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ABSTRACT

Tasks from the Torrance Tests of Creative Thinking were administered to children in a cognitive-structured preprimary program. Results indicated that children entering as 5-year-olds showed a continuity of creative growth and excelled their controls on elaboration at the beginning of grade 1 and end of grade 2. Also, at the end of grade 2, they excelled their controls on verbal originality. Children entering as 4-year-olds also showed continuity of creative growth while in the preprimary program but tended to slump in figural originality and elaboration while in grade 1. (Author/JD)

Research Paper No. 20

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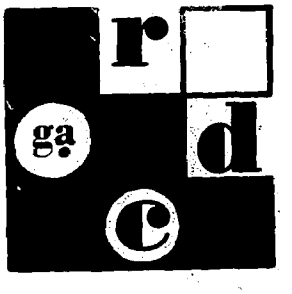

Research and Development Center in Educational Stimulation

University of Georgia Athens, Georgia

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We are especially indebted for the excellent cooperation of the teachers of the Lillie B. Suder Elementary School; Mr. Lacy Powell, Principal; and the staff of the Research and Development Center. We are also indebted to the following associates who assisted in the administration of the tests of creative thinking ability: Pansy Torrance, Marvin Grossman, Barney C. Brewton, Bonnie Royal, Betty Huff, Nancy Schrader Bonney, Barbara Farr, James Hall, Charles Shell, Donald Herdon, Anna Haslbauer, Nicholas Aliotti, Hasan Langgulung, Herbert Alf, William Nash, Leonard Buccellato, Malinda Ray, Gerald Strag, Hubert Lovett, Gene Wiggins, and Stella Kaltsounis.

Introduction

Many people have for years presumed that preprimary school programs with their emphasis upon play and socialization activities contribute to creative development. Some of those who have observed and examined preprimary programs, however, have expressed opinions that the contrary is true, that such programs cause a decline in creative functioning. In a considerable body of clinical data (Torrance, 1962, 1963), this has seemed fairly obvious, at least in individual cases. Insofar as these authors have been able to determine, however, these conclusions have not been documented with psychometric data.

A number of recent preprimary education programs have shifted sharply away from play and social activity approaches to school readiness toward more direct, intellectual development approach (Bereiter and Englemann, 1966; Pines, 1966; Gray, Klaus, Miller & Forrester, 1966; Hamlin, Mukerji & Yonemura, 1967). It has been presumed that these programs contribute to the creative development of children, but the authors have been unable to locate any psychometric documentations for such assumptions. From descriptions of some of these programs, creative growth would appear to be highly unlikely, in the opinion of the senior author.

The single psychometric documentation of creative growth associated with an experimental preprimary program known to the authors is one reported by Torrance, Fortson, and Orcutt (1967). The experimental preprimary program under investigation was Fortson's Creative-Aesthetic Approach to School Readiness in 1966-67. Children in the experimental program excelled those enrolled in an excellent, but more traditionally oriented preschool program which did not stress beginning reading and arithmetic on a variety of measures of creative thinking ability. Their superiority on several measures of originality in thinking was especially compelling, excelling the level achieved by several kindergarten and first-grade classes studied earlier by the senior author (1965, 1966). In spite of methodological deficiencies, such as a slightly lower mean IQ for the control group and small samples, the evidence seems quite strong that the Creative-Aesthetic Approach to School Readiness and Beginning Reading and Arithmetic produced significantly greater growth than that found in a more traditional program of high quality. Further similar studies of a more methodologically rigorous nature have been completed with similar results and are being reported elsewhere.

The present investigation is concerned with the evaluation of the effects on creative growth of a major experimental preprimary program of Research and Development Center in Educational Stimulation at the

University of Georgia. The methods of the project emphasize the concept of continuous educational stimulation from age three to age twelve. One group of subjects of the present study did not enter the program until age five, however, and were in the preprimary program for only one year. The second group entered at age four and had two years of preprimary educational stimulation.

On the basis of the information available to the senior author, it seems appropriate to label the approach to educational stimulation employed in this project as "Cognitive-Structured." All subject matter areas (reading, language arts, mathematics, science, social studies, art, music, physical education, etc.) are emphasized. There is stress on knowledge acquisition through structured sequences of educational stimulation.

PROCEDURES

The subjects were chosen randomly from applicants in such a way as to represent the socioeconomic distribution of the community. They were taught in classes of about 15 with three teachers (a master teacher, an assistant teacher, and a teacher aide) per class for four- and one-half days per week during the preprimary years. In the first and second grades there were two teachers (a master teacher and a teacher aide). The subjects have been described in considerable detail in the various reports of the Research and Development Center in Educational Stimulation.

In the four- and five-year-old groups creative functioning was assessed by means of the Mother Goose Problems Test developed by the senior author (Torrance, 1969). The five-year-olds were also administered the figural form of the Torrance Tests of Creative Thinking (Torrance, 1966). At the beginning of the first grade and at the end of the first and second grades, creative functioning was assessed by means of the Torrance Tests of Creative Thinking. The figural battery consisting of the Picture Construction, Picture Completion, and Repeated Figures activities was administered in classroom groups by the senior author. Labels were recorded by the examiner and assistants immediately after the group administration. The verbal battery consisting of the Ask Questions, Guess Causes, Guess Consequences, Product Improvement, Unusual Uses, Unusual Questions and Just Suppose activities was administered individually by the senior author and his assistants. All tests were scored by experienced scorers of tested scoring reliability following the detailed guides published guides published for the tests.

Initially there were 60 children in each of the two experimental groups in the Cognitive-Structured mode of educational stimulation. The parents of all applicants had made a commitment to continue their children in the

project to the extent possible. Complete data were available for 52 of the 60 who entered as five-year-olds and 51 of the 60 who entered as four-year-olds.

The control subjects were chosen randomly from children attending regular first and second grade classes in the school where the experimental groups were enrolled. Complete data were obtained on 64 beginning first graders and 61 end-of-the-year second graders as controls for those who entered the preprimary program as fifth graders. Data were obtained for 61 end-of-the-year first graders as controls for the experimentals that entered the preprimary program as four-year-olds. Many of the control subjects had been applicants for the preprimary program and thus were members of the population from which the experimentals were drawn.

RESULTS

In studying the creative growth of the older group, data were available for each of the three years on the figural forms of the Torrance Tests of Creative Thinking. The means, standard deviations and F-values from these measures are shown in Table 1.

Table 1

CONTINUITY OF CREATIVE GROWTH ON FIGURAL TESTS FROM PRE-PRIMARY (AGE 5) TO END OF SECOND GRADE

Measure	Preprimary		First Grade		Second Grade		F-ratio
	Means	St. Dev.	Means	St. Dev.	Means	St. Dev.	
Fluency	13.97	8.01	17.29	6.82	19.90	6.24	23.20*
Flexibility	10.46	4.66	12.54	4.16	16.03	4.44	37.87*
Originality	15.90	7.60	18.49	8.82	23.29	9.06	21.60*
Elaboration	31.09	15.24	54.05	20.78	74.32	27.51	70.69*

*Significant at less than .01 level; analysis of variance computed for the three years

From Table 1, it will be noted that the group as a whole has shown steady progress on all four of the figural measures of creative thinking. Especially marked is their growth on ability to elaborate.

The data related to growth in verbal creativity are presented in Table 2.

Table 2

CONTINUITY OF CREATIVE GROWTH ON VERBAL TESTS FROM BEGINNING OF FIRST GRADE TO END OF SECOND GRADE

	First Grade		Second Grade		
	Means	St. Dev.	Means	St. Dev.	F-ratio
Fluency	33.89	22.29	63.26	25.77	37.25
Flexibility	17.87	9.64	27.48	8.80	28.86
Originality	14.38	13.42	27.00	16.50	18.92

Here it will be noted that there was substantial growth between the beginning of the first grade and the end of the second grade. All gains are significant at better than the .01 level.

Since there is a rather general tendency for children in our society to show growth in creative thinking ability during the period under study, it is necessary to compare the experimentals with the controls (children who had not been in a preprimary program of educational stimulation). Table 3 represents the mean T-scores of the experimentals who had entered the preprimary program at age five and their controls soon after they entered the first grade. Here it will be noted that the only superiority of the experimentals over the controls is in Figural Elaboration.

Table 3

TESTS OF SIGNIFICANCE OF THE DIFFERENCES IN MEAN T-SCORES OF EXPERIMENTAL (COGNITIVE-STRUCTURED) AND CONTROL FIRST GRADERS AT BEGINNING OF FIRST GRADE ON VERBAL AND FIGURAL TESTS OF CREATIVE THINKING

Measure	Experim. (n=55) Means	St. Dev.	Control (N=64) Means	St. Dev.	F-ratio
Verbal Fluency	34.85	7.26	35.85	6.57	0.61
Verbal Flexib.	39.60	11.09	39.78	8.92	0.10
Verbal Original.	39.42	6.00	38.71	4.29	0.51
Figural Fluency	39.02	8.32	40.43	10.47	0.67
Figural Flexib.	41.79	9.58	44.39	9.96	2.07
Figural Origin.	40.88	9.76	38.99	10.64	1.00
Figural Elabor.	47.27	7.26	43.90	11.11	3.96*

*Significant at the .05 level

Table 4 presents similar data for the experimentals and controls near the end of the second grade in terms of raw scores. Here it will be seen that the experimentals show superiority on Verbal Originality and Figural Elaboration. It is especially interesting that the superiority of Figural Elaboration noted at the beginning of the first grade has increased considerably by the end of the second grade. It is equally interesting that the non-significant difference in Verbal Originality noted at the beginning of the first grade has now become statistically significant at better than the .01 level.

Table 4

TESTS OF SIGNIFICANCE OF THE DIFFERENCES IN MEAN RAW SCORES OF EXPERIMENTAL (COGNITIVE-STRUCTURED) AND CONTROL SECOND GRADERS NEAR END OF SECOND GRADE ON VERBAL AND FIGURAL TESTS OF CREATIVE THINKING

	Experim. (N=51)		Control (N=61)		
	Means	St. Dev.	Means	St. Dev.	F-ratio
Verbal Fluency	62.26	26.96	53.90	25.25	2.82
Verbal Flexib.	27.24	9.21	25.57	10.95	0.76
Verbal Origin.	26.98	16.82	18.00	14.80	8.82*
Figural Fluency	19.80	6.53	22.77	10.91	3.20
Figural Flexib.	15.63	4.71	14.65	5.56	1.11
Figural Origin.	23.39	9.58	21.26	9.77	1.34
Figural Elaborat.	75.59	32.43	52.23	21.81	19.18*

*Significant at .05 level
**Significant at .001 level

Note: Slight variations in means and standard deviations of the experimentals in this table and those that follows from the preceding ones are due to small losses of subjects having complete data.

We are now ready to examine the results for the experimentals who entered the preprimary program as four-year-olds. Table 5 presents the means, standard deviations, and F-ratios for scores on the Mother Goose Problems Tests of this group near the end of the first and second years in the preprimary program. It will be noted that growth on these measures was statistically significant at a high level of confidence.

Table 5

CONTINUITY OF CREATIVE GROWTH ON A VERBAL TEST OF CREATIVE THINKING (MOTHER GOOSE PROBLEMS) FROM PREPRIMARY (FOUR-YEAR-OLDS) TO PREPRIMARY (FIVE-YEAR-OLDS)

Measure	Preprimary 4 Yr. Means	St. Dev.	Preprimary 5 Yr. Means	St. Dev.	F. ratio
Fluency	6.10	2.40	7.52	3.12	8.34*
Flexibility	4.17	1.49	5.40	3.41	13.64*
Originality	5.92	4.77	10.00	5.42	15.87*

*Significant at the .01 level

Table 6 presents the results for this same group near the end of the second year at the time they were five-years-old and near the end of the third year at the time they were six-years-old. It will be noted from these data that they showed statistically significant growth on Figural Fluency and Figural Flexibility but not on Figural Originality and Figural Elaboration. This latter result is especially interesting in the light of the continuity of growth in elaboration achieved by those who entered the preprimary program as five-year-olds. It will be noted that these children attained a high level of ability to elaborate while they were in the preprimary program itself. It is just that this growth was not continued during the subsequent year.

Table 6

CONTINUITY OF CREATIVE GROWTH ON FIGURAL TEST OF CREATIVE THINKING FROM PRE-PRIMARY (FIVE-YEAR-OLDS) TO END OF FIRST GRADE

Measure	Preprimary 5 Yr. Means	St. Dev.	First Grade Means	St. Dev.	F-ratio
Fluency	16.54	8.50	20.03	6.14	5.92*
Flexibility	11.17	3.43	15.63	4.14	36.07**
Originality	18.58	10.20	20.74	8.19	1.44
Elaboration	47.39	23.66	43.30	18.75	.99

*Significant at the .05 level
**Significant at the .001 level

Table 7 presents a comparison of the performance of the experimentals who entered the preprimary program at age four and their controls at the time both groups were approaching the end of the first grade. As these data show, the experimentals tended to excel the controls on all three of the verbal measures. The differences for Verbal Fluency and Verbal Originality fall just short of significance at the .05 level, however. The controls excel the experimentals on Figural Fluency and Figural Elaboration, whereas the results for Figural Flexibility are reversed.

Table 7

TESTS OF SIGNIFICANCE OF DIFFERENCES IN RAW SCORES OF EXPERIMENTAL (COGNITIVE-STRUCTURED) AND CONTROL FIRST GRADERS NEAR END OF FIRST GRADE ON VERBAL AND FIGURAL TESTS OF CREATIVE THINKING

Measure	Experim. (N=55) Means	St. Dev.	Control (N=61) Means	St. Dev.	F-ratio
Verbal Fluency	48.27	31.80	38.98	22.21	3.49
Verbal Flexibility	22.15	10.65	17.43	8.68	7.05*
Verbal Originality	23.20	16.98	18.00	14.80	3.18
Figural Fluency	19.73	6.20	23.38	11.59	4.28*
Figural Flexibility	15.47	4.16	13.36	3.93	7.90*
Figural Originality	20.38	8.14	21.64	10.79	0.49
Figural Elaboration	42.38	20.87	63.15	29.83	26.70*

*Significant at .05 level

DISCUSSION

From the evidence presented in this report the influence of the Cognitive-Structured Approach to educational stimulation is not yet clear. From the results obtained from the children who entered the preprimary program at age five it seems fairly clear that creative growth during the first three years has been continuous and that growth in ability to elaborate has been especially accelerated. In fact, at the end of the

second grade their mean elaboration score was equal to that of upper elementary and high school students in the norm groups for the test. The results for those who entered as four-year-olds are less clear-cut than those for children entering as five-year-olds. During the time that they were actually in the preprimary program their creative development seemed to be continuous. During the first grade, however, they tended to slump in figural originality and elaboration while their controls rather strangely showed unusual growth, especially in elaboration. Information available to the authors does not provide an explanation of these results. One would suspect, however, that the first grade curriculum for these children was different from what it was the previous year.

SUMMARY

The creative growth of two groups of children in an experimental Cognitive-Structured preprimary program was studied over a three-year period. The first group entered the preprimary program as five-year-olds and the other, as four-year-olds. At the beginning of the first grade and at the end of the second grade, those who entered as five-year-olds were compared with their controls. Those who entered as four-year-olds were compared with their controls at the end of the first grade. Creative growth was assessed by appropriate tasks form the Torrance Tests of Creative Thinking.

The experimental subjects who entered as five-year-olds showed continuity of creative growth throughout the three-year period and on both occasions excelled their controls on elaboration. At the end of the second grade, they also excelled their controls on verbal originality. In most respects, the children who entered as four-year-olds also showed continuity of creative growth, the major expectation being figural originality and elaboration. These two discontinuities, however, are not too severe.

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