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ABSTRACT

Effects of heterogeneous and homogeneous grouping on the psychological functioning of Mexican American preschool children from economically disadvantaged families were investigated in a pilot project at San Jose State College Child Laboratory. Three experimental groups were composed of (1) 9 Mexican American children from low-income families and 9 Anglo children from middle-income professional families (heterogeneous), (2) 18 Mexican American children from low-income families (homogeneous), and (3) 17 Anglo children from middle-income professional families (homogeneous). Four measures of cognitive functioning and 3 behavioral measures were individually administered at the beginning of the school year and again 8 months later. Comparisons of mean gain scores on pre- and post-tests were computed. Data demonstrated that heterogeneous and homogeneous grouping both have a facilitating effect on cognitive growth and behavior modification. It was noted that further research is needed to identify the psychosocial dimensions of the learning environments in heterogeneous and homogeneous groups and to assess their contribution to cognitive change and behavior modification. Dimensions suggested in interpretation of data were the teacher's mode of coping with problem situations and interacting with children, the role of the teacher as a model for behavior modification and an agent of reinforcement, the nature of the interpersonal relationships among children, and the social-climate properties of the group. (JH)

A PILOT STUDY OF THE EFFECTS OF HETEROGENEOUS AND HOMOGENEOUS GROUPING ON MEXICAN-AMERICAN AND ANGLO CHILDREN ATTENDING PREKINDERGARTEN PROGRAMS

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A PILOT STUDY OF THE EFFECTS OF HETEROGENEOUS AND HOMOGENEOUS GROUPING ON MEXICAN-AMERICAN AND ANGLO CHILDREN ATTENDING PREKINDERGARTEN PROGRAMS

It is well known that children from low income families are often segregated from middle-class children as a result of various grouping practices in the schools. The Head Start guidelines state that 90 percent of the children in each class must be from disadvantaged families. Such practices have been criticized by educators who emphasize the advantages of heterogeneous grouping (Pearl, 1967; Henderson, Rankin, Frobisher, 1969; Hervey, Boger, 1969) on the cognitive development and socialization of the child. According to the theory of identification outlined by Bandura (1969), "observational learning" or "imitation" is assumed to mediate behavioral outcomes resulting from exposure to modeling stimuli. This theoretical formulation suggests that children who show cognitive and behavioral deficits, and whose discriminative and attentional capacities are limited, may benefit from the behavior of peer models possessing these characteristics. Some findings of the Coleman Report (1966) indicated that, for the pupil from a racial or ethnic minority, achievement appears to be related to the aspirations and educational backgrounds of his peers in school. Hence it seems that the composition of the peer group may be an important variable in the learning process.

This paper is a report on a pilot project designed to investigate the effects of heterogeneous and homogeneous grouping on the psychological functioning of Mexican-American pre-school children from economically disadvantaged families. The concern of this study extended beyond interest in effecting change in general IQ and verbal performance. The concern here was

with the development of a wide range of cognitive functions, and behavioral attributes which would enable the child to cope with novel situations and cognitive demands, and facilitate cognitive development. The cognitive measures selected for study were: Stanford Binet--Form LM (Terman and Merrill, 1960); Draw-A-Man Test (Harris, 1962); Peabody Picture Vocabulary Test (Dunn, 1959); and Torrance's Test of Creative Thinking--Ideational Fluency, Flexibility, and Originality (Torrance, 1966). The behavioral attributes selected for study were: level of aspiration, delay of gratification, and curiosity, i.e., preference for the unfamiliar.

Previous research (Durrett and Pirofski, 1970) has indicated a relationship between these behavioral attributes and the cognitive measures noted above.

METHOD

Subjects. The subjects were pre-school children from low income, Mexican-American families and middle income Anglo families. Three experimental groups were enrolled in prekindergarten programs at San Jose State College Child Laboratory: (1) eighteen children, nine Mexican-American children from low income families and nine Anglo children from middle income-professional families (heterogeneous); (2) eighteen Mexican-American children from low income families, nine boys and nine girls (homogeneous Mexican-American); and (3) seventeen Anglo children from middle-income, professional families (homogeneous Anglo). Each of the experimental groups had its own control groups. In September, the children in each group ranged in age from three years to four years nine months, with a mean age of three years eight months. During the course of the year, three Mexican-American children were lost as subjects because their families moved out of town.

The Anglo subjects were from native-born, urban, intact professional families. The fathers of these children were all college graduates and all but one of their mothers were college graduates. The median number of

children was two with a range from one to five. The parents of the Anglo subjects had applied for their child to enter the San Jose State College Laboratory at least twelve months prior to the date they were enrolled. From those who had applied children were randomly selected for the experimental and control groups.

The names of low income Mexican-American families with young children were obtained from the county welfare department, the Office of Economic Opportunity Commission for Santa Clara County, the Mexican-American Community Service Project, nearby elementary schools, and a house-to-house canvas. The "poverty line" index established by the Office of Economic Opportunity for Head Start was used for determining eligibility. All of the Mexican-American children were bilingual; fourteen of them were living in fatherless homes. The occupations of the parents were unskilled or semiskilled. The mean educational level of the fathers was seventh grade, or below, and of the mothers was ninth grade, or below. The median number of children was five with a range from three to ten. Subsequently, each subject was randomly assigned to the experimental or control groups.

Procedure. The prekindergarten programs* were derived from a flexible curriculum, responsive to the developmental level, changing needs and interests of individual children. Hence, the curriculum for each of the groups was based on observation of individual children and identification of their cognitive and behavioral attributes. A more detailed description of the prekindergarten program has been described elsewhere (Durrett and Pirofski, 1970).

*These programs were supported by Grant No. CG-9778 from the Office of Economic Opportunity, Washington, D.C. and Grant No. 9362-68 from the Office of Compensatory Education, Sacramento, California, and the San Jose State College Child Laboratory.

It should be noted that while each experimental group had their own classroom, the children enrolled in the homogeneous groups shared the outdoor space with the heterogeneous group. Because of the physical plant it was not possible for each group to have a separate outdoor play area.

The four measures of cognitive functioning--Stanford Binet--Form LM (Terman and Merrill, 1960); Draw-A-Man (Harris, 1962); Peabody Picture Vocabulary Test (Dunn, 1959); Torrance's Test of Creative Thinking, i.e., Ideational Fluency, Flexibility and Originality (Torrance, 1967) and the behavioral measures--curiosity, i.e., preference for the unfamiliar (Smock and Holt, 1962); delay of gratification (Block and Martin, 1955); and level of aspiration (Dreyer and Haupt, 1966), were individually administered by Anglo examiners at the beginning of the school year and again eight months later.

Scores on Torrance's Test of Creative Thinking--on verbal ideational fluency, flexibility, and originality were obtained by asking children to suggest alternative possibilities to various problems posed by two of the Mother Goose rhymes. Hence these scores were also considered as a measure of the child's problem-solving behavior. Test-retest reliabilities with a subsample of twenty subjects over a one-week interval yielded r's of .86,.94, and .87 for verbal flexibility, fluency, and originality.

An index of curiosity motivation was measured for each child from the Preference for the Unknown Task as developed by Smock and Holt (1962). Test-retest reliability of a subsample of twenty over a one-week period yielded a product-moment r of .87.

The level of aspiration of each child was obtained in a task devised by Sears and Levin (1957) adapted by Dreyer and Haupt (1966). The procedure

for administration and scoring has been given elsewhere and will not be repeated here. Test-retest reliability over a subsample of twenty over a one-week period produced a product-moment correlation of .82.

RESULTS AND DISCUSSION

To determine the effects of heterogeneous and homogeneous grouping on the development of cognitive abilities and behavioral attributes, comparisons of mean gain scores on pre- and post-test scores for the experimental and control groups were computed.

Table 1A and 1B present eight-month test-retest comparisons for the Mexican-American children in the heterogeneous and homogeneous groups and their respective control group. The results indicate significant changes in all of the dependent measures except flexibility for the experimental heterogeneous group and significant changes in all of the dependent measures for the homogeneous group. In reviewing these findings, it should be recalled,

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Insert Table 1A about here

Insert Table 1B about here

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that the children in the homogeneous and heterogeneous groups shared the outdoor play periods. Hence, the children in the homogeneous group did not experience the kind of segregation and total isolation considered to be debilitating (Henderson et al., 1969).

The data yielded from this analysis suggest that the learning environments of both the homogeneous and heterogeneous groups have a facilitating influence on cognitive growth and behavior modification. Contrary to expectations, the evidence of significant gains in the flexibility measure for

the homogeneous group would suggest that this grouping treatment generated conditions which were somewhat more facilitative of change in this behavior. It is quite possible that the interaction of the learning experiences within the group and the opportunity to interact with the Anglo and Mexican-American children in the heterogeneous group provided optimal conditions for change to occur.

Several other uncontrolled sources of variance, i.e., teacher behavior, social climate properties, and task motivation, should be considered as possible interpretations of the data.

The lack of information on teacher behavior in the homogeneous and heterogeneous groups is a serious limitation of the present study. Variations in teacher behaviors: selection and presentation of activities; modeling and reinforcement of desirable behaviors, i.e., flexibility; mode of coping with problem and conflict situations; and general style of interaction with the children undoubtedly interact with treatment effects, compounding the results.

Recent investigation of classroom social climate properties (Anderson, 1970) demonstrates that social climate properties, i.e., intimacy, cohesiveness, friction, cliqueness, have differential effects on individual learning. These findings raise certain problems of interest relevant to this inquiry. What social climate properties are present in the homogeneous and heterogeneous groups? What are the interactional effects of social climate properties, in the heterogeneous and homogeneous groups, on cognitive development and behavior modification?

Another plausible interpretation of these findings derive from the research findings of Zigler and Butterfield (1968); Elkind, Deblinger, and

Adler (1970). Results of these studies suggest the importance of considering task motivational and motivational context effects in the evaluation of test performance. Hence, the absence of significant change in the flexibility measure for the heterogeneous group may be a function of motivational effects rather than treatment effects.

Table II-A indicates the comparison of individual measures between the Mexican-American children in the homogeneous experimental group and the control group.

Insert Table II-A about here

In the fall, scores made by these two groups were not significantly different except on the fluency ($p. < .01$) and flexibility ($p. < .05$) measures, which were significantly higher for the control group. Eight months later, the retest scores were significantly different on the Peabody Picture Vocabulary Test ($p. < .05$) for the homogeneous group and the fluency measure ($p. < .05$) for the control group.

The comparison of individual measures between the Mexican-American children in the heterogeneous group and the control group are presented in Table II-B. In the fall, the test performance of the Mexican American children in the heterogeneous group indicates significance differences ($p. < .05$) on three measures: curiosity, fluency, and flexibility. Eight months later, the retest scores indicate that the Mexican-American children in

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Insert Table II-B about here

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the heterogeneous group scored significantly higher than the control group on curiosity ($p. < .05$), fluency ($p. < .05$), Draw-A-Man ($p. < .01$), Peabody

Picture Vocabulary Test ($p. < .01$), and delay of gratification ($p. < .001$). In view of the significant differences in the curiosity and fluency measures on the pre-test, the post-test interpretation of the results is not possible. Further statistical analysis of these results is being conducted.

While it is tempting to attribute the significant gains in language and delay of gratification to the favorable modeling effects of the Anglo children, this interpretation goes beyond our data. Behavioral evidence is needed to identify the psycho-social variables influencing the selection of particular models and the degree to which their behavior is imitated.

A relevant experimental study on the modeling process (Hartup and Coates, 1967) suggests that the determinants of peer imitation include the child's experience with reinforcement from other children in the group, and his experience with the particular child who was the model. These findings suggest that the potential influence of the modeling behaviors of economically advantaged children on behavior modification in economically disadvantaged children is dependent upon the nature of their interpersonal transactions. In the absence of specific observational data on the interpersonal relationships among the children, we cannot assume that the changes noted in the behavior of the Mexican-American children has been influenced by the modeling behaviors of the Anglo children.

Table III presents comparisons of individual measures between the Mexican-American children in the experimental heterogeneous and homogeneous groups. It may be noted that gains occur on all measures in both groups, however, with the exception of the curiosity measure in the heterogeneous group, these gains do not reach significance. In view of the significant difference in the curiosity measure at the pre-test, interpretation of the

post-test results is not possible. Further statistical analysis of these results is being conducted.

Insert Table III about here

Comparison of individual measures between the Mexican-American and Anglo children is presented in Table IV. It is of interest to note that there are no significant differences in the delay of gratification pre-test scores for the Mexican-American and Anglo children. However, significant gains are noted at the post-test for the Mexican-American children.

Insert Table IV about here

Since there was no significant difference in the delay of gratification at the pre-test, we cannot attribute the significant post-test gains to the modeling effects of the Anglo children.

A further point of interest to be noted in Table IV is the difference scores for the various cognitive measures. Significant differences occur in the Stanford Binet and Peabody Picture Vocabulary Test scores, which are essentially verbal measures of cognitive functioning. However, there are no significant differences in the fluency, flexibility, and originality test scores, nor in the Draw-A-Man Test, which is a non-verbal measure of intelligence. The comparison data on the Stanford Binet, Picture Vocabulary, and Draw-A-Man test scores are consistent with those reported by Beller (1968) and emphasize the importance of a multivariate approach to the assessment of cognitive functioning in economically disadvantaged children.

While the major focus of this inquiry was to investigate the effects of heterogeneous and homogeneous grouping on cognitive change and behavior

modification in Mexican-American children from economically disadvantaged families, we were also concerned with the effects of the treatment groups on the Anglo children.

Table V-A presents the eight month test-retest comparisons for the Anglo children in the heterogeneous group and their control group. Significant changes occur in the following measures: Stanford Binet, Draw-A-Man, Peabody Picture Vocabulary, delay of gratification, curiosity, level of aspiration, and flexibility.

Insert Table V-A about here

The eight month test-retest comparisons for Anglo children in the homogeneous group and their control group (Table V-B) show significant changes in the following measures: PPVT, the Draw-A-Man, Delay of Gratification, Curiosity, Level of Aspiration, Flexibility and Originality for experimental group. It is of particular interest to note that while significant gains do

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Insert Table V-B about here

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occur in the Stanford Binet test scores for the heterogeneous group there are no significant gains in this measure for the homogeneous group.

Comparison of individual measures for Anglo children in the heterogeneous and control group are presented in Table VI-A. In the fall there were no significant differences in the scores made by the two groups except on the scores of the Stanford Binet, Form LM ($p. < .05$).

Insert Table VI-A about here

Eight months later it was found that the Anglo children in the heterogeneous experimental group scored significantly higher than the Anglo children in the

control group on the Stanford Binet ($p. < .01$), the Peabody Picture Vocabulary Test ($p. < .05$), fluency ($p. < .05$), and flexibility ($p. < .05$).

Table VI-B shows the comparison of individual measures for the Anglo children in the homogeneous experimental control group. In the fall the scores made by these two groups were not significantly different, and eight

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Insert Table VI-B about here

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months later the retest scores were not significantly different except on the Peabody Picture Vocabulary Test.

An examination of Table VII indicates that there is no significant difference in comparison of the dependent variables between the Anglo children in the experimental heterogeneous and homogeneous groups.

Insert Table VII about here

Taken together, these findings suggest that heterogeneous and homogeneous groupings have differential effects on cognitive change and behavioral modification in Anglo children. Although it is tempting to attribute these findings to the positive influences of either heterogeneous or homogeneous grouping, we regard these findings as further evidence of the need to collect specific behavioral data in the treatment groups on the nature of the learning experiences, the interpersonal relationships among the children, and the teacher's interaction with the children, in order to evaluate the effectiveness of either treatment variable.

CONCLUSION

Taken as a whole, the data yielded from this study demonstrate that heterogeneous and homogeneous grouping both have a facilitating effect on

cognitive growth and behavior modification. However, discussion of alternative interpretations of the data suggest that heterogeneous or homogeneous grouping, per se, is not a sufficient explanatory variable to account for change. Further research is needed to identify the psycho-social dimensions of the learning environments in heterogeneous and homogeneous groups, and to assess their contribution to cognitive change and behavioral modification. The dimensions suggested in the interpretation of the data are: the teacher's mode of coping with problem situations and interacting with children; the role of the teacher as model for behavior modification and agent of reinforcement; the nature of the interpersonal relationships among the children; and the social climate properties of the group.

In the absence of specific behavioral data on the teacher's behaviors and the interpersonal relationships in the groups, it is difficult to evaluate the effectiveness of the treatment variable on cognitive growth and behavior modification.

Also, additional research is needed to identify the psychological variables influencing the selection of models, in heterogeneous and homogeneous groups, and the extent to which their behavior is imitated. Ideally, investigation of the modeling effects of economically advantaged children should include economically advantaged children from similar ethnic or racial backgrounds. Such research would increase our understanding of the complex interactions that influence cognitive growth and behavior modification in heterogeneous and homogeneous groups, and would no doubt generate educational implications for development of effective interaction programs.

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TABLE I-A

EIGHT MONTH TEST-RETEST COMPARISONS FOR MEXICAN-AMERICAN CHILDREN IN EXPERIMENTAL HETEROGENEOUS GROUP AND CONTROL GROUP

	Pretest		Retest		r	Mean Diff.	t
	Mean	SD	Mean	SD			
Mexican Exp. (N-3) df 7							
SB-LM	95.50	14.98	106.62	16.27	.86	11.12	3.73**
DAM	72.37	9.30	84.37	7.96	.71	12.00	5.05**
PPVT	25.00	13.41	39.75	12.26	.72	14.75	4.34**
Delay of Grat.	4.00	4.93	11.75	3.88	.81	7.75	7.51***
Curiosity	4.50	1.85	6.50	.76	.82	2.00	4.32**
Level of Aspir.	1.50	.93	2.87	1.36	.85	1.37	5.22**
Torrance Tests							
Fluency	3.50	3.34	5.00	4.11	.95	1.50	3.00*
Flexibility	1.87	1.73	2.62	2.00	.65	.75	1.34
Originality	1.25	1.49	3.00	2.83	.81	1.75	2.70*
Mexican Con. (N-8) df7							
SB-LM	91.62	15.03	84.75	12.07	.17	6.87	1.10
DAM	66.75	6.80	69.25	7.30	.63	2.50	1.16
PPVT	22.12	8.77	23.25	9.00	.51	1.12	.36
Delay of Grat.	1.62	.52	3.62	3.07	.53	2.00	2.00
Curiosity	2.12	1.55	3.87	1.96	.38	1.75	2.49*
Level of Aspir.	2.37	.52	3.00	.76	.73	.62	1.48
Torrance Tests							
Fluency	2.12	2.17	3.00	2.78	.26	.87	.81
Flexibility	1.50	1.07	2.50	2.62	.20	1.00	1.08
Originality	1.00	1.20	2.87	3.72	.58	1.87	1.66

* .05 level
** .01 level
*** .001 level

two-tailed test

TABLE I-B

EIGHT MONTH TEST-RETEST COMPARISONS FOR MEXICAN-AMERICAN CHILDREN IN EXPERIMENTAL HOMOGENEOUS GROUPS AND CONTROL GROUPS

	Pretest		Retest		r	Mean Diff.	t
	Mean	SD	Mean	SD			
Experimental (N=16) df 15							
SB-LM	91.50	12.95	100.50	12.90	.70	9.00	3.14**
DAM	68.81	12.03	80.06	17.53	.85	11.25	4.62***
PPVT	30.06	12.97	40.81	10.16	.91	10.75	7.80***
Delay of Grat.	2.62	2.70	9.56	4.98	.52	6.94	6.50***
Curiosity	2.31	1.54	4.37	1.41	.80	2.06	8.88***
Level of Aspir.	2.06	.68	3.37	.96	.68	1.31	7.45***
Torrance Tests							
Fluency	1.94	2.64	3.56	3.78	.75	1.62	7.60*
Flexibility	1.06	1.44	2.62	2.03	.44	1.56	3.29**
Originality	1.37	2.37	4.00	4.80	.72	2.62	2.98**
Control (N=16) df 15							
SB-LM	93.06	12.32	96.87	12.19	.54	3.81	1.29
DAM	74.00	16.48	76.12	10.28	.22	2.12	.48
PPVT	27.69	13.01	32.94	9.92	.68	5.25	2.17*
Delay of Grat.	4.25	5.22	5.81	6.12	.88	1.56	2.17*
Curiosity	3.44	1.67	3.81	1.94	.46	.37	.79
Level of Aspir.	2.44	.63	2.75	.77	.24	.31	1.43
Torrance Tests							
Fluency	5.06	3.45	6.19	3.27	.71	1.12	1.76
Flexibility	2.44	1.41	3.81	1.42	.44	1.37	3.66**
Originality	2.19	1.52	4.37	5.23	.44	2.19	1.83

* .05 level
** .01 level
*** .001 level

TABLE II-A

COMPARISON OF INDIVIDUAL MEASURES FOR MEXICAN-AMERICAN CHILDREN IN EXPERIMENTAL HOMOGENEOUS GROUP AND CONTROL GROUP

	Experimental N=16 Mean	SD	Control N=16 Mean	SD	Mean Diff.	F	df 30
PRETEST							
SB-LM	91.50	12.95	93.06	12.32	1.56	.12	
DAM	68.81	12.03	74.00	16.48	5.19	1.03	
PPVT	30.06	12.97	27.69	13.01	2.37	.26	
Delay of Grat.	2.62	2.70	4.25	5.22	1.63	1.22	
Curiosity	2.31	1.54	3.44	1.67	1.13	3.92	
Level of Aspir.	2.06	.68	2.44	.63	.38	2.62	
Torrance Tests							
Fluency	1.94	2.64	5.06	3.45	3.12	8.25**	
Flexibility	1.06	1.44	2.44	1.41	1.38	7.45*	
Originality	1.37	2.36	2.19	1.52	.82	1.34	
RETEST 8 MOS LATER							
SB-LM	100.50	15.90	96.87	12.19	3.63	.52	
DAM	80.06	17.53	76.12	10.28	3.94	.60	
PPVT	40.81	10.16	32.94	9.92	7.87	4.92*	
Delay of Grat.	9.56	4.98	5.81	6.12	3.75	3.61	
Curiosity	4.37	1.41	3.81	1.94	.56	.88	
Level of Aspir.	3.37	.96	2.75	.77	.62	4.12	
Torrance Tests							
Fluency	3.56	3.78	6.19	3.27	2.63	4.41*	
Flexibility	2.62	2.03	3.81	1.42	1.19	3.67	
Originality	4.00	4.80	4.37	5.23	.37	.04	

* .05 level
** .01 level
*** .001 level

two-tailed test

TABLE II-B

COMPARISON OF INDIVIDUAL MEASURES FOR MEXICAN-AMERICAN CHILDREN IN EXPERIMENTAL HETEROGENEOUS GROUP AND CONTROL GROUP

	Mex-Am Exp. N=8 Mean	SD	Mex-Am Control N=8 Mean	SD	Mean Diff.	F	df 14
TEST							
SB-LM	95.50	14.98	91.62	15.03	3.88	.26	
DAM	72.37	9.30	66.75	6.80	5.62	1.90	
PPVT	25.00	13.41	22.12	8.77	2.88	.25	
Delay of Grat.	4.00	4.93	1.62	.52	2.38	1.83	
Curiosity	4.50	1.85	2.12	1.55	2.38	7.72*	
Level of Aspir.	1.71	.75	2.37	.52	.66	3.99	
Torrance Tests							
Fluency	5.60	2.19	2.43	2.15	3.17	6.25*	
Flexibility	3.00	1.00	1.71	.95	1.29	5.11*	
Originality	2.50	1.00	2.00	.82	.50	.60	
RETEST 8 MOS. LATER							
SB-LM	106.62	16.27	84.75	12.07	21.87	9.33	
DAM	84.37	7.96	69.25	7.30	15.12	15.67**	
PPVT	39.75	12.26	23.25	9.00	16.50	9.41**	
Delay of Grat.	11.75	3.88	3.62	3.07	8.13	21.57***	
Curiosity	6.50	.76	3.87	1.96	2.63	12.49**	
Level of Aspir.	3.29	.76	3.00	.76	.29	.53	
Torrance Tests							
Fluency	7.20	3.49	3.14	2.97	4.06	4.06*	
Flexibility	3.60	1.82	2.57	2.82	1.03	.50	
Originality	5.50	1.00	5.25	4.11	.25	.01	

* .05 level
** .01 level
*** .001 level

two-tailed test

TABLE III

COMPARISON OF INDIVIDUAL MEASURES BETWEEN THE MEXICAN-AMERICAN CHILDREN IN THE EXPERIMENTAL HETEROGENEOUS GROUP AND THE EXPERIMENTAL HOMOGENEOUS GROUP

	Heterogenous N=8		Homogeneous N=16		Mean	F	df 22
	Mean	SD	Mean	SD	Diff.		
PRETEST							
SB-LM	95.50	14.98	91.50	12.95	4.00	.45	
DAM	72.37	9.30	68.81	12.03	3.56	.53	
PPVT	25.00	13.41	30.06	12.97	5.06	.79	
Delay of Grat.	4.00	4.93	2.62	2.70	1.38	.79	
Curiosity	4.50	1.85	2.31	1.54	2.19	9.44**	
Level of Aspir.	1.50	.93	2.06	.68	.56	2.86	
Torrance Tests							
Fluency	3.50	3.34	1.94	2.64	1.56	1.56	
Flexibility	1.87	1.73	1.06	1.44	.81	1.49	
Originality	1.25	1.49	1.37	2.36	.12	.01	
RETEST 8 MOS. LATER							
SB-LM	106.62	16.27	100.50	15.90	6.12	.78	
DAM	84.37	7.96	80.06	17.53	4.31	.43	
PPVT	39.75	12.26	40.81	10.16	1.06	.05	
Delay of Grat.	11.75	3.88	9.56	4.98	2.19	1.17	
Curiosity	6.50	.76	4.37	1.41	3.13	15.69**	
Level of Aspir.	2.87	1.36	3.37	.96	.50	1.10	
Torrance Tests							
Fluency	5.00	4.11	3.56	3.78	1.44	.73	
Flexibility	2.62	2.00	2.62	2.03	.00	.00	
Originality	3.00	2.83	4.00	4.80	1.00	.29	

** .01 level two-tailed test

TABLE IV

COMPARISON OF INDIVIDUAL MEASURES BETWEEN THE MEXICAN-AMERICAN CHILDREN AND THE ANGLO CHILDREN IN THE HETEROGENEOUS EXPERIMENTAL GROUP

	Mex-Am N=8 Mean	SD	N	Anglo N=8 Mean	SD	Mean Diff.	F	df 15
PRETEST								
SB-LM	95.50	14.98		120.44	10.05	24.94	16.62**	
DAM	72.37	9.30		79.44	13.93	7.05	1.47	
PPVT	25.00	13.41		39.44	14.53	14.44	4.49*	
Delay of Grat.	4.00	4.93		3.67	2.35	.33	.03	
Curiosity	4.50	1.85		3.89	2.03	.61	.41	
Level of Aspir.	1.50	.93		2.78	.44	1.28	13.72**	
Torrance Tests								
Fluency	3.50	3.34		5.00	4.44	1.50	.60	
Flexibility	1.87	1.73		2.11	1.05	.24	.11	
Originality	1.25	1.47		2.33	2.29	1.08	1.29	
RETEST 8 MOS. LATER								
SB-LM	106.62	16.27		129.78	13.86	23.16	10.04**	
DAM	84.37	7.96		92.00	12.68	7.63	2.13	
PPVT	39.75	12.26		52.78	12.18	13.03	4.81*	
Delay of Grat.	11.75	3.88		8.33	2.74	3.42	4.48*	
Curiosity	6.50	.76		5.89	1.27	.61	1.40	
Level of Aspir.	2.87	1.36		3.67	.71	.80	2.35	
Torrance Test								
Fluency	5.00	4.11		5.89	1.90	.89	.34	
Flexibility	2.62	2.00		3.67	1.22	1.05	1.72	
Originality	3.00	2.83		5.56	5.34	2.56	1.45	

* .05 level
** .01 level

two-tailed test

TABLE V-A

EIGHT MONTH TEST-RETEST COMPARISONS FOR ANGLO CHILDREN IN EXPERIMENTAL HETEROGENEOUS GROUP AND CONTROL GROUP

	Pretest		Retest		r	Mean Diff	t
	Mean	SD	Mean	SD			
Anglo Exp. (N-9) df 8							
SB-LM	120.44	10.05	129.78	13.86	.64	9.33	2.60*
DAM	79.44	13.93	92.00	12.68	.61	12.56	3.17*
PPVT	39.44	14.53	52.78	12.18	.84	13.33	5.12***
Delay of Grat.	3.67	2.35	8.33	2.74	.54	4.67	5.71***
Curiosity	3.89	2.03	5.89	1.27	.77	2.00	4.53**
Level of Aspir.	2.78	.44	3.67	.71	.13	.89	3.41**
Torrance Tests							
Fluency	5.00	4.44	5.89	1.90	.40	.89	.65
Flexibility	2.11	1.05	3.67	1.22	.71	1.56	5.29***
Originality	2.33	2.29	5.56	5.34	.34	3.22	1.91
Anglo Control (N-8) df 7							
SB-LM	108.00	10.73	108.75	15.14	.52	.75	.16
DAM	75.12	12.22	82.87	8.71	.13	7.75	1.56
PPVT	35.62	14.32	40.12	9.99	.66	4.50	1.18
Delay of Grat.	3.87	5.19	7.00	6.19	.21	3.12	1.23
Curiosity	3.12	1.13	4.50	1.69	.49	1.37	1.59
Level of Aspir.	2.87	.83	3.25	.46	.09	.37	1.15
Torrance Test							
Fluency	6.14	2.34	9.71	3.64	.44	3.57	2.81*
Flexibility	3.57	1.72	6.29	2.36	.13	2.71	2.32
Originality	2.29	1.11	10.43	6.37	.78	8.14	3.88*

* .05 level
** .01 level
*** .001 level

two-tailed test

TABLE V-B

EIGHT MONTH TEST-RETEST COMPARISONS FOR ANGLO CHILDREN
IN HOMOGENOUS GROUP AND CONTROL GROUP

	Pretest		Retest		r	Mean Diff.	t
	Mean	SD	Mean	SD			
Experimental (N=17) df 16							
SB-LM	115.47	17.39	118.41	14.43	.83	2.94	1.24
DAM	74.53	13.78	89.41	17.08	.84	14.88	6.67***
PPVT	36.59	13.08	49.00	6.60	.35	12.41	4.11***
Delay of Grat.	3.47	3.22	7.53	2.55	.68	4.06	7.01***
Curiosity	4.12	1.90	5.41	1.77	.56	1.29	3.09**
Level of Aspir.	2.47	.62	3.18	.81	.32	.71	3.42**
Torrance Tests							
Fluency	7.29	4.30	8.94	6.64	.25	1.65	.97
Flexibility	2.47	1.07	4.88	2.76	.15	2.41	3.20**
Originality	3.76	3.01	9.41	9.22	.20	5.65	2.55*
Control (N=16) df 15							
SB-LM	108.25	19.02	112.56	16.94	.82	4.31	1.55
DAM	85.19	17.26	90.06	17.52	.77	4.87	1.67
PPVT	32.19	13.51	39.19	11.82	.69	7.00	2.79
Delay of Grat.	2.56	2.06	4.69	6.53	.01	2.12	1.23
Curiosity	3.81	2.10	5.12	1.31	.73	1.31	3.62**
Level of Aspir.	2.62	.81	2.94	.68	.32	.31	1.43
Torrance Test							
Fluency	7.19	2.71	7.12	3.20	.38	.06	.07
Flexibility	2.69	.87	4.06	2.24	.49	1.37	2.80*
Originality	3.12	2.28	5.87	5.74	.55	2.75	2.25

* Significant at the .05 level
** Significant at the .01 level
*** Significant at the .001 level

TABLE VI-A

COMPARISON OF INDIVIDUAL MEASURES FOR ANGLO CHILDREN IN HETEROGENEOUS EXPERIMENTAL GROUP AND CONTROL GROUP

	Anglo Exp. N=9 Mean	SD	Anglo Control N=8 Mean	SD	Mean Diff.	F df 15
PRETEST						
SB-LM	120.44	10.05	108.00	10.73	12.44	6.09*
DAM	79.44	13.93	75.12	12.22	4.32	.45
PPVT	39.44	14.53	35.62	14.32	3.82	.29
Delay of Grat.	3.67	2.35	3.87	5.19	.20	.01
Curiosity	3.88	2.03	3.12	1.13	.76	.88
Level of Aspir.	2.78	.44	2.87	.83	.09	.09
Torrance Tests						
Fluency	5.62	4.31	6.14	2.34	.52	.07
Flexibility	2.11	1.05	3.57	1.72	1.46	4.41
Originality	3.50	1.87	2.29	1.11	1.21	2.10
RETEST 8 MOS. LATER						
SB-LM	129.78	13.86	108.75	15.14	21.03	8.93**
DAM	92.00	12.68	82.87	8.71	9.13	2.91
PPVT	52.78	12.18	40.12	9.99	12.66	5.39*
Delay of Grat.	8.33	2.74	7.00	6.19	1.33	.34
Curiosity	5.88	1.27	4.50	1.69	1.38	3.72
Level of Aspir.	3.67	.71	3.25	.46	.42	2.00
Torrance Tests						
Fluency	6.25	1.67	9.71	3.64	3.46	5.88*
Flexibility	3.67	1.22	6.29	2.36	2.62	8.32*
Originality	8.00	4.90	10.43	6.37	2.43	.57

* .05 level
** .01 level
*** .001 level

two-tailed test

TABLE VI-B

COMPARISON OF INDIVIDUAL MEASURES FOR ANGLO CHILDREN IN HOMOGENEOUS AND CONTROL GROUPS

	Anglo Exp. N=17 Mean	SD	Anglo Control N=16 Mean	SD	Mean Diff.	F	df 31
TEST							
SB-LM	115.47	17.39	108.25	19.02	7.22	1.29	
DAM	74.53	13.78	85.19	17.26	10.66	3.86	
PPVT	36.59	13.09	32.19	13.51	4.40	.90	
Delay of Grat.	3.47	3.22	2.56	2.06	.91	.91	
Curiosity	4.12	1.90	3.81	2.10	.31	.19	
Level of Aspir.	2.47	.62	2.62	.81	.15	.38	
Torrance Tests							
Fluency	7.29	4.30	7.19	2.71	.10	.00	
Flexibility	2.47	1.07	2.69	.87	.22	.40	
Originality	3.76	3.01	3.12	2.28	.64	.46	
RETEST 8 MOS. LATER							
SB-LM	118.41	14.43	112.56	16.94	5.85	1.14	
DAM	89.41	17.08	90.06	17.52	.65	.01	
PPVT	49.00	6.60	39.19	11.82	9.81	8.80**	
Delay of Grat.	7.53	2.55	4.69	6.53	2.84	2.77	
Curiosity	5.41	1.77	5.12	1.31	.29	.27	
Level of Aspir.	3.18	.81	2.94	.68	.24	.83	
Torrance Tests							
Fluency	8.94	6.64	7.12	3.20	1.82	.98	
Flexibility	4.88	2.76	4.06	2.24	.82	.87	
Originality	9.41	9.22	5.87	5.74	3.54	1.72	

** .01 level two-tailed test

TABLE VII

COMPARISON OF INDIVIDUAL MEASURES BETWEEN THE ANGLO CHILDREN IN THE EXPERIMENTAL HETEROGENEOUS GROUP AND THE EXPERIMENTAL HOMOGENOUS GROUP

	Anglo Heterogeneous N=8 Mean	SD	Anglo Homogeneous N=17 Mean	SD	Mean Diff.	F	df 23
PRETEST							
SB-LM	120.44	10.05	115.47	17.39	4.97	.61	
DAM	79.44	13.93	74.53	13.78	4.91	.74	
PPVT	39.44	14.53	36.59	13.09	2.85	.26	
Delay of Grat.	3.67	2.35	3.47	3.22	.20	.02	
Curiosity	3.89	2.03	4.12	1.90	.23	.08	
Level of Aspir.	2.78	.44	2.47	.62	.31	1.71	
Torrance Tests							
Fluency	5.00	4.44	7.29	4.30	2.29	1.63	
Flexibility	2.11	1.06	2.47	1.07	.36	.67	
Originality	2.33	2.29	3.76	3.01	1.43	1.54	
TEST 8 MOS. LATER							
SB-LM	129.78	13.86	118.41	14.43	11.37	3.75	
DAM	92.00	12.68	89.41	17.08	2.59	.15	
PPVT	52.78	12.18	49.00	6.60	3.78	1.06	
Delay of Grat.	8.33	2.74	7.53	2.55	.80	.55	
Curiosity	5.89	1.27	5.41	1.77	.48	.51	
Level of Aspir.	3.67	.71	3.18	.81	.49	2.34	
Torrance Tests							
Fluency	5.89	1.90	8.94	6.64	3.05	1.79	
Flexibility	3.67	1.22	4.88	2.76	1.21	1.56	
Originality	5.56	5.34	9.41	9.22	3.85	1.32	

two-tailed test