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ABSTRACT

The 1969 study, the first in a series which attempts to reflect the impact of selected summer migrant programs, yielded the base data for the ongoing 3-year study. Some 228 Mexican American children aged from 4 to 8 years, enrolled in special summer migrant classes, were given the (1) Peabody Picture Vocabulary Test (PPVT), (2) Wide Range Achievement Test (WRAT), and (3) Sequin Form Board (SFB) from the Arthur Point Scale. The purpose was to identify performance levels in specific learning skills (vocabulary, reading, arithmetic, spelling, and motor performance), to establish whether those levels were low, and to suggest implications for future educational programs. The classes were located in Hollandale, Hector, and Moorhead, Minnesota and in Casselton, North Dakota. The results indicated (1) below average scores on the PPVT and WRAT, (2) average scores on the SFB, (3) no significant sex differences, and (4) differences in age which correlated with the time the youngsters were taken out of a Spanish-speaking environment and placed in an English-speaking, structured, educational environment. Performance deficiencies were due primarily to a lack of English language skills. (BD)

A STUDY OF ABILITY AND ACADEMIC ACHIEVEMENT LEVELS OF MEXICAN-AMERICAN CHILDREN AGES FOUR THROUGH EIGHT IN SELECTED SUMMER MIGRANT PROGRAMS IN MINNESOTA AND NORTH DAKOTA

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INTRODUCTION

A great deal of space in recent professional journals has been devoted to the problems connected with disadvantaged youth in our educational system. The literature is replete with articles dealing with minority group characteristics which affect academic performance and social adjustment. Many such articles are concerned with language development, differential abilities, learning deficits, effects of integration, and specialized educational approaches (Bereiter and Engelmann, 1966; Bloom, Allison, and Hess, 1965; Deutsch, 1963; McCandless, 1952).

The populations studied extend from the Negro, Puerto Rican, Chinese, Indian, and Mexican-American minorities through the children of Appalachia. These studies have rather consistently indicated or suggested, among other things, the following: (1) a quantitative language deficit exists among the disadvantaged, (2) much of the educational material and methodology appropriate for the middle-class students is irrelevant to the disadvantaged youth, (3) organized preschool educational experiences increase success of later academic performance of deprived children, (4) ethnicity and social class affect the level and pattern of differential abilities in young children, and (5) the degree of learning deficits increase as the disadvantaged child progresses through school.

Acting on the above suggestions, various educational institutions have initiated special educational programs designed to interrupt or overcome the deprivation process experienced by disadvantaged youth. These have been termed "intervention programs." Although results have been

inconsistent, studies of intervention programs to improve the personal, social, and intellectual competence of deprived youth suggest positive gains in specific cognitive variables as measured by various achievement and ability evaluation instruments.

The difficulty with most of the studies in this area is their small scale and limited scope which make generalizations hazardous.

In view of the inability to generalize from other research investigating the relationship of ethnic and social class characteristics to special learning problems of minority groups in middle-class schools, it seemed beneficial to attempt to study the problem specifically for Mexican-American children.

PURPOSE OF THE STUDY

This study was designed to investigate the achievement levels of Mexican-American children in the five specific areas of vocabulary, reading, arithmetic, spelling, and motor performance. Its purpose was to attempt to identify some academic characteristics of these children which might be taken into consideration by those persons concerned with planning and administering the various summer educational programs in this area. It also may have implications for the academic year programs being conducted in these children's "home communities."

The following research questions were formulated to give direction to the study:

1. Are there any significant learning deficiencies in any of the specific areas when compared to mean learning levels of the standardization group?

2. Are there any significant differences in the extent of learning deficiencies when related to age and sex in any of the specified areas?
3. Are there any significant differences between learning levels of Mexican-American children in the specific ability areas of vocabulary, reading, arithmetic, spelling, and motor performance?
4. Do any significant changes in learning levels of vocabulary, reading, arithmetic, spelling, or motor performance occur as the result of the Mexican-American children being enrolled in special summer school programs?

In that the initial stage of the study was intended only to gather baseline data, queation four above cannot be answered immediately. It is asked to give direction and continuity to the longitudinal aspects of the research.

Obviously, some of these questions determined that, in addition to within-group comparisons, the study would be conducted from the standpoint of making comparisons between disadvantaged youth and the ever-present middle-class student. This is subject to the criticism of its being an unfair comparison. Be this as it may, it is equally so that these youth are being educated in middle-class oriented schools, competing with middle-class youth, and preparing to enter a society dominated by the middle class. Thus it seemed appropriate to make comparisons which would reflect their status in the middle-class milieu in which they function.

DESIGN OF THE STUDY

This study was designed to be conducted over a period of three years to attempt to reflect the impact the special summer programs might have

upon the academic performance of the children of Mexican-American migrant laborers. The projected plan was to measure the learning levels of these children initially in the summer of 1969. This would establish a base level for their performance in the learning skills of vocabulary, reading, arithmetic, spelling, and motor performance. The second phase of the study would be to test these same children again the spring of 1970 prior to entering the summer school program for that year. At the conclusion of the 1970 summer educational experience, the children would be tested a third time. The accumulated data would then be analyzed to determine if any significant changes might have occurred in the specified learning skills areas as a result of having attended the various educational programs conducted that summer. This procedure would be extended over the next two summers to evaluate the long-term impact of continued participation in the summer programs.

Thus, the first phase of the study conducted in the summer of 1969 was intended to identify relative levels of performance in the specified learning skills, establish whether those levels would be considered deficits, and suggest implications for upcoming education programs.

The subjects who participated in this research were Mexican-American children enrolled in special summer school programs in four communities in Minnesota and North Dakota. Two hundred and twenty-eight pupils in schools in Hollandale, Hector, and Moorhead, Minnesota, and Casselton, North Dakota, cooperated in the study. See Appendix A for a complete description of the age groups. These children were enrolled in school as part of a cooperative program funded by Title I of E.S.E.A. through Migrants Incorporated for upgrading educational opportunities for children of

migrant workers in these states. The research sample was limited to children of four through eight years of age. This age range was selected so as to provide a basis for continuing study for several years. The younger children are not yet in the formal educational process, and the older children may enter the labor force within a year or two.

The research was based on the use of the following instruments: (1) Peabody Picture Vocabulary Test (Form B), (2) Wide Range Achievement Test, and (3) Sequin Form Board from the Arthur Point Scale.

The Peabody Picture Vocabulary Test (PPVT) consists of 150 stimulus words and 150 four-choice picture responses. The subject selects the picture which correctly illustrates the stimulus word. Mental age and an intelligent quotient are reported.

The Wide Range Achievement Test (WRAT) consists of items divided into arithmetic, spelling, and reading on two levels. Results are reported in grade equivalents and standard scores.

The Sequin Form Board (SFB) consists of 15 blocks of various shapes which the subject must place in the correct cutout spaces in a board. The score is the fastest time in seconds of three trials. The results are reported in terms of a performance factor score.

Each of these instruments was administered individually to each pupil, using verbal directions in English.

Scores of all of these tests and information from a personal data sheet on each pupil comprised the data for this study. The information was collected through the following steps.

The training centers were visited on separate weekends in the order of Hollandale, Moorhead, Casselton, and Hector. At each center the staff was asked to fill out a personal data sheet for each pupil from 4 through

8 years of age from the information available. Then each student was escorted to one of the investigators for testing. At the conclusion of testing the instruments were scored and the results tabulated.

The data for the research group were submitted to analysis. Means and standard deviations were computed for the PPVT, SFB, and three parts of the WRAT separately by sex and by age. Significance of differences between means and standard deviations were determined by calculating t and F tests respectively for the various combinations of ability area, age, sex, and total group, two at a time. The results are reported below.

ANALYSIS AND RESULTS

The results of the initial phases of the research are reported in the following tables. It will be observed that slightly different numbers of subjects are reported in the various tables. This is the result of incomplete data on certain children when making the several combinations of comparisons. In all cases this variation is limited to a difference of one to six cases. The population included 40 four year olds, 38 five year olds, 41 six year olds, 59 seven year olds, and 50 eight year olds, for a total of 228.

Comparison with Standardization Group

Table 1 shows the mean performance of the Mexican-American children on each of the three research instruments by age and sex. Observation of the results provides a method of comparing performance of the research population with the mean performance of the standardization group on each measurement device. Tests of significance were not computed because of lack of original data for the standardization group. Rather, the

TABLE 1
MEAN STANDARD SCORE AND STANDARD DEVIATIONS
ON FIVE LEARNING VARIABLES ACCORDING
TO AGE, BY SEX, AND TOTAL GROUP

Group	PPVT IQ		WRAT						SFB	
			Reading		Arithmetic		Spelling		Performance Score	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
4 Yr. Old										
Male	55.61	25.64	88.25	34.46	96.25	42.82	82.80	27.42	109.31	21.83
Female	47.40	17.09	70.80	31.94	76.62	24.32	66.28	21.82	107.66	20.53
Total	50.63	20.90	78.55	32.25	83.16	31.14	73.16	24.60	108.37	20.82
5 Yr. Old										
Male	44.91	24.96	87.75	29.31	84.40	29.38	82.12	20.08	96.87	25.97
Female	39.57	24.51	86.16	5.97	85.30	15.79	87.23	22.48	98.90	24.41
Total	41.51	24.43	86.56	14.09	85.05	19.48	85.28	21.23	98.02	24.76
6 Yr. Old										
Male	60.31	15.31	91.55	21.65	96.94	21.54	89.55	18.15	108.19	26.90
Female	55.57	25.77	84.71	16.89	93.33	15.64	97.46	15.18	104.15	26.46
Total	57.94	21.17	88.56	19.71	95.30	18.89	93.15	17.08	106.21	26.43
7 Yr. Old										
Male	60.58	17.92	84.67	14.39	89.83	11.76	83.51	5.98	102.06	25.91
Female	61.78	22.93	91.18	14.22	91.18	10.95	88.85	9.86	104.10	30.08
Total	61.15	20.28	87.70	14.56	90.46	11.31	86.05	8.42	103.03	27.74
8 Yr. Old										
Male	68.36	19.52	86.32	11.64	87.04	11.08	83.64	8.47	95.76	23.94
Female	64.20	20.49	90.80	13.06	89.72	5.44	88.68	11.32	96.84	24.89
Total	66.28	19.92	88.56	12.45	88.38	8.74	86.38	10.22	96.30	24.18

number of standard deviations by which the various calculated means varied from the test mean were used to indicate significant differences.

Peabody Picture Vocabulary Test: The performance of the Mexican-American children on the PPVT ranged from a low of 39.57 intelligence score for 5 year old girls to a high of 68.36 for 8 year old boys. The PPVT has a mean intelligence score of 100 and a standard deviation of 16. Thus, Table 1 indicates that the highest mean score for any age group of the children studied was approximately two standard deviations below the mean of the test. The lowest was 3.77 standard deviations below the mean. Two standard deviations is considerably beyond that needed to be judged as a significant difference.

Due to the items on the test, this score might more properly be termed an English vocabulary score than an intelligence score. Evidence supporting this point of view is seen in Table 2 below. The measured IQ jumps from 23 to 64 points higher for Spanish than English administration of the test. This allows a difference in interpretation from one of "below average" to "very much in the average" range.

TABLE 2
PPVT I.Q. YIELDS WHEN GIVEN
IN ENGLISH AND SPANISH*

		IN ENGLISH			IN SPANISH		
SUBJECT	C.A.	R.S.	M.A.	I.Q.	R.S.	M.A.	I.Q.
S.M.	6.6	27	2.10	31	54	5.10	97
N.M.	6.10	40	3.10	59	67	8.2	112
P.P.	7.3	41	3.11	61	65	7.10	108
R.T.	8.11	47	4.9	60	61	7.10	83

*Note: This data was obtained on PPVT's administered by summer program staff in Casselton, North Dakota.

Wide Range Achievement Test: The performance of the Mexican-American children on the WRAT ranged from a low of 86.28 standard scores for 4 year olds in spelling to a high of 97.45 for 6 year old girls in spelling. The WRAT has a mean standard score of 100 and a standard deviation of 16. Of the 45 average scores reported in Table 1 for the WRAT, only six were less than 8 points or one-half a standard deviation below the mean of the test. The remainder clustered between 10 and 34 points below the mean. Most were close to a minus one standard deviation or more. This is considered to be significantly below the mean for the norming group.

Sequin Form Board: Table 1 shows that the general performance of the Mexican-American children on the non-verbal performance test (SFB) was considerably different than on the verbal devices. Here the scores ranged from 96.30 to 109.31. The pattern shows a clustering around 100 or what would be described as average performance. Thus, it appears there is no real difference between the research group and the standardization group on this factor.

In summary, the results in Table 1 indicate that in those skills which are usually connected with the academic program in most schools, Mexican-American children do significantly poorer than the average subject in the norming population on the research measurement instruments. Again, it must be noted that perhaps only verbal English is being measured, and this may not be a true indication of real ability. In the non-verbal area this discrepancy is not observed.

Differences by Sex

Table 3 Series consists of five tables describing the performance of the research population on each measurement instrument according to sex within each age group. There were only three significant differences observed. Five year old boys were significantly more variable in their performance on the WRAT arithmetic test than 5 year old girls. Seven year old girls did significantly better than 7 year old boys on the WRAT spelling test. They were also more variable.

It is apparent that, in general, sex was not a factor in level of achievement as measured by these tests. There was no consistent pattern of boys or girls doing better than the other in any specified achievement area.

TABLE 3 SERIES
SIGNIFICANCE OF DIFFERENCES BETWEEN MEAN STANDARD SCORE OF MALES AND FEMALES BY AGE ON FIVE LEARNING VARIABLES

TABLE 3A
Peabody Picture Vocabulary Test

Group	Male $\bar{X}$	Male SD	Female $\bar{X}$	Female SD	F	t	df
4 Yr. Old	55.61	25.64	47.40	17.09	2.25	1.11	31
5 Yr. Old	44.91	24.96	39.57	24.51	1.04	.60	31
6 Yr. Old	60.31	15.31	55.57	25.97	2.88	.69	36
7 Yr. Old	60.58	17.92	61.78	22.93	1.64	.23	57
8 Yr. Old	68.36	19.52	64.20	20.49	1.10	.74	48

*Significant at .05 level or greater.

TABLE 3B
Sequin Form Board

Group	Male $\bar{X}$	Male SD	Female $\bar{X}$	Female SD	F	t	df
4 Yr. Old	109.31	21.83	107.66	20.53	1.13	.24	35
5 Yr. Old	96.87	25.97	98.90	24.41	1.13	.24	35
6 Yr. Old	108.19	26.90	104.15	26.46	1.03	.48	39
7 Yr. Old	102.06	25.91	104.10	30.08	1.35	.28	57
8 Yr. Old	95.76	23.94	96.84	24.89	1.08	.16	48

*Significant at .05 level or greater.

TABLE 3C
Wide Range Achievement Test: Reading

Group	Male $\bar{X}$	Male SD	Female $\bar{X}$	Female SD	F	t	df
4 Yr. Old	88.25	34.46	70.80	31.94	1.16	.78	7
5 Yr. Old	87.75	29.31	86.16	5.97	24.12*	.19	14
6 Yr. Old	91.55	21.65	84.71	16.89	1.64	.97	30
7 Yr. Old	84.67	14.39	91.18	14.22	1.03	1.73	56
8 Yr. Old	86.32	11.64	90.80	13.06	1.26	1.28	48

*Significant at .05 level or greater.

TABLE 3D
Wide Range Achievement Test: Arithmetic

Group	Male $\bar{X}$	Male SD	Female $\bar{X}$	Female SD	F	t	df
4 Yr. Old	96.25	42.82	76.62	24.32	3.10	1.03	10
5 Yr. Old	84.40	29.38	85.30	15.80	3.46	.09	16
6 Yr. Old	96.94	21.54	93.33	15.64	1.90	.54	31
7 Yr. Old	89.83	11.76	91.18	10.95	1.15	.45	56
8 Yr. Old	87.04	11.08	89.72	5.44	4.15*	1.09	48

*Significant at .05 level or greater.

TABLE 3E
Wide Range Achievement Test: Spelling

Group	Male $\bar{X}$	Male SD	Female $\bar{X}$	Female SD	F	t	df
4 Yr. Old	82.80	27.42	66.28	21.82	1.58	1.17	10
5 Yr. Old	82.12	20.08	87.23	22.48	1.25	.53	19
6 Yr. Old	89.55	18.15	97.46	15.18	1.43	1.34	31
7 Yr. Old	83.51	5.98	88.85	9.86	2.72*	2.54*	57
8 Yr. Old	83.64	8.48	88.68	11.32	1.78	1.78	48

*Significant at .05 level or greater.

Differences between Ages

Table 4 Series on five tables describes differences between all the combinations of ages for each of the five measurement devices. It was

impossible to construct a readable table which would include all the information about means and standard deviations as well as significance of values. Consequently, the following tables show only the critical F and t values for each age combination on each test. The mean scores and standard deviations are located in Table 1 on page 7.

TABLE 4 SERIES
SIGNIFICANCE OF DIFFERENCES BETWEEN
MEAN STANDARD SCORE OF AGE GROUPS
ON FIVE LEARNING VARIABLES

TABLE 4A
Peabody Picture Vocabulary Test

Age Group	4		5		6		7		8	
	F	t	F	t	F	t	F	t	F	t
4	.00	.00	1.37	1.63	1.03	1.46	1.06	2.36*	1.10	3.43*
5					1.33	3.04*	1.45	4.14*	1.50	5.06*
6							1.09	.75	1.13	1.89
7									1.04	1.33
8									.00	.00
N =	33		33		38		59		50	

*Significant at .05 level or greater.

In Table 4A it is seen that 5 year old children did not score significantly higher than 4 year olds on the PPVT. Eight year olds did not do better than 6 and 7 year olds, and 7 year olds didn't do better than 6 year olds. It was not until the 4 year olds were compared with 7 and 8 year olds that a significant difference of 11 and 16 IQ points appeared.

Six, seven, and eight year olds all did better than five year olds by a margin of 16, 20, and 25 IQ points respectively.

TABLE 4B
Sequin Form Board

Age Group	4 F	4 t	5 F	5 t	6 F	6 t	7 F	7 t	8 F	8 t
4	.00	.00	1.42	-1.95	1.61	-.40	1.78	-1.01	1.35	-2.44*
5					1.14	1.41	1.25	.89	1.05	-.33
6							1.10	-.58	1.19	-1.87
7									1.32	-1.34
8									.00	.00
N =	37		37		41		59		50	

*Significant at .05 level or greater.

In only one case was there a significant difference between the ages on the SFB. Eight year olds performed faster than did 4 year olds. In all other combinations the difference in seconds required to replace the blocks was not great enough to be statistically significant.

TABLE 4C
Wide Range Achievement Test: Reading

Age Group	4 F	4 t	5 F	5 t	6 F	6 t	7 F	7 t	8 F	8 t
4	.00	.00	5.24*	.87	2.68	1.16	4.91*	1.44	6.71*	1.65
5					1.96	.36	1.07	.28	1.28	.54
6							1.83	-.23	2.51*	-.01
7									1.37	.32
8									.00	.00
N =	9		16		32		58		50	

*Significant at .05 level or greater.

There were no significant differences between the mean scores of any of the ages on the WRAT: Reading Test. The only differences observed were in amount of variation between the groups. Four year olds were much more variable in their performance than five, seven, or eight year olds; and 6 year olds were more variable than 8 year olds.

TABLE 4D
Wide Range Achievement Test: Arithmetic

Age Group	4 F	4 t	5 F	5 t	6 F	6 t	7 F	7 t	8 F	8 t
4	.00	.00	2.56	.20	2.72	1.58	7.58*	1.42	12.69*	1.04
5					1.06	1.83	2.96*	1.47	4.97*	.97
6							2.79*	-1.53	4.67*	-2.26*
7									1.68	-1.06
8									.00	.00
N =	12		18		33		58		50	

*Significant at .05 level or greater.

Again, there was only one significant difference in level of performance on the WRAT: Arithmetic Test. Six year olds did better on this section by 7 standard score points than did 8 year olds, but it was not significantly improved from one age level to the next. In fact, there is an indication of leveling off. In amount of variation the performance of 4, 5, and 6 year olds in arithmetic was more variable than that of 7 and 8 year olds.

TABLE 4E
Wide Range Achievement Test: Spelling

Age Group	4		5		6		7		8	
	F	t	F	t	F	t	F	t	F	t
4	.00	.00	1.34	1.49	2.07	3.07*	8.53*	3.26*	5.86*	2.86*
5					1.54	1.50	6.35*	.23	4.32*	.23
6							4.11*	-2.67*	2.80*	-2.33*
7									1.47	.06
8									.00	.00
N =	12		21		33		59		50	

*Significant at .05 level or greater.

Note: The values shown in Table 4 Series are computed on the means and standard deviations shown in Table 1. Readability of the above tables necessitated leaving off the actual means, etc.

In the final section of the WRAT, 6, 7, and 8 year olds spelled significantly better than 4 year olds by a margin of 20, 13, and 13 standard score points. Seven and eight year olds did better than five year olds by a narrow margin, but 6 year olds scored 9 standard scores higher than did 7 and 8 year olds. This was statistically significant.

Four, five, and six year olds were significantly less consistent than 7 and 8 year olds in their spelling achievement.

In summary then, it seems that several years difference in age is necessary to produce significantly different mean scores on the PPVT. There were virtually no real differences between the mean performance of the various ages on the SFB and the WRAT Reading and Arithmetic Tests. Differences in age seemed to have a greater impact in level of spelling on the WRAT. Generally, when comparisons were made in the language area, a regression pattern formed after the first year of formal instruction. Where there were differences in variability of scores between the ages, the younger were less consistent in their performances than the older children.

Differences between Tests

Tables 5 through 14 describe differences between the performances on the PPVT, WRAT, and SFB in the several possible combinations, two at a time. These differences were analyzed for the total research population, then for all males and all females, and then for all children in each age group.

TABLE 5
SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN STANDARD SCORES
EARNED ON PEABODY PICTURE VOCABULARY TEST
AND SEQUIN FORM BOARD

Group	PPVT $\bar{X}$	PPVT SD	SFB $\bar{X}$	SFB SD	F	t	df
Total Group	57.09	22.62	102.84	25.33	1.25	22.77*	210
All Males	59.95	20.71	102.95	24.98	1.45	15.45*	99
All Females	54.52	24.02	102.75	25.76	1.15	16.79*	110
All 4 Yr. Olds	50.50	21.21	108.78	21.22	1.00	14.83*	31
All 5 Yr. Olds	40.84	24.51	101.69	24.15	1.03	11.42*	31
All 6 Yr. Olds	57.95	21.17	107.13	26.21	1.53	11.45*	37
All 7 Yr. Olds	61.15	20.28	103.03	27.74	1.84	11.35*	58
All 8 Yr. Olds	66.28	19.92	96.30	24.18	1.47	7.74*	49

*Significant at .05 level or greater.

It is observed in Table 5 that in all cases the children did significantly better on the SFB than they did on the PPVT. Differences ranged from 33 to 61 points. In only five cases out of 100 would differences this great occur by chance.

TABLE 6
SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN STANDARD SCORES EARNED ON PEABODY PICTURE VOCABULARY TEST AND WIDE RANGE ACHIEVEMENT TEST: ARITHMETIC

Group	PPVT $\bar{X}$	PPVT SD	WRAT Arithmetic $\bar{X}$	WRAT Arithmetic SD	F	t	df
Total Group	60.51	21.55	89.69	15.70	1.89*	17.92*	169
All Males	62.23	20.52	90.50	17.68	1.35	12.43*	81
All Females	58.90	22.46	88.94	13.65	2.71*	12.86*	87
All 4 Yr. Olds	52.92	28.75	83.17	31.14	1.17	6.88*	11
All 5 Yr. Olds	46.06	23.91	85.06	19.48	1.51	7.87*	17
All 6 Yr. Olds	59.69	20.28	95.41	19.18	1.12	2.85*	31
All 7 Yr. Olds	62.03	19.28	90.47	11.31	2.91*	10.82*	57
All 8 Yr. Olds	66.28	19.92	88.38	8.74	5.19*	8.35*	49

*Significant at .05 level or greater.

Table 6 indicates that in all comparisons by age and sex the research population scored higher on the WRAT Arithmetic Test than they did on the PPVT. Differences ranged from 22 points for 8 year olds to 39 points for 5 year old children. These were all significant at the .05 level. In four cases there were significant differences in variability. As a total group the children were more variable on the PPVT than on the WRAT: Reading. Girls as an individual group were also more variable in this direction as were 7 and 8 year olds.

TABLE 7
SIGNIFICANCE OF DIGGERENCE BETWEEN MEAN STANDARD SCORES
EARNED ON PEABODY PICTURE VOCABULARY TEST AND
WIDE RANGE ACHIEVEMENT TEST: SPELLING

Group	PPVT $\bar{X}$	PPVT SD	WRAT Spelling $\bar{X}$	WRAT Spelling SD	F	t	df
Total Group	60.24	21.60	86.59	14.65	2.17*	16.44*	172
All Males	61.71	20.52	84.88	12.87	2.54*	11.14*	84
All Females	58.82	22.62	88.24	16.09	1.98*	12.29*	87
All 4 Yr. Olds	53.75	27.74	73.17	24.60	1.27	2.55*	11
All 5 Yr. Olds	47.20	22.90	86.75	20.66	1.23	6.80*	19
All 6 Yr. Olds	59.69	20.28	93.19	17.36	1.37	9.72*	31
All 7 Yr. Olds	61.15	20.28	86.05	8.42	5.79*	10.14*	58
All 8 Yr. Olds	66.28	19.92	86.16	10.22	3.80*	7.87*	49

*Significant at .05 level or greater.

As on previous comparisons the children continued to perform at a significantly higher level on the WRAT Spelling Test than on the PPVT. Five year olds were 39 points better while 4 and 8 year olds were both 20 points better. Again, differences this great would be found in only five cases out of 100 by chance. Seven and 8 year olds, boys and girls, and the group as a whole were more consistent in spelling than they were on the PPVT.

TABLE 8
SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN STANDARD SCORES EARNED ON PEABODY PICTURE VOCABULARY TEST AND WIDE RANGE ACHIEVEMENT TEST: READING

Group	PPVT $\bar{X}$	PPVT SD	WRAT Reading $\bar{X}$	WRAT Reading SD	F	f	df
Total Group	60.52	21.60	87.60	16.37	1.74*	17.01	163
All Males	62.19	20.83	87.17	17.31	1.45	11.48*	80
All Females	58.89	22.34	88.02	15.49	2.08*	12.60*	82
All 4 Yr. Olds	50.89	31.68	78.56	32.25	1.04	3.93*	8
All 5 Yr. Olds	43.75	22.43	86.56	14.09	2.54	9.11*	15
All 6 Yr. Olds	59.84	20.60	89.03	19.85	1.08	7.32*	30
All 7 Yr. Olds	62.03	19.28	87.71	14.56	1.75	10.00*	57
All 8 Yr. Olds	66.28	19.92	88.56	12.45	2.56*	8.46*	49

*Significant at .05 level or greater.

The final comparison of the PPVT with other tests was in harmony with the first three. The children again scored significantly higher on the reading section of the WRAT than they did on the PPVT. The range was from a low of 22 points for 8 year olds to a high of 43 for 5 year olds. Eight year olds, girls, and the group as a whole were more variable on the PPVT than in reading.

In Tables 9, 10, and 11, the SFB is compared with the three sections of the WRAT.

TABLE 9
SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN STANDARD SCORES EARNED ON WIDE RANGE ACHIEVEMENT TEST: READING AND SEQUIN FORM BOARD

Group	WRAT Reading $\bar{X}$	WRAT Reading SD	SFB $\bar{X}$	SFB SD	F	t	df
Total Group	87.55	16.39	103.41	25.84	2.48*	7.99*	163
All Males	87.01	17.26	104.06	26.38	2.34*	6.05*	81
All Females	88.09	15.57	102.76	25.43	2.67*	5.22*	81
All 4 Yr. Olds	78.56	32.25	115.22	28.80	1.25	7.14*	8
All 5 Yr. Olds	86.87	14.53	105.67	24.54	2.85	4.47*	14
All 6 Yr. Olds	88.56	19.71	109.72	23.14	1.38	5.08*	31
All 7 Yr. Olds	87.71	14.56	103.64	27.59	3.59*	4.13*	57
All 8 Yr. Olds	88.56	12.45	96.30	24.18	3.77*	2.42*	49

*Significant at .05 level or greater.

TABLE 10
SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN STANDARD SCORES EARNED ON WIDE RANGE ACHIEVEMENT TEST: ARITHMETIC AND SEQUIN FORM BOARD

Group	WRAT Arithmetic $\bar{X}$	WRAT Arithmetic SD	SFB $\bar{X}$	SFB SD	F	t	df
Total Group	89.66	15.68	103.85	25.76	2.79*	7.45*	169
All Males	90.92	17.57	104.14	26.05	2.20*	5.24*	82
All Females	88.84	13.70	103.56	25.64	3.50*	5.28*	86
All 4 Yr. Olds	83.17	31.14	116.08	25.91	1.45	5.37*	11
All 5 Yr. Olds	84.29	19.80	104.59	23.24	1.38	4.20*	16
All 6 Yr. Olds	95.30	18.89	110.82	23.64	1.52	3.62*	32
All 7 Yr. Olds	90.47	11.31	103.64	27.59	5.94*	3.72*	57
All 8 Yr. Olds	88.38	8.74	96.30	24.18	7.65*	2.48*	49

*Significant at .05 level or greater.

TABLE 11
SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN STANDARD SCORES EARNED ON WIDE RANGE ACHIEVEMENT TEST: SPELLING AND SEQUIN FORM BOARD

Group	WRAT Spelling $\bar{X}$	SD	SFB $\bar{X}$	SD	F	t	df
Total Group	86.37	14.76	103.56	25.83	3.06*	9.11*	173
All Males	84.63	13.11	103.83	25.91	3.90*	8.10*	86
All Females	88.10	16.13	103.30	25.89	2.58*	5.18*	86
All 4 Yr. Olds	73.17	24.60	118.42	24.67	1.01	5.99*	11
All 5 Yr. Olds	84.55	21.51	102.40	23.49	1.19	3.96*	19
All 6 Yr. Olds	93.15	17.08	110.82	23.64	1.91	4.54*	32
All 7 Yr. Olds	86.05	8.42	103.03	27.74	10.84*	5.04*	58
All 8 Yr. Olds	86.16	10.22	96.30	24.18	5.60*	3.16*	49

*Significant at .05 level or greater

It can be observed in all three comparisons above that performance was significantly better on the SFB than on any of the sections of the WRAT. This was true regardless of groups compared. In all three comparisons the smallest differences between the tests were for the 8 year old group, and the longest differences were for the 4 year old group. In reading versus SFB the range was 11 to 37 points; in arithmetic versus SFB it was 8 to 33 points; and in spelling versus SFB 10 to 45 point spread existed. The level of significance for these differences were at the .05 level. In all three comparisons 7 and 8 year olds, males and females, and the total group were more variable on speed in the SFB than in reading, arithmetic, or spelling on the WRAT.

The final comparisons in this section were made between the subtests of the WRAT. Levels of achievement in reading, spelling, and arithmetic are compared two at a time in Tables 12, 13, and 14.

TABLE 12
SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN STANDARD SCORES EARNED ON READING AND SPELLING TESTS OF WIDE RANGE ACHIEVEMENT TEST

Group	Reading $\bar{X}$	Reading SD	Spelling $\bar{X}$	Spelling SD	F	t	df
Total Group	87.55		87.08			.73	163
		16.39		25.83	1.28		
All Males	87.48		85.19			1.91	80
		16.86		12.15	1.92*		
All Females	88.02		88.93			.65	82
		15.49		15.92	1.06		
All 4 Yr. Olds	82.25		74.50			1.63	7
		32.37		25.62	1.61		
All 5 Yr. Olds	86.56		86.69			.03	15
		14.08		22.55	2.56		
All 6 Yr. Olds	88.56		93.34			1.71	31
		19.71		17.32	1.29		
All 7 Yr. Olds	87.71		86.26			1.25	57
		14.56		8.34	3.04*		
All 8 Yr. Olds	88.56		86.16			2.49*	49
		12.45		10.22	1.48		

*Significant at .05 level or greater.

In only one case was there any significant difference in the mean scores achieved between reading and spelling. Among 8 year olds the children scored higher in reading than spelling. In two instances there were significant differences in variation of scores. Boys in general were more variable in reading achievement than in spelling. Seven year olds also were more variable in reading.

TABLE 13
SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN STANDARD SCORES EARNED ON READING AND ARITHMETIC TESTS OF WIDE RANGE ACHIEVEMENT TEST

Group	Reading $\bar{X}$	Reading SD	Arithmetic $\bar{X}$	Arithmetic SD	F	t	df
Total Group	86.68	21.27	88.96	20.93	1.03	2.13*	163
All Males	87.49	16.94	90.95	17.70	1.09	2.14*	79
All Females	88.02	15.48	89.15	13.53	1.31	.80	82
All 4 Yr. Olds	81.57	34.91	84.00	40.30	1.33	.36	6
All 5 Yr. Olds	86.56	14.08	85.25	20.04	2.02	.36	15
All 6 Yr. Olds	88.56	19.71	95.56	19.13	1.06	2.27*	31
All 7 Yr. Olds	87.71	14.56	90.47	11.31	1.65	1.68	57
All 8 Yr. Olds	88.56	12.45	88.38	8.74	2.03*	.12	49

*Significant at .05 level or greater.

The experimental group as a whole performed better in the arithmetic part of the WRAT than they did in the reading part. This was true of boys in general and also of 6 year olds. Eight year olds were less consistent in their reading achievement than in arithmetic.

TABLE 14
SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN STANDARD SCORES
EARNED ON SPELLING AND ARITHMETIC TESTS OF
WIDE RANGE ACHIEVEMENT TEST

Group	Spelling $\bar{X}$	Spelling SD	Arithmetic $\bar{X}$	Arithmetic SD	F	t	df
Total Group	85.64		88.81			2.99*	170
		20.25		20.99	1.07		
All Males	84.93		90.51			4.03*	82
		12.93		17.57	1.85*		
All Females	88.40		89.31			.58	86
		16.11		13.28	1.47		
All 4 Yr. Olds	72.18		85.54			1.90	11
		25.55		31.50	1.52		
All 5 Yr. Olds	86.72		85.06			.37	17
		21.51		19.48	1.22		
All 6 Yr. Olds	93.15		95.30			.75	32
		17.08		18.89	1.22		
All 7 Yr. Olds	86.25		90.47			2.99*	57
		8.34		11.31	1.84		
All 8 Yr. Olds	86.10		88.38			1.74	49
		10.22		8.74	1.37		

*Significant at .05 level or greater.

The mean arithmetic score for total group was significantly higher than its mean spelling score. Boys followed this pattern as did 7 year olds. Although boys on the average did better in arithmetic than spelling, they were significantly more variable also.

In summary of the WRAT comparisons, it can be seen that the total group on an average scored better in arithmetic than in either spelling or reading. Boys performed on the same level as the total group. There was no difference between reading and spelling mean scores for the group.

SUMMARY AND CONCLUSION

The purpose of the initial phase of this study was to gather base data for a continuing study of the achievement levels of Mexican-American migrant children in the areas of vocabulary, reading, arithmetic, spelling, and motor performance. Specifically, it was designed to answer these three questions: (1) Are there any significant learning deficiencies in any of the specific areas when compared to mean learning levels of the standardization group? (2) Are there any significant differences in extent of learning deficiencies when related to age and sex in any of the specified areas? (3) Are there any significant differences between learning levels of the Mexican-American children in the ability areas of vocabulary, reading, arithmetic, spelling, and motor performance?

To attempt to answer these questions, the PPVT, WRAT, and SFB were administered individually to 228 Mexican-American children enrolled in summer programs in four centers in Minnesota and North Dakota. The results of the analysis of the data are discussed below.

Question One

The summary of the results in Table 1 indicate that average scores of Mexican-American children were significantly lower than the average standardization population score on the PPVT and WRAT. Their average score on the SFB was no different than the average for that test.

These results clearly show that there are deficits among these children in the learning skills usually associated with the academic program in most schools. It is hypothesized that the limited proficiency of these children in English language is a real factor in achievement levels of

the measured skills which fall one to three standard deviations below the mean. This limitation may also have extended to the testing situation itself.

The instructions for administering the tests were all given in English. Possibly a degree of lack of communication as to what was expected on the tests effected the level of success in the skills measured.

Question Two

The summary of the results in Table 3 Series and Table 4 Series indicated that, in general, sex was not a factor in level of success on the research instruments. Changes in age were more significant.

Sex Differences: There was only one significant difference noted between the mean scores of boys and girls on any of the tests. This was between 7 year old boys and girls on the WRAT spelling test. In that 25 different comparisons were made, this could have been a function of error due to multiple comparisons across tests and age levels.

The great difference in variability noted between 5 year old boys and girls in WRAT reading may be that at this age level there has been no direct formal instruction in reading. So the factor that may contribute most to the significantly more consistent performance of girls is that of role playing. Typically, the male figure in the family may rarely have the time or inclination to be involved in reading and writing. Boys strongly identifying with the patriarchal father figure at this time may not be led by role playing to academic areas as much as the girls.

Age Differences--PPVT: The English language ability as measured by the PPVT shows clearly that little growth is accomplished in this

area until the child is placed in a structured education program that removes him somewhat from a totally Spanish-speaking environment. It seems reasonable to assume in order to provide for facilitation in learning the English language these children would profit from being placed in a structured education situation at the age of 3 or 4 years. After initial impact of the summer school program on the 4 and 5 year olds, there seems to be a lack in language development until the child is exposed to the full-time school environment.

Age Differences--WRAT: The indicated lack of growth in reading skills as measured by the WRAT shows that the reading instruction given these children does not significantly improve their performance from one age level to another. This would seem to indicate that these children do not have enough of an English speaking-listening vocabulary to benefit from reading instruction as it is presently constituted. The only significant result seems to be that as the children grew older they became more consistently deficient.

In spelling it again seems clear that after the first year of formal education at the 6 year level, achievement levels and skills actually seem to regress. It appears that there are factors that mitigate against growth after that first year of formal education. Whether these factors are emotional, psychological, cultural, or a combination of these factors is a moot question; but it seems clear that research should be conducted to find out how and why this regression occurs.

Question Three

In all cases this population performs much better in areas of performance where language is not a factor than they do in any of the achievement or skill areas where language is an important factor.

Performance on PPVT: When the PPVT is compared with any of the achievement or skill tests, it appears that there is a much greater deficit in language development (second order habit development of the speaking-listening vocabulary) than in school achievement areas. This great language handicap seems to be at least partially responsible for the regression phenomena in academic skills mentioned earlier and the tremendous disabilities shown in all achievement areas.

Performance on SFB: The children studied generally performed better on the speed and placement tasks of the SFB than they did on any of the other tests. It is suggested that the deficit in language development had least impact in this area than in those where verbal skills are needed to perform the required tasks such as recognition of vocabulary pictures, writing words, reading and doing arithmetic problems.

Performance on WRAT: As indicated above, the population performed better in each of the WRAT areas than they did on the PPVT. The significant factor is apparently a deficit in second order habit development of the speaking-listening vocabulary. However, when compared to the non-verbal SFB, success on the WRAT was significantly lower.

Comparison within the WRAT between spelling, reading, and arithmetic revealed that the research population on an average score higher in arithmetic than in either spelling or reading. The arithmetic test requires fewer verbal skills than do the other two areas. Thus, language development deficits had less of an impact upon their performance. The scores in the arithmetic section indicate that the children do not understand basic arithmetic manipulations beyond simple, one-column addition and subtraction problems. Multiplication, division, and two or more

column addition and subtraction problems were beyond the skills of almost all the children tested, regardless of age.

Closer observation of the test results reported in Tables 13 and 14 indicated that girls as a group did not do significantly better in arithmetic than in spelling or reading. This is in contrast to the comparisons for the total group and for boys. This seems to indicate that the level of language development used in the reading and spelling skills is less for boys than for girls. This appears to be incongruent with the analysis of question one which indicated no differences between the sexes in level of performance in any of the achievement areas. The former analysis was made for each age group separately. Perhaps when all ages are combined, the difference in language development between boys and girls becomes more obvious.

In final summary, this study gives evidence that Mexican-American migrant children show a significantly lower English language development than is expected for pupils of their respective ages and that this deficit negatively affects performance in school-related skills such as reading and spelling and to a lesser extent arithmetic. This language problem does not significantly effect motor performance.

RECOMMENDATIONS

The following recommendations are considered to be reasonable responses to information gathered through observation of activities being carried on at the centers and analysis of the data resulting from the administration of the research instruments.

Early Interruptions

It seems that if these children are to experience an increasing degree of success in English academic areas the definite tendency toward tremendous oral and written language deficits must be interrupted through providing necessary language instruction and activities beginning at 3 or 4 years of age. Possible activities might include the following:

1. Those pre-school nursery programs which are currently carrying out primarily nursing care and play activities should change the emphasis from merely informal socialization processes to one of a semi-formal language learning program. This means the use of the bilingual approach to carry on communication must be minimized. It is suggested that English be used exclusively to develop conversation levels for meeting basic needs and socialized conversation skills.
2. The summer program for migrant workers might consider initiating a family learning experience program. This would involve all members of the family in teaching and learning of communication skills in English. The purpose of such a program would be to increase the English speaking skills of the older members of the family and to motivate them to rely on English in such family living experiences as dinner conversations and personal care directions.

Common Experiences

The language development program for children of all ages must be highly structured rather than incidental or accidental as is frequently observed. The materials and structure should deal basically with high

frequency words in the English language which occurs as an integral part of the children's growth experiences.

The more structured approach would rely less heavily on standardized prepared materials for language skills instruction than is the case in many programs presently being carried on.

An example of a more functional and effective approach would be the use of an experience chart where children would relate "here and now" life activities which the teacher could record and utilize as the basic material for language development. This method has the advantages of starting at the children's level of understanding and involving them more completely in the learning process.

Unilingualism

It has already been stated obliquely that English should be utilized more completely and earlier in the formal and informal learning experiences of the Mexican-American children. To emphasize this point, it is suggested that instruction and interaction as it occurs in the school environment should not be bilingual. Contrary to what might be read infrequently in the literature, it is felt that the intermixed used of Spanish interferes with the English learning set of these children.

Reading

The general oral language deficit suggests that learning to read English is extremely difficult if not impossible for these children as it is currently being taught. A more effective method of teaching reading would take the language deficit into account and attempt to compensate for it through utilizing an experience approach similar to that suggested earlier for oral language development. The essence of this idea is to

forget the commercially prepared books and reading schedules and to emphasize spontaneous and current learning experiences to provide the stimuli for teaching such fundamentals as the alphabet, decoding skills, and basic vocabulary. This approach utilizes the visual discrimination abilities which seem to be one of the measured strengths of these children.

Arithmetic

Observation of deficits in arithmetic skills of the children measured follows the same pattern as has been discussed previously for oral and reading language development. Thus the suggestion for future training in arithmetic skills are also similar to those for reading. Again, rather than to use the prepared materials, it is recommended that life experiences be capitalized upon to teach quantitative terms such as more and less than, times, and division. Commerically prepared materials emphasize abstractions which rely on thought patterns in English not possessed extensively by these children and relate experiences which are not common to many of those children. Common experiences which might be used with real involvement and meaning could include exchange of money, time, production figures, and terms of position.

Other Academic Areas

Without elaboration, it is sufficient to suggest that other areas such as health and social studies, etc., must necessarily capitalize on the procedure established in reading and language development. For example, geography might very readily adapt itself to relating previous environmental characteristics with those currently being observed in the new location by the child.

Summary

Although these recommendations are intended to apply most directly to summer school programs, the extent and persistence of the regression phenomena noted at all levels certainly points to the necessity for development of a program at the national level. This would insure some degree of scope, sequence, and continuity for the highly mobile migrant population.

It is re-emphasized that any program, local or national, should begin in the early pre-school years and continue through at least the elementary school level.

Structuring a program such as is suggested on a full-day, 12-month basis would increase its intensity when it is most needed.

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DISTRIBUTION OF SUBJECTS BY CENTER AND AGE

CENTER	AGE GROUP 4	5	6	7	8	
Casselton	5	7	12	9	10	43
Hector	16	19	12	21	16	84
Hollandale	12	11	12	9	11	55
Moorhead	7	1	5	20	13	46
	40	38	41	59	50	228