces which enable a child to develop to his greatest potential, to live creatively, and to adapt effectively in this rapidly changing world.

D.J. - A Child in Program-M

D. J. and his sister entered Program-M as day care children, arriving at about nine in the morning and leaving at three in the afternoon. D.J.'s age was three years three months, and his sister was fifteen months older. At the beginning of the year he was rather dependent on her, being unhappy if they were separated and being very friendly if she were near.

D. J. was blind in one eye, the result of falling on a sharp object at home. In the late fall, his eye was removed, and he wore an eye patch for several months. Finally, in March, D.J. was fitted with his "new" eye.

At the beginning of the year, D.J. was a happy friendly child, a little bit head-strong, and mischievous but not unruly. He learned the ground rules quickly and seemed to find pleasant satisfaction in routines. He was seldom idle, and he concentrated seriously on anything that he attempted.

D.J. mother's attitude toward both children seemed at times to be sharp and critical. She scolded them for minor infractions of rules, and by facial expression or remarks indicated that she was displeased with their work or behavior. Whether she was serious or joking when she responded to the children in this manner, was difficult to tell. Despite this treatment, both children were happy and well adjusted; however, both were thumb suckers.

D.J. talked a lot in his play and showed that he was a good conversationalist. He talked while playing by himself, and he engaged the teachers in conversations. Occasionally, his comments included reference to restrictions placed upon him by his mother. He remarked that he liked to sing but that in church his mother said, "Shut up!" In play he placed a baby-bean beside the daddy-bean and remarked that his mother wouldn't let him drink coffee. One day when he tore his pants rather badly in play, he referred to the fact that his mother would "get" him. These statements tended to be rather matter-of-fact and did not interfere with his happy mood.

In late October, D.J. was absent from school for four days. When he returned, he was dressed in new jeans and shirt and wanted to be noticed. In the morning of that first day back, he worked randomly with different materials until he finally became involved with some art materials (clay, coloring, and cutting). Outside he was a bundle of energy, fighting and pushing, and causing numerous disturbances. He went into a temper tantrum when a nail that he was sucking was taken away from him. After lunch, he cried because he could not sleep near his sister. (The two children had actually be separated for nap time since the first week of school.) After the rest period on this day, D. J. again became his old lovable self.

From this time on, D. J. mornings became increasingly filled with negative, aggressive, and sensitive responses to the world about him. Minor frustrations were extremely upsetting for him; and his aggressive behavior included one incident in which he literally shoved two children down the stairs. His negative behavior included such incidents as refusing to complete the cycle of activity in dishwashing and sweeping.

During this same period of time (January and later), bashful behavior entered the picture, D. J. would hide his face and not talk when spoken to, even

though much of the time he still showed his ability to be a good conversationalist. His behavior pattern seemed to alternate between bashfulness and aggressiveness; but by late February, the temper tantrums had virtually disappeared.

In late March, D. J. was at lasted fitted with his "new" eye. Seemingly, this change was accepted by D. J. and the other children in a matter-of-fact way. From then on, as the weeks went by, D. J's behavior "leveled off". The tantrums, fighting, and negative behavior disappeared.

Comments about D. J's Bar-Graph Profile

D. J.'s profile shows that at the time of pretesting, he was actually more capable for a child his age in many areas than were other children in the program. At the time of posttesting, he had made marked gains, well beyond what one would have expected for his age, in all areas but one. Where difficult tasks were concerned, D. J. had become cautious. In this regard, no value judgment is warranted; but rather this evidence from objective testing, should help one to understand this child and to appreciate his adjustment to the many pressures, identified and unidentified, which were a part of his life during this year.

Beyond this, the relationship between subjective and objective pictures of this child and other children should serve to raise questions which will prompt research designed to increase our understanding of the forces in early child development and in turn make us all better parents and teachers.

APPENDIX F

Examples of Bar-Graph Profiles

The pretest and posttest scores of each child were ranked. These ranks were then converted to scores of one to 100 for use in a bar-graph profile which could picture the child's position in his group at the time of pretesting and posttesting and picture the change that occurred during the interval between tests.

On the following pages, bar-graph profiles for three children are presented. These include profiles for the two children described in the previous section and the profile for one child from the control group.

Similar profiles for all the children who participated in the research were given to their respective schools.

NAME BOY L.D. - Control Group Number M-1007

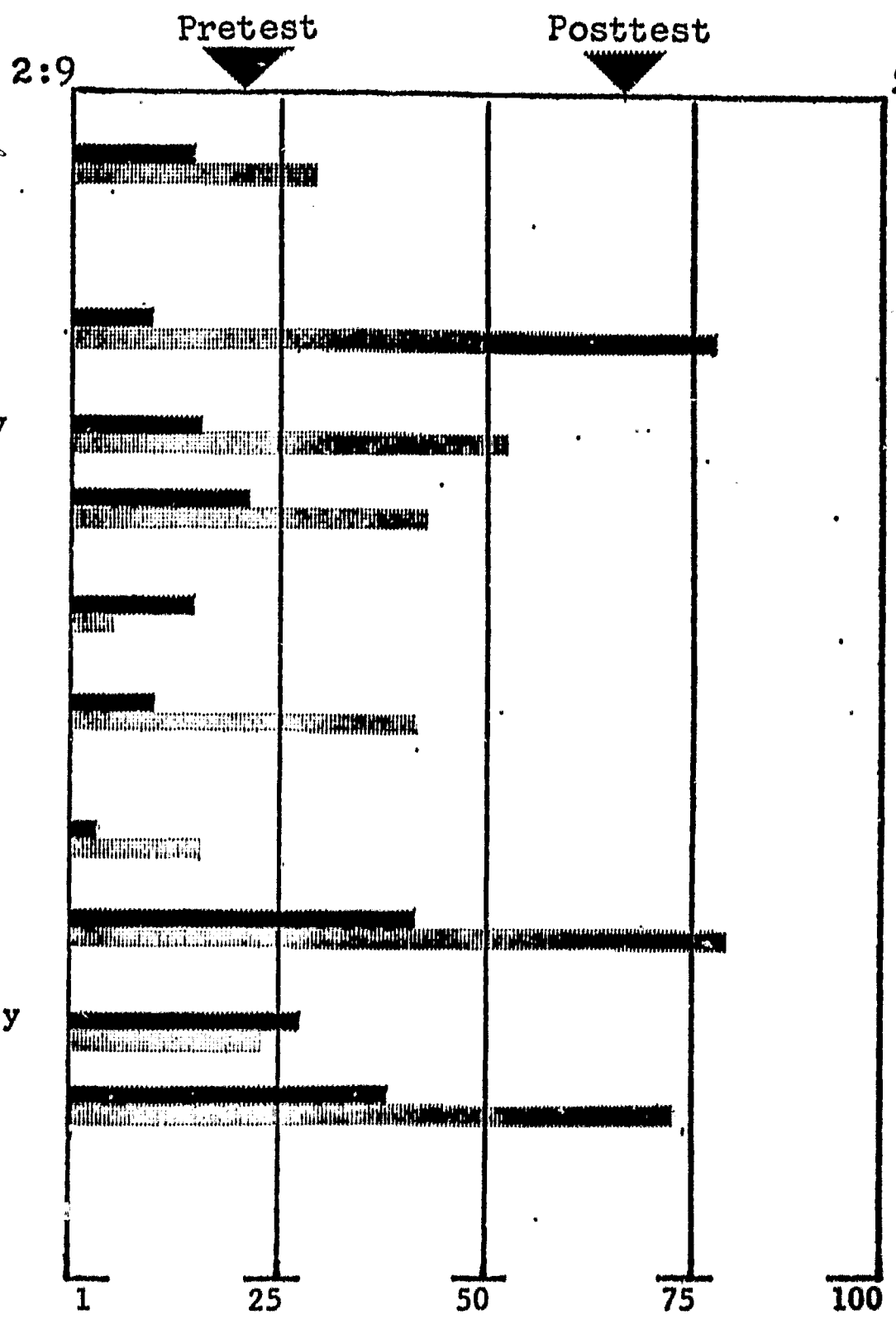
Birthdate 11-26-61 Age 3:8 - 4:7 Date July 1966

Group in which this child is ranked:

Program-PS, Program-M, and Control Group

N: 97

(Child's age ranked)



GROUP AGE RANGE

PPVT - Peabody Picture Vocabulary Test

PRESCHOOL INVENTORY

I. Personal-Social Responsiveness

II. Associative Vocabulary

III. Concept Activation: Numerical

IV. Concept Activation: Sensory

TOTAL

CREATIVITY TESTS

1. Originality

2. Curiosity - Preference for the Novel

3. Conformity-Nonconformity

4. Willingness to Try Difficult Tasks

(Child's profile is based on N:100)

NAME BOY D.J. - Program-M Number M-1180

Birthdate 6-10-62 Age 3:4 - 3:11 Date July 1966

Group in which this child is ranked:

Program-PS, Program-M, and Control Group

N: 97

(Child's age ranked)

Pretest Posttest

2:9 5:6

GROUP AGE RANGE

PPVT - Peabody Picture Vocabulary Test

PRESCHOOL INVENTORY

I. Personal-Social Responsiveness

II. Associative Vocabulary

III. Concept Activation: Numerical

IV. Concept Activation: Sensory

TOTAL

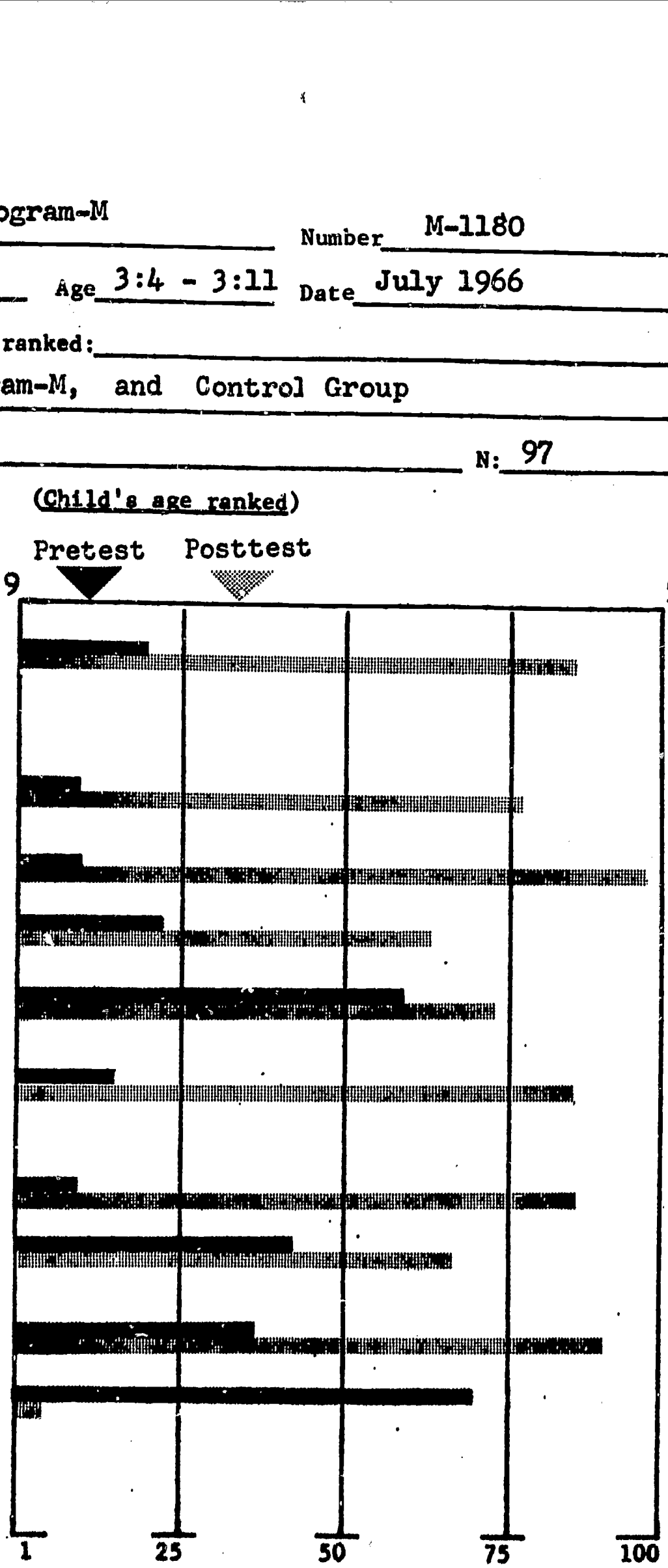
CREATIVITY TESTS

1. Originality

2. Curiosity - Preference for the Novel

3. Conformity-Nonconformity

4. Willingness to Try Difficult Tasks



(Child's profile is based on N:100)

NAME BOY K.K.S. - Program-PS Number M-1037

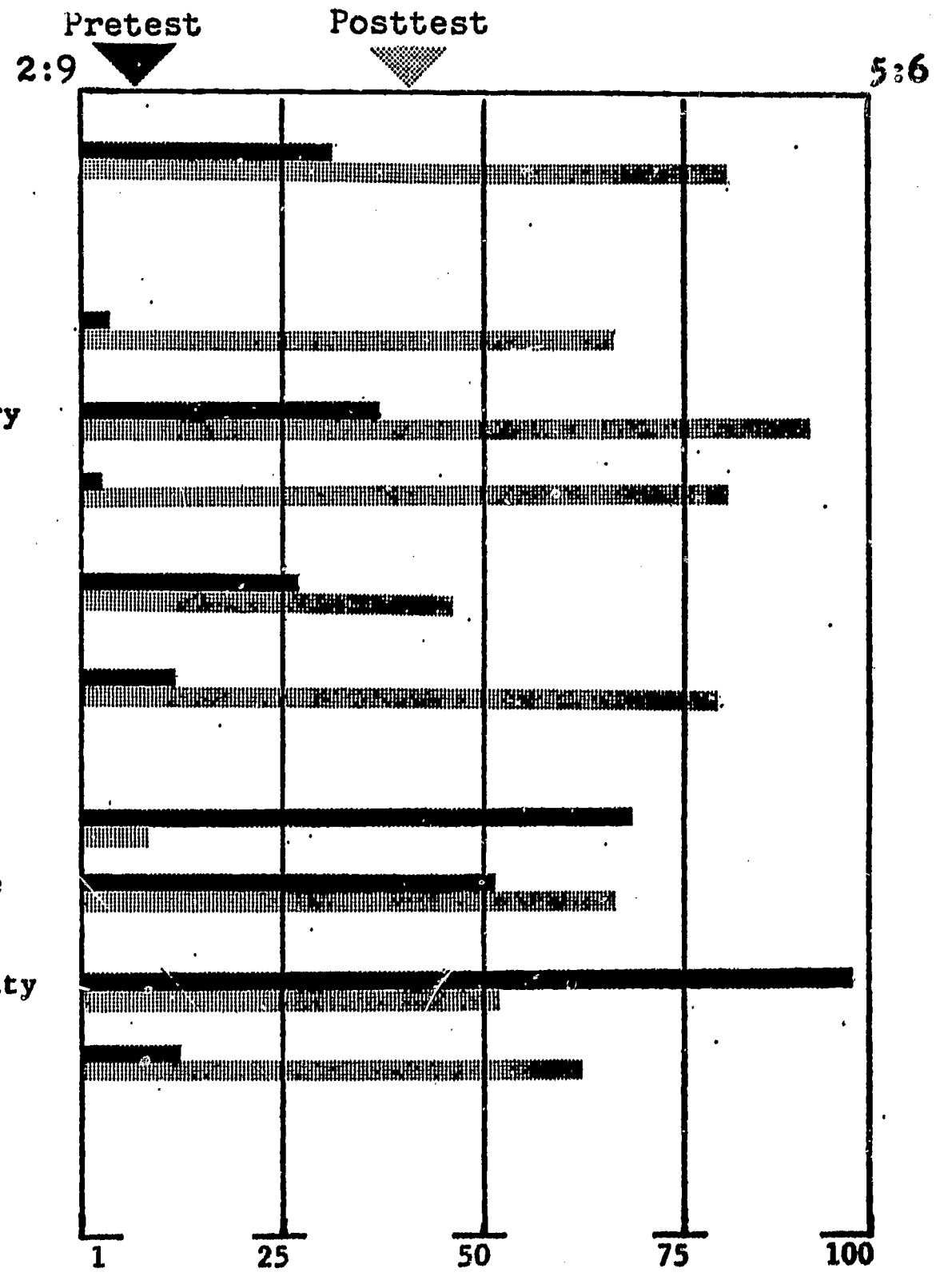
Birthdate 4-8-62 Age 3:3 - 4:1 Date July 1966

Group in which this child is ranked:

Program-PS, Program-M, and Control Group

N: 97

(Child's age ranked)



GROUP AGE RANGE

PPVT - Peabody Picture Vocabulary Test

PRESCHOOL INVENTORY

I. Personal-Social Responsiveness

II. Associative Vocabulary

III. Concept Activation: Numerical

IV. Concept Activation: Sensory

TOTAL

CREATIVITY TESTS

1. Originality

2. Curiosity - Preference for the Novel

3. Conformity-Nonconformity

4. Willingness to Try Difficult Tasks

(Child's profile is based on N:100)