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ABSTRACT

Data on two preschool intervention programs for children from low-income families are discussed. The first program, the Karnes Preschool Program for the amelioration of learning deficits, is characterized by a structured format based on psychological theories. Its curriculum is designed to develop the basic language processes and to teach content in mathematics, language arts, social studies, and science. The other program, the Traditional program, aims to advance the personal, social, motor, and general language development of the children. Data were collected on 60 four-year-old children who were assigned to one of four classes, of 15 each, on a stratified basis such that the sex, race, IQ, and ages of the children in the classrooms were comparable. Results include: (1) Initially, the Karnes program more effectively promoted cognitive development than the Traditional program; (2) After three years, the differential program effects of the two programs were no longer statistically evident; and (3) the Cognitive functioning of the children at the end of a five-year period was significantly above their initial level. It is concluded that the Karnes Program significantly enhances the functioning of children in the cognitive, social, and probably affective areas. It is recommended that serious consideration be given to the further study and implementation of structured programs. (Author/CK)

A FIVE-YEAR LONGITUDINAL COMPARISON OF A TRADITIONAL VERSUS STRUCTURED PRESCHOOL PROGRAM ON COGNITIVE, SOCIAL, AND AFFECTIVE VARIABLES

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Five years of longitudinal data have been gathered on two preschool intervention programs for children from low-income families. One approach, the Karnes Preschool Program for the amelioration of learning deficits, is a highly structured program based on psychological theories. Activities which employ a game format and stress motor-sensory manipulation are carefully programmed to help the disadvantaged child overcome specific deficits in learning as well as in basic motivation and to accelerate his development in areas which will enable him to cope more successfully with later school tasks. The curriculum is designed to develop the basic language processes as well as to teach specific content in the areas of mathematics, language arts, social studies and science. Since language is the area of greatest weakness among these children, the development of language skills was a basic goal throughout the curriculum. Because these children seem to profit from educational experiences less well than their peers from more favorable socio-economic backgrounds, special emphasis is placed on helping them process information.

The major goals of the Traditional program were to promote the personal, social, motor, and general language development of the children. Teachers were instructed to capitalize on opportunities for incidental and informal learning, to encourage the children to talk and to ask questions, to stimulate their interest in the world around them. Special efforts were made to interest the children in books. Music, story, and art activities were scheduled regularly each week. Outdoor play on appropriate equipment was a part of the daily routine when weather permitted. Indoor play focused on a doll and housekeeping center, a vehicle and block center, and a small toy center. Juice time, rest period, show and tell, and the routine supervision of toileting and outdoor wraps completed the daily schedule.

Data were collected on 60 four-year-old children who were assigned to one of four classes, of 15 each, on a stratified basis such that the sex, race, IQ, and ages of the children in the classrooms were comparable. Two of the classes received the Karnes curriculum and the other two received the Traditional curriculum. All variables that are typically considered to make a difference, such as teacher-pupil ratio (1:5), physical facilities, training of teachers, length of school day (2 hours 15 minutes), psychological examiners, setting of evaluation, medical examinations, nutrition, were provided equally. During the second year of the research project, the Karnes

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children had a one-hour-per-day supportive program along with a regular public school kindergarten program. The Traditional children attended public school kindergarten only. Subsequently, all children attended public schools with no further intervention.

The basic goals of the Karnes curriculum include enhancing the cognitive and social and emotional development of the preschool child. To evaluate the program, data were gathered in each area. In the cognitive area, longitudinal data have been gathered on the Stanford-Binet Intelligence Scale, Form L-M (S-B), and on the California Achievement Test. In the social area, data were gathered on a questionnaire administered to the public school teachers and, in the emotional area, data were gathered on an incomplete sentence test administered to each child. All data were gathered by qualified personnel who did not have knowledge of the child's program placement.

Results and Discussions

Cognitive Area

Evaluation of growth in the cognitive area was based on two measures--the Stanford-Binet and the California Achievement Test. Mean IQ data gathered on the Stanford-Binet over the five-year period are presented in Table 1.

Analysis of these S-B data is presented in Tables 2 and 3. As will be seen by examination of Table 2, there was a significant difference among the means for tests. Further, the F for Groups approaches significance. As a result, it was deemed appropriate to ascertain where the differences might reside to clarify interpretation of the data. Results of the Newman-Keuls Procedure presented in Table 3 can be summarized as follows:

1. At Test 1, the two groups were not significantly different from each other.

2. Both groups were significantly higher at Test 2 than they had been at Test 1.

3. At Tests 2 and 3, the Karnes group was significantly higher than the Traditional group.

4. At Tests 4, 5, and 6, the two groups did not differ significantly from each other.

5. At Test 6, both groups were significantly higher than they had been at Test 1.

Table 1
Stanford-Binet Mean IQ Data

Test	Time	Group: Karnes (N=24)	Group: Traditional (N=25)
1	Before preschool	96.2	94.4
2	After preschool	110.3	102.6
3	After kindergarden	108.6	100.0
4	After 1st grade	104.3	100.0
5	After 2nd grade	104.3	99.7
6	After 3rd grade	103.0	100.4

Table 2
Stanford Binet IQ
Repeated Measures Analysis of Variance

Source of variation	Sum of squares	Degrees of freedom	Mean square	F
Between subjects				
Groups	1,756.60	1	1,756.60	2.64
Subjects within groups	31,297.44	47	665.90	
Within subjects				
Tests	3,329.77	5	665.95	13.60*
Tests x groups	440.61	5	88.12	1.80
Tests x subjects within groups	11,508.45	235	48.97	

*Significant at .05 level.

Table 3
Stanford-Binet IQ
Newman-Keuls Procedure

Group and test	T-1	K-1	T-5	T-3	T-4	T-6	T-2	K-6	K-4	K-5	K-3	K-2
						Means						
	94.4	96.2	99.7	100.0	100.0	100.4	102.6	103.0	104.3	104.3	108.6	110.0
						Differences						
T-1		1.8	5.3*	5.6*	5.6*	6.0*	8.2*	8.6*	9.9*	9.9*	14.2*	15.6*
K-1			3.5	3.8	3.8	4.2	6.4*	6.8*	8.1*	8.1*	12.4*	13.8*
T-5				.3	.3	.7	2.9	3.3	4.6	4.6	8.9*	10.3*
T-3					.0	.4	2.6	3.0	4.3	4.3	8.6*	10.0*
T-4						.4	2.6	3.0	4.3	4.3	8.6*	10.0*
T-6							2.2	2.6	3.9	3.9	8.2*	9.6*
T-2								.4	1.7	1.7	6.0*	8.4*
K-6									1.3	1.3	5.6*	7.0*
K-4										.0	4.3	5.7*
K-5											4.3	5.7*
K-3												1.4
Table value		2.80	3.36	3.69	3.92	4.10	4.24	4.36	4.48	4.56	4.64	4.72
Corrected table value		3.95	4.74	5.20	5.53	5.78	5.98	6.15	6.32	6.43	6.54	6.66

$\sqrt{\text{MS within/harmonic mean}} = 1.41$.

*Significant difference at .05 level.

The results indicate that the Karnes program initially was more effective in promoting cognitive development as reflected in S-B scores than the Traditional program. After three years, however, the differential program effects of the two programs were no longer statistically evident. Nevertheless, the cognitive functioning of the children at the end of a five-year period was significantly above their initial level.

A second measure of cognitive functioning was obtained on the California Achievement Test. Since the overriding goal of the Karnes program is to promote more effective functioning of the children in school, these data are considered to be more closely related to the major goal of the program. California Achievement Tests were administered to the children in both groups at the end of the second, third, and fourth years (first, second, and third grade level) after their initial year of intervention at age 4. Since reading is the most important skill that a child must acquire during the first three grades, analysis of the reading achievement data are presented in Table 4. At the end of the first grade, the Karnes group was nearly one-half year (.45) ahead of the Traditional group, a difference that was statistically significant at the .05 level. A difference of nearly a half year at this level is obviously an educationally, as well as statistically, significant difference. At the completion of the second grade, the difference between the two groups was .29 year, a statistically and educationally significant difference. At the completion of the third grade, the difference between the groups was .22 year, which was also statistically significant. Although the differences between the two groups remain significant, it seems clear that the magnitude of the differences decreased over the three-year period of time.

Table 4

CALIFORNIA ACHIEVEMENT TEST

Mean Total Reading Grade Placement Scores

Group	Test 4		Test 5		Test 6	
	AGP[1] mean	Reading grade level mean in years	AGP mean	Reading grade level mean in years	AGP mean	Reading grade level mean in years
Traditional (N=25)	1.74	1.67	2.72	2.41	3.73	3.55
Karnes (N=24)	1.74	2.12	2.72	2.70	3.71	3.77

1/ Actual grade placement in years.

Repeated Measures
Analysis of Variance

Source of variation	Sum of squares	Degrees of freedom	Mean square	F
Between subjects				
Groups	3.76	1	3.76	2.89
Subjects within groups	61.22	47	1.30	
Within subjects				
Tests	78.14	2	39.07	384.55*
Tests x groups	.32	2	.16	1.57
Tests x subjects within groups	9.55	94	.1016	

*Significant at .05 level.

Newman-Keuls Procedure

Group and test	T-4	K-4	T-5	K-5	T-6	K-6
Means	1.67	2.12	2.41	2.70	3.55	3.77
Differences						
T-4		.45*	.74*	1.03*	1.88*	2.10*
K-4			.29*	.58*	1.43*	1.65*
T-5				.29*	1.14*	1.36*
K-5					.85*	1.07*
T-6						.22*
Table value		2.82	3.38	3.72	3.95	4.13
Corrected table value		.18	.22	.24	.25	.26

$\sqrt{MS \text{ within/harmonic mean}} = .064$.
*Significant difference at .05 level.

Social Area

Social development has been an area of concern in preschool education, since some educators feel that emphasis on cognitive development means neglect of social and emotional development. Because of the questions that have been raised, it seemed important to demonstrate, if possible, that the social and emotional behavior of a child can develop along with, rather than separate from, his cognitive growth. In so doing, support for the entire rationale for the Karnes program, which is concerned with social, emotional, and cognitive development, would obtain.

Since one of the goals of the Karnes Preschool Program was to enhance the social development of children so that they might better function in the classroom, it was deemed appropriate to obtain the teacher's perception of the children's social behavior. As a result, a brief follow-up questionnaire was administered to each child's public school teacher at the time of the follow-up testing at the end of the children's kindergarten year. Neither the teachers nor the interviewers knew which of the preschool programs the child had attended.

Inspection of the scores on the items relating to social development reveals that the two groups did not differ significantly on six of the eight items (Table 5). On two of the items, one relating to the child's confidence in approaching new tasks (Question 4) and the other to the child's self-concept (Question 5), the teachers rated the children who had attended the Karnes preschool significantly higher than the children who had attended the Traditional preschool. This finding is of special interest since the goals of the Traditional program express substantial concern for the social and emotional development of the child, yet the children who attended that program seem to have done somewhat less well than the children who attended the Karnes program. Although the evidence presented here should not be considered conclusive, it does support Weikart's (1967) point that programs directed at language and intellectual development are not only effective in achieving that goal but also effective in promoting social and emotional development.

A second concern, expressed by some, lies in the area of possible negative effects on work habits that might be fostered by a highly structured program. These critics feel that since the teacher maintains a high degree of control in a structured program, the children will not internalize good work habits and will subsequently demonstrate poor work habits in the less structured public school setting with its higher pupil-teacher ratio. Since one goal of the Karnes program is to develop the child's confidence and enjoyment of the learning situation, the findings on the six items of the questionnaire relating to work habits are most interesting. Substantial and significant differences in favor of the children who attended the Karnes program are found on all six of the "work habit" items in the questionnaire (Table 5). In these aspects of behavior, so critical to effective functioning in the public school classroom, the children from the Karnes program are functioning at the "Usually" and "Always" levels, while the children from the Traditional program are functioning at the "Sometimes" level. From the foregoing data, it appears that

Table 5
Questionnaire Administered to Public School Teachers
at the Completion of Kindergarten Year (Test 3)

Item	Group mean: Karnes	Group mean: Traditional	t	Level of significance
Social development				
1. Gets along well with other children (shows respect for others, has empathy with others)	3.75	3.88		
2. Is cooperative (shares equipment, takes turns)	3.92	4.00		
3. Takes failure in stride	3.46	3.52		
4. Manifests confidence in approaching new tasks	3.92	2.96	3.17	.005*
5. Has a positive self concept	3.79	3.16	1.96	.05
6. Shows self control	3.62	3.52	.35	NS
7. Relates well to the teacher, accepts her authority	4.00	4.20		
8. Shows freedom from nervous habits (thumbsucking, nailbiting)	3.83	4.12		
Work habits and attitudes				
1. Listens carefully and follows directions for play activities	4.08	3.68	1.77	.05
2. Listens carefully and follows directions for academic activities	4.04	3.20	3.51	.005
3. Volunteers in discussions	3.71	3.16	1.52	.10
4. Has good work habits (begins assigned work promptly and perseveres)	4.42	3.24	4.35	.0005
5. Remembers learnings from day to day	4.08	3.04	4.82	.0005
6. Has attention span commensurate with C.A.	4.00	3.20	3.11	.005

* One-tailed test.

Note: The questionnaire was administered orally to the child's teacher who was asked to respond on a five-point scale: (5) Always, (4) Usually, (3) Sometimes, (2) Seldom, and (1) Never.

the Karnes program resulted in social gains that were equal to or greater than those made by children in a Traditional program, in spite of the fact that the goals of the Traditional program expressly state that the acquisition of social skills is of prime importance.

Affective Area

One of the basic questions raised about programs in early education is "What effect does the program have on the affective development of the child?" This question is raised most often when highly structured programs are being evaluated because the traditional belief about preschool is that children should be able to select, freely, the activities with which they will engage rather than being provided with teacher-selected activities designed to be interesting and appropriate yet stimulating in the cognitive and language areas.

As was stated earlier, one of the goals of the Karnes program is to enhance the affective, as well as the cognitive, development of the child. It is believed that structuring helps the child more readily discriminate that which needs to be learned from the less relevant aspects of the world about him so that he can learn more quickly and easily. Further, it is believed that children who learn in a setting where they receive positive reinforcement frequently, and who are helped to believe that they can learn something, will be positively oriented toward school and work and, thus, themselves. In view of the foregoing, it was decided to gather data that might help reveal whether or not a structured program interfered with the affective growth of children and, if possible, to ascertain whether or not the Karnes curriculum did, in fact, enhance affective development.

Information pertinent to the affective development of children was gathered on all but one of the subjects who had been previously enrolled in either the Traditional or Karnes Preschool Curriculum (N=24 in each group). At the time these data were collected, the subjects were at the mid-fourth-grade level. Information was gathered by graduate students who went to the school where the child was enrolled, took the child, and individually administered (1) a "crossing out T's" test and (2) a short form of a sentence completion test designed for oral administration to elementary-age children. After talking with the child briefly, the "crossing out T's" test was used to establish a working relationship. The "T's" test was administered under both low incentive, "I want to see how many you can do," and high incentive, "This time I will give you candy for every T that you can cross more than you did last time," conditions. Although the task was basically administered to establish a positive response set in the child, the results of the test were analyzed to determine if there were any significant differences between the two groups on the test. Briefly, the results revealed that the children from both programs worked significantly harder for reinforcement under the high incentive condition than the low incentive condition and that there were no significant differences between the groups in the way they responded to either the low or high incentive conditions. These findings suggest that the children became involved in the task preparatory to engaging in the new phase of the evaluation and that their involvement did not differ with their placement in either the Traditional or Ameliorative program.

Once the examiner thought the child was ready, he administered, orally, a 17-item Incomplete Sentence Test designed to tap the child's attitudes and beliefs about himself, his friends, other people, and school-related activities. The test was scored in two ways: (1) To assess pupil's general attitude toward himself, others, and school and (2) to assess his attitude toward school and school-related activities. All testing and scoring of materials were accomplished on a "blind" basis such that neither the scorer nor data gatherer knew in which preschool program the children had previously been enrolled. To assess general attitude, all items were scored using a revision of the approach described by Rotter (1950). Children viewed as being conflicted in an area were given higher scores than children who were viewed as having less conflicts in the area. The results (Table 6) show that the Karnes subjects, who attained a mean score of 39.00, have expectedly fewer conflicts than the children in the Traditional program whose mean score was 40.71. A t test to determine the significance of the difference between the two means revealed a t of .86 (df = 46) which did not attain the .05 level of significance (t = 1.68). The findings reveal that, contrary to the beliefs of many critics of structured cognitively based programs, there was no difference between children formerly in the Karnes Preschool Program and in the Traditional program. In fact, if any difference could have been established from the data, it would most likely have revealed that children in the Karnes program are less conflicted and therefore considered to be better adjusted than the Traditional children.

Table 6
Analysis of Sentence Completion Data

	Karnes		Traditional		
	$\bar{X}$	S^2	$\bar{X}$	S^2	t
Full scale	39.00	41.04	40.71	57.08	.86
School scale	7.42	8.95	8.71	10.04	1.45
Achievement-related scale	2.46	.78	2.79	.34	1.53

N = 24 in each group.

The second question asked of the incomplete sentence data was, "Are the children from the Karnes program less conflicted in the school area than are the children from the Traditional program?" A separate analysis was made of the items whose stems were school oriented (School_____, Arithmetic_____, Reading_____, In school I like_____). Each child's scores on these four items were summed to provide a subscale score associated with the child's attitude toward school. On the "School" subscale as reported in Table 6, children in the Karnes program attained a mean raw score of 7.42 while children in the Traditional program attained a mean raw score of 8.71. Comparison of the means by t test revealed t = 1.45 which did not attain the .05 level of significance (t = 1.68) but would have attained significance at the .10 per level (t = 1.31).

Rotter, J. B., & Rafferty, J. E. The Rotter incomplete sentences blank. New York: The Psychological Corporation. 1950.

Evaluation of these findings reveals that contrary to popular belief, the children in the highly structured, cognitively based Karnes preschool curriculum were no more conflicted in their attitudes toward school than children in a traditional program. Further, if any trend might be evidenced it is that the children in the Karnes program had fewer conflicts in their attitudes toward school and therefore would be assumed to be better adjusted. For example, children in the Karnes program are likely to give responses such as "School is fun; is good for learning; does many things for you" rather than "School makes me sick; gives me a headache" or "Reading is my favorite subject; is fun" rather than is OK or is horrible.

One interesting question raised by a post hoc review of the completions is "What effect does a structured program have on a child's perception of his peers?" To the stem "My classmates_____," children might answer "Are my friends; play; are fun." They might, on the other hand, answer "Are smart; beat me in my work; are very good at math." A post hoc study of responses to this stem suggested that they might be scored along two dimensions: One, with regard to social acceptance and two, with regard to the extent to which the responses suggested that the child might be aware of the behavior of peers, especially achieving behavior. Comparison of the Karnes group with the Traditional on the social acceptance subscale revealed almost identical means. This suggests no probable difference in the amount of positive social acceptance felt by the subjects. On the other hand, a t test of the difference between the mean raw scores on the achievement related subscale of 2.46 for the Karnes group and of 2.79 for the Traditional group yields a t of 1.53. This result, although not statistically significant, suggests the need for further study of the awareness of the work orientedness and goal directedness of peers. If such a study could be made with appropriate instruments, it may sensitize educators to the possibilities of changing values through small group structured activities, especially during the preschool years. Moreover, future findings might reveal that children from a Karnes program mature at a slightly more accelerated rate, so that they reach the "sensitivity to peers stage" more quickly than children from other programs. Such a finding would be consistent with the belief that the Karnes Preschool Program enhances the emotional development of young children.

Summary of Findings

Data pertinent to the longitudinal effects of the Karnes Preschool Program on four-year-old children relative to cognitive, social, and affective variables reveal differential effects associated with programming. In the cognitive area, the Karnes Preschool Program was shown to have a strong initial positive effect on the intellectual functioning of children which even after five years was significantly above initial level. Further, the Karnes program produced initially higher gains than the Traditional program in intellectual functioning, although the difference between the two tended to disappear after two years of attendance in the public schools. With regard to academic achievement, children who had been in the Karnes program, after four years were achieving at a significantly higher level, almost a quarter of a school year, than children from the Traditional program.

In spite of dire predictions of negative effects of a structured program on the social and affective growth of children, these beliefs were not only refuted but the data suggest that the structured program significantly enhanced children's functioning, at least in the social area. Thus, the data support the contention that the Karnes Preschool Program significantly enhances the functioning of children in the cognitive, social, and probably the affective areas. Serious consideration must, therefore, be given to the further study and implementation of structured programs.