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ABSTRACT

The St. Louis Vocabulary Development Project was developed to help children cope with the increasing vocabulary demands in content area textbooks encountered in the fourth grade. The project was presented over the school radio system for 30 minutes daily, 3 days weekly, for 30 weeks in about 150 schools. The fifth and sixth graders were taught 1,800 words, and the fourth graders received 585. For each radio lesson the students were pretested and post-tested. The Iowa Tests of Basic Skills and the Lorge-Thorndike Intelligence Tests were administered before and after the project. Test results were factor analyzed and correlated with gains in vocabulary development. A teacher questionnaire was also administered. It was found that (1) the vocabulary development project had positive effects on measured achievement growth in general vocabulary and spelling; (2) it had a small, but positive, effect on measured changes in reading achievement and intelligence; (3) the effects on achievement variables were greatest for students in predominately black schools; and (4) teachers generally favored the project. Tables and references are included. (AW)

VOCABULARY DEVELOPMENT PROJECT

EVALUATION REPORT 2

Board of Education

Component 1

1969-70

St. Louis Public Schools Division of Evaluation & Research

1517 South Theresa Avenue

St. Louis, Missouri 63104

SAINT LOUIS PUBLIC SCHOOLS

DIVISION OF EVALUATION
AND RESEARCH

EVALUATION REPORT

VOCABULARY DEVELOPMENT PROJECT

APRIL, 1971

Clyde C. Miller
Acting Superintendent

CONTENTS

ACKNOWLEDGMENTS

The creation of the St. Louis Vocabulary Development Project has been a cumulative process, has gone through several phases over several years now. The project has required the talent and energy of many people. Dr. William Kottmeyer, the former St. Louis Superintendent of Schools, conceived the project, wrote many of the materials, and was the first radio teacher. Mrs. Mattie Craig also wrote materials for both the fifth grade programs and the new program for the fourth grade. Mrs. Craig also handled many of the details of administering the program. Miss Ruth Dockery, Miss Audrey Claus, and Mrs. Craig produced the stories, tests, and radio scripts for the fourth grade program for which Mr. Robert Winters has been the radio teacher. Mrs. Gertrude Hoffsten, recently retired as Director of the system's FM radio station, contributed substantially to the organization and implementation of the program. The new sixth grade series of lessons to be used in 1971-72 is being developed by Mrs. Lila Murphy and Miss Rebecca Hays. The entire Division of Curriculum Services, Directed by Dr. Earl Herminghaus, coordinated and directed the operation. Many classroom teachers and the elementary supervisors provided valuable input and counsel during the development of the project.

The evaluation of the project has also been a cumulative process, has involved many people over considerable time. Mr. David Tanis and Dr. Gordon White have handled much of the evaluation design and data processing. Dr. Jon Marshall was responsible for the statistical analyses of this particular report. Dr. Gerald Moeller and Mr. Arthur Draper have done much of the writing for the evaluations.

A TEACHING SYSTEM TO IMPROVE CITY CHILDREN'S VOCABULARIES

INTRODUCTION:

The St. Louis Vocabulary Development Project was presented over the school system's radio station three days weekly for thirty weeks in 1969-70. Nearly 900 fourth, fifth, and sixth grade classrooms in 150 schools were involved. Fifth and sixth graders were taught 1,800 words, and fourth graders received 585.

The project required elaborate systems of communication and coordination. Ninety radio lessons were produced; test and textual materials were developed. Structures were provided for collecting tests, scoring them and feeding the results back to the teachers and children. Scheduling was arranged so that the program could be received at all schools at the same time. Computer and machine scoring schedules were adjusted. Hundreds of details of monitoring and administration were involved.

The system was developed to deal more adequately with the children's need for larger vocabularies to cope with the subject matter text books they begin encountering in the fourth grade. Vocabulary becomes a serious obstacle to many urban children's learning at about the middle grade level. During the primary years, a very limited basal vocabulary of several thousand of the most frequently used words is used in most teaching materials. Each succeeding reader the children use is carefully constructed to use only a few unfamiliar words. New words are taught the children before they encounter them in the text. In their primary reading instruction, the children learn to recognize whole word patterns, to associate letters and sounds and to syllabicate. By those methods they are able to identify the words that are already in their hearing and speaking vocabularies.

The major problem arises when students leave the controlled vocabularies of the basal texts and run into words that are new to them in their science, arithmetic, and social studies materials. They often have little skill in deciphering meanings of

words from the context, even less skill in phonetic or structural analysis, and little appetite for using the dictionary independently. Inner-city children, especially, often come from backgrounds that have not exposed them to the kinds of words that schools rely on for teaching. The St. Louis Vocabulary Development Project was designed to confront the vocabulary problem during the stage in school when students are first being severely challenged by the expanded vocabularies of subject matter texts.

The assumption behind the Vocabulary Development Project has been that a systematic, massive infusion of new words at the middle grade level will produce marked gains in children's verbal skills as measured by standardized tests. The intention has been to improve the child's vocabulary, and thus to improve his general school achievement.

RELATED LITERATURE:

A number of research articles, classroom reports, and the like have dealt with this problem of vocabulary development. A fairly comprehensive review of the literature is reported by Dale and Razik (1963). Following is a selected review of literature directly related to the Vocabulary Development Project.

It was demonstrated by Traxler (1938) and Bernard (1941) that over a relatively short period of several months, vocabulary can be taught directly. They reported finding that students' scores on vocabulary tests increased when studying from prepared lists. Miles (1945) reported finding that the direct teaching of vocabulary for a semester resulted in significant improvement in general vocabulary, and that the improvement was significant over a control group even after a two and one-half month period. Furthermore, he found that the improved vocabulary skills were related to higher levels of achievement in English.

In a study designed to study the effects of programmed instruction on vocabulary development, Eicholz & Barbe (1961) carefully matched two groups of 7th grade students for age, sex, and IQ. The experimental group heard an informal talk once a week for 30 minutes for 8 weeks by one of the experimenters. Experimental subjects were subsequently given two practice forms of a test of 20 words and were provided with immediate feedback.

Control subjects received no treatment. At the end of the experimental period, both experimental and control subjects were given another form of the 20-word test. Results showed significantly greater gains for the experimental group as compared to the control group.

Many researchers have stressed the importance of direct experience, including wide use of the words in a variety of contents, on vocabulary development (Townsend, 1964; Burns, 1964). Of particular interest, Cohen (1968) found that the vocabulary of disadvantaged children can be greatly improved through story-telling.

It has been reported by several researchers that vocabulary improvement is related to improved achievement in other academic areas. It has been shown that the learning of general vocabulary is significantly related to improved achievement in English (Miles, 1945) and that the learning of quantitative vocabulary is significantly related to improved achievement in arithmetic problem-solving (Vander Linde, 1964).

Most of the research has involved relatively small numbers of subjects in controlled settings. However, Von Horn and Janes (1967) reported many of the same kinds of results in a city-wide project involving 5,000 grade nine students. For 25 weeks, students were given vocabulary lists weekly; obtaining the words on Monday and being tested on Friday, with systematic reviews at the end of each 4-week period. They reported an average increase in students' scores on the Cooperative English Test of 36 points (48.5 to 84.5). Furthermore, they observed that (1) student motivation increased, (2) vocabulary improvement generalized to other scholastic areas, and (3) prepared lessons were valuable time-savers for the teachers.

While no experimental precedent exists for the Vocabulary Development Project, there is considerable evidence that vocabulary can be improved by systematic teaching efforts including relating vocabulary through stories, and consistent testing-evaluation. Moreover, the effects of such vocabulary instruction tend to transfer to other areas of learning and seem to be retained by the students.

THE PROJECT:

The Vocabulary Development Program has been evolving since 1967. (See Figure 1.) Materials were developed and tested during 1967-68. In that school year experimental classes located in poor schools made significantly higher gains in reading comprehension than controls. Similarly, low IQ students made greater gains than did high IQ students. These results with 3,150 students in grades 4-9 were so optimistic that further development of the project was warranted. Results from a large demonstration in 1968-69 encouraged the administration to expand the program to include all middle grade students in the project for 1969-70. In 1968-69, the project presented the same lessons to students in grades four through six. In 1969-70, fifth and sixth graders received the same instruction--thirty minute lessons three days weekly, Greek and Roman myths to give the words a context, and a total of 1,800 words for the year. That proved to be too many words for fourth graders. In 1969-70, fourth graders were given fewer words and shorter lessons, with fables and folk tales to accompany them.

The words for the lessons were selected from Thorndike and Lorge's The Teacher's Word Book of 30,000 Words (1945) which lists the words according to their frequency of use in English prose. Words which would be likely to give middle grade students some difficulty were chosen from the thousand words that are most frequently used. Those were arranged alphabetically in groups of twenty (groups of eight for the fourth grade) and simple multiple choice vocabulary tests were devised. The same was done with the second thousand, the third, the fourth, and so on. The lists were printed as pre-tests of twenty words (eight for the fourth graders), re-tests of the same words in scrambled order, and mastery tests of a sample of 100 of the words covered in nine lessons.

The lessons were presented three days weekly over the school system's radio station. Before the radio lesson was presented, the classroom teachers gave the students a pre-test. Answers were recorded on Digitek answer sheets and the teacher collected them. The radio lesson began, and the radio teacher dictated the test words and dictionary pronunciation as the classroom teacher wrote them on the board and the students wrote the words in their word notebooks.

Stage I: 1967

Spring: Pre-test, re-test, mastery test materials prepared in mimeograph form by teacher committee.

Summer: Materials tested on one hundred eighth and ninth grade poor readers.

Fall: Materials refined and published in format suitable for self-instruction.

Stage II: 1968

Spring: Self-instruction packages tested with experimental and control groups
Groups consisted of 3,150 students in grades 4-9 in each group.
Low income and low IQ students made greater gains than middle income and high IQ students.

Stage III: 1968-69

Substituted radio instruction and created stories of myths with words in context.
Presented 90 lessons, four weekly, to 525 students in 18 classes.
Restricted population to grades 4, 5, 6.
Results showed ITBS and IQ gains well above students' average previous gain in school.
Developed new materials with fewer words, shorter lessons with fables and folk tales for fourth grade.

Stage IV: 1969-70

Presented radio instruction to all 24,000 4th, 5th, and 6th graders.
Began developing new materials for 6th grade.

FIGURE 1

Vocabulary Development Project Evolution: 1967-70

The radio teacher provided an explanation of the meaning of each word; gave illustrations of its uses; called attention to unexpected spellings; explained the dictionary spellings and symbols; gave the noun, verb, adjective, and adverb forms when they were formed from the same root; discussed synonyms, antonyms, and homonyms.

When the words had been discussed, the radio teacher told stories that used the test words in context as the students followed along in their own books. After a number of lessons had accumulated, it became possible to incorporate, in addition to the twenty test words for the day, between one and two hundred test words from earlier lessons. Thus, the test words reappeared frequently in various narrative contexts including regular textbooks. Teachers were alert to reviewing the meanings as the words were encountered in other contexts, and many of the teachers developed ingenious and effective ways of their own for reinforcing the vocabulary instruction.

When the radio lesson was over, the students took a re-test, again recording answers on Digitek sheets. The answer sheets were brought to a central collection point where they were picked up by regular truck delivery. The pre- and re-test answer sheets were scored by a test scanner at the school's computer center. The computer then provided data by child, by class in each school, and by overall grade level. The computer print-outs were returned to each teacher a few days after the mastery test, and the results were given to the students.

None of the individual elements of the St. Louis Vocabulary Development Project is new. Radio teaching has been around for a long time. Digitek scoring and computer tabulation are familiar applications of technology. The radio teacher's techniques are in the best style of the old school of deductive, direct teaching.

The distinction of the program comes from the combinations of the elements, and the massive, systematic, long-term barrage of new words for many children. Many words and systematic instruction over a long period of time produce a cumulative effect that, we believe, accounts for sizeable gains in students' verbal ability as reflected in standardized achievement tests and paper-and-pencil IQ measures.

PROJECT RESULTS: 1968 - 1969

Tables 1 and 2 summarize the expected gains of the pupils involved in comparison to their actual gains. All achievement and IQ testing was done initially in September 1968. Expected scores were based on prior learning rates. In all but one case, the actual results surpassed the expected scores. These data tend to support the hypothesized outcomes presented in Figure 2.

TABLE 1.

VDP: Expected Achievement Gains vs Actual Gains, 1968-1969

Variable	Grade	N	Natl Avg.	Initial Score	Lrng Rate	Exp. Score	Actual Score	Exp. Gain	Actual Gain
READING COMPREHENSION (Gates-MacGinitie)	4	148	4.2	3.5	78%	4.1	4.2	.6	.7
	5	153	5.2	4.7	84%	5.3	5.7	.6	1.0
	6	144	6.2	6.2	91%	6.8	7.2	.6	1.0
VOCABULARY (Gates-MacGinitie)	4	148	4.2	4.0	89%	4.6	4.7	.6	.7
	5	153	5.2	5.1	90%	5.7	5.9	.6	.8
	6	144	6.2	6.1	90%	6.7	7.1	.6	1.0
SPELLING (ITBS)	4	148	4.2	3.6	78%	4.1	4.4	.5	.8
	5	153	5.2	5.0	89%	5.6	5.9	.6	.9
	6	144	6.2	6.2	94%	6.8	6.6	.6	.4

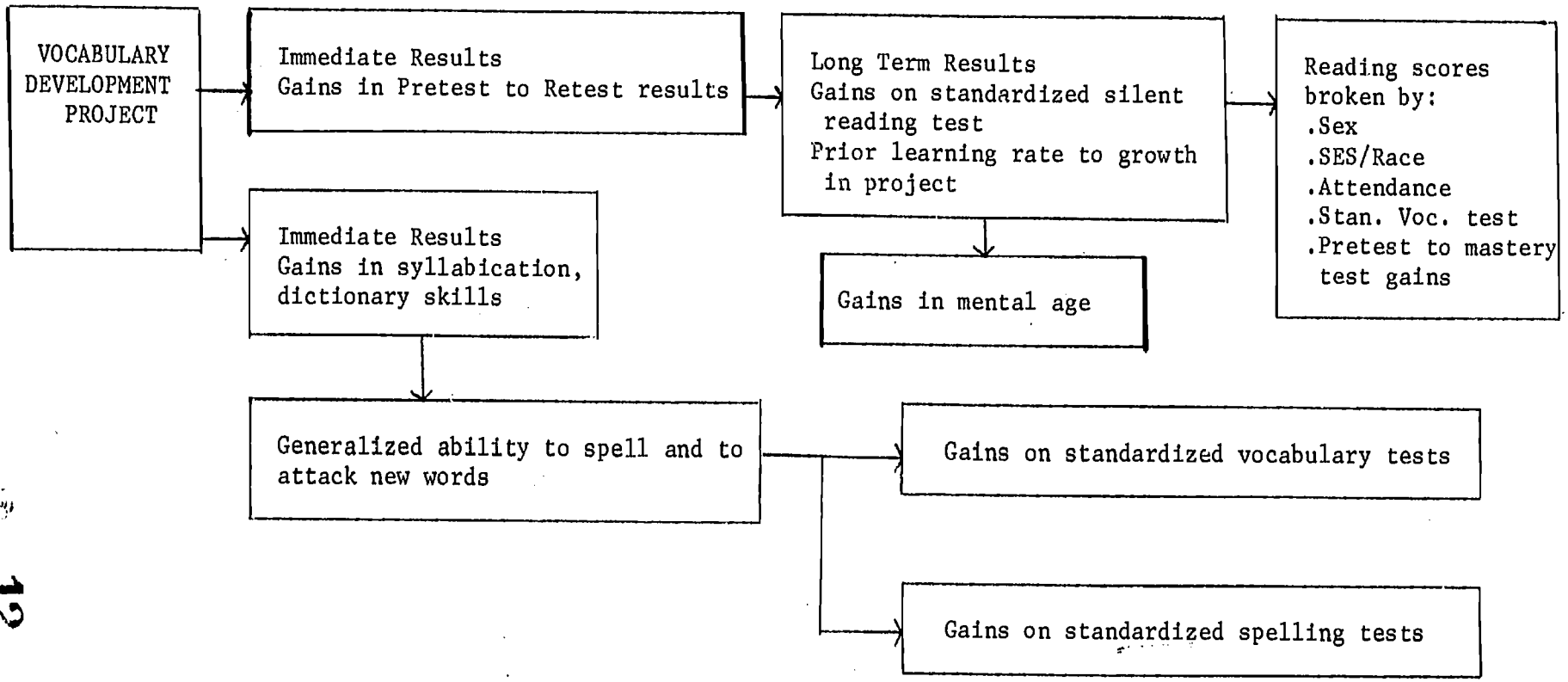


FIGURE 2

Hypothesized Results of the Vocabulary Development Project

TABLE 2

VDP: Gains in IQ as Measured by the Lorge-Thorndike Intelligence Tests, 1968-1969

Grade	Pre	Post	Gain
4	91.2	96.8	5.6
5	98.4	102.0	3.6
6	102.2	105.4	3.2

PROJECT RESULTS: 1969-70

The 1969-1970 evaluation of the project was concerned with two major issues. First, with the project, did students produce better than expected achievement results in verbal areas; and, second, was the project equally effective for all subgroups of students.

In specific, we were interested in determining whether or not a massive, systematic infusion of new vocabulary words over an extended time period at the middle grade levels would be related to gains in children's vocabulary, spelling, reading comprehension and intelligence as measured by standardized tests.

In order to deal with these questions, several sets of analyses were run. The first of these dealt with the results obtained by students on the Iowa Tests of Basic Skills (ITBS) and Lorge-Thorndike Intelligence Tests (L-T). These tests were administered in September, 1969 and May, 1970 to the 24,000 students in the middle grades in St. Louis City Public Schools. During this period, the students were taught vocabulary for three thirty minute sessions three days weekly.

The standardized test data will be reported here from two vantage points. First, the expected levels of achievement[1] are compared to actual levels obtained

[1]Based on the child's learning rate determined by the following formula:

$$\frac{\text{Obtained Grade Equivalent}}{\text{No. of years in school} + 1}$$

Figure 3. Comparison of Pre-Test, Expected Post-Test, and Actual Post-Test ITBS Scores:

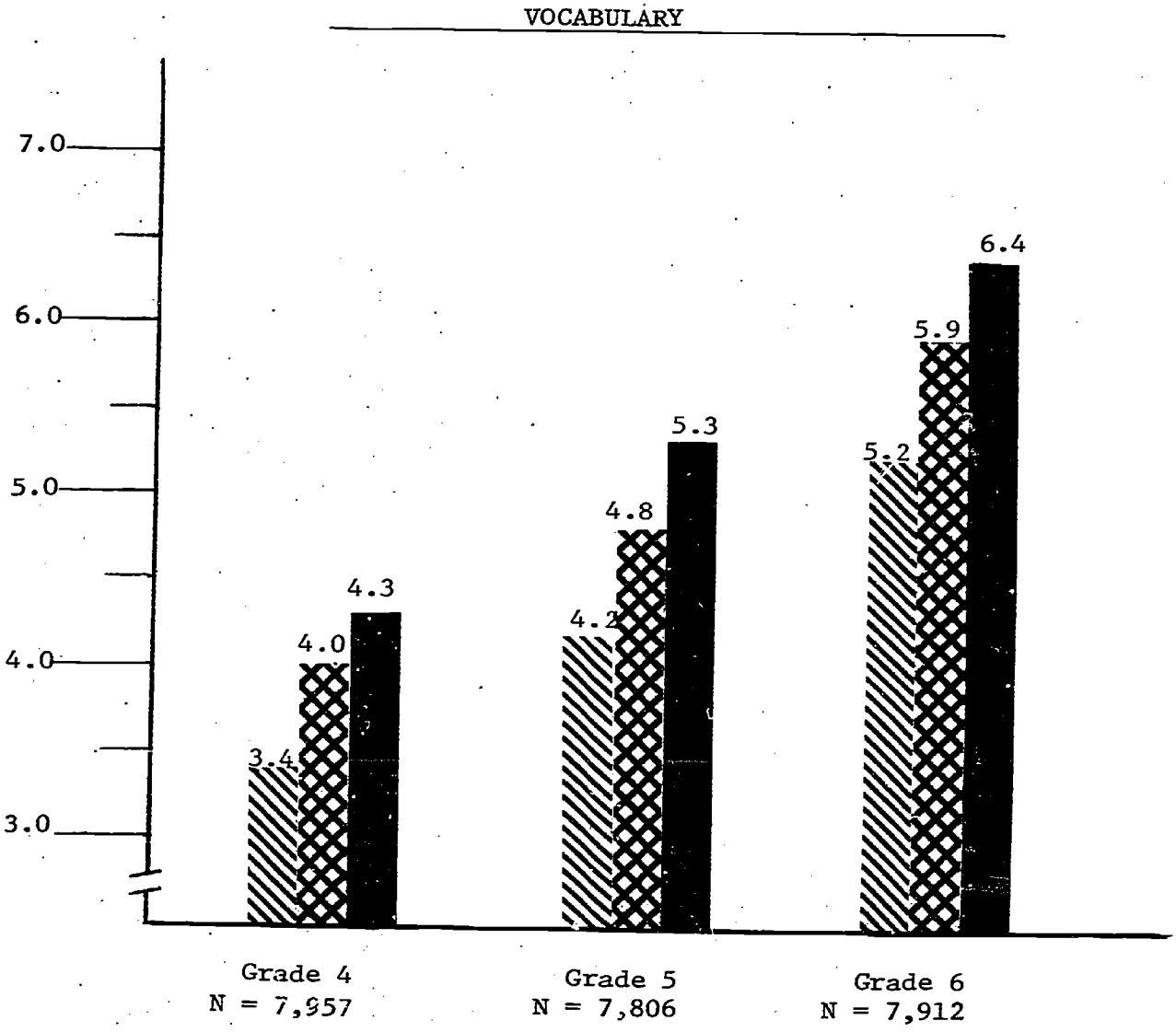


Figure 4. Comparison of Pre-Test, Expected Post-Test, and Actual Post-Test ITBS Scores:

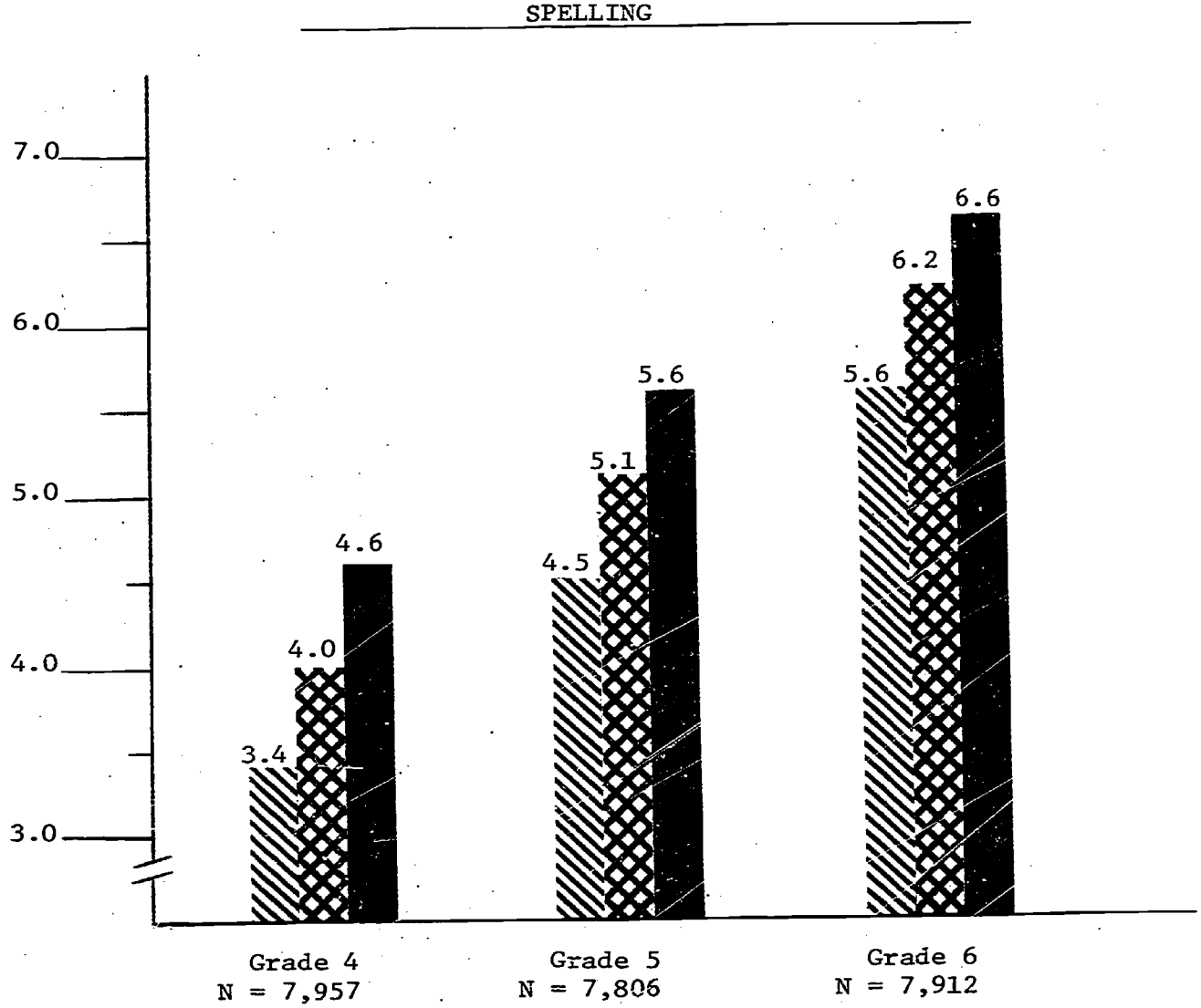
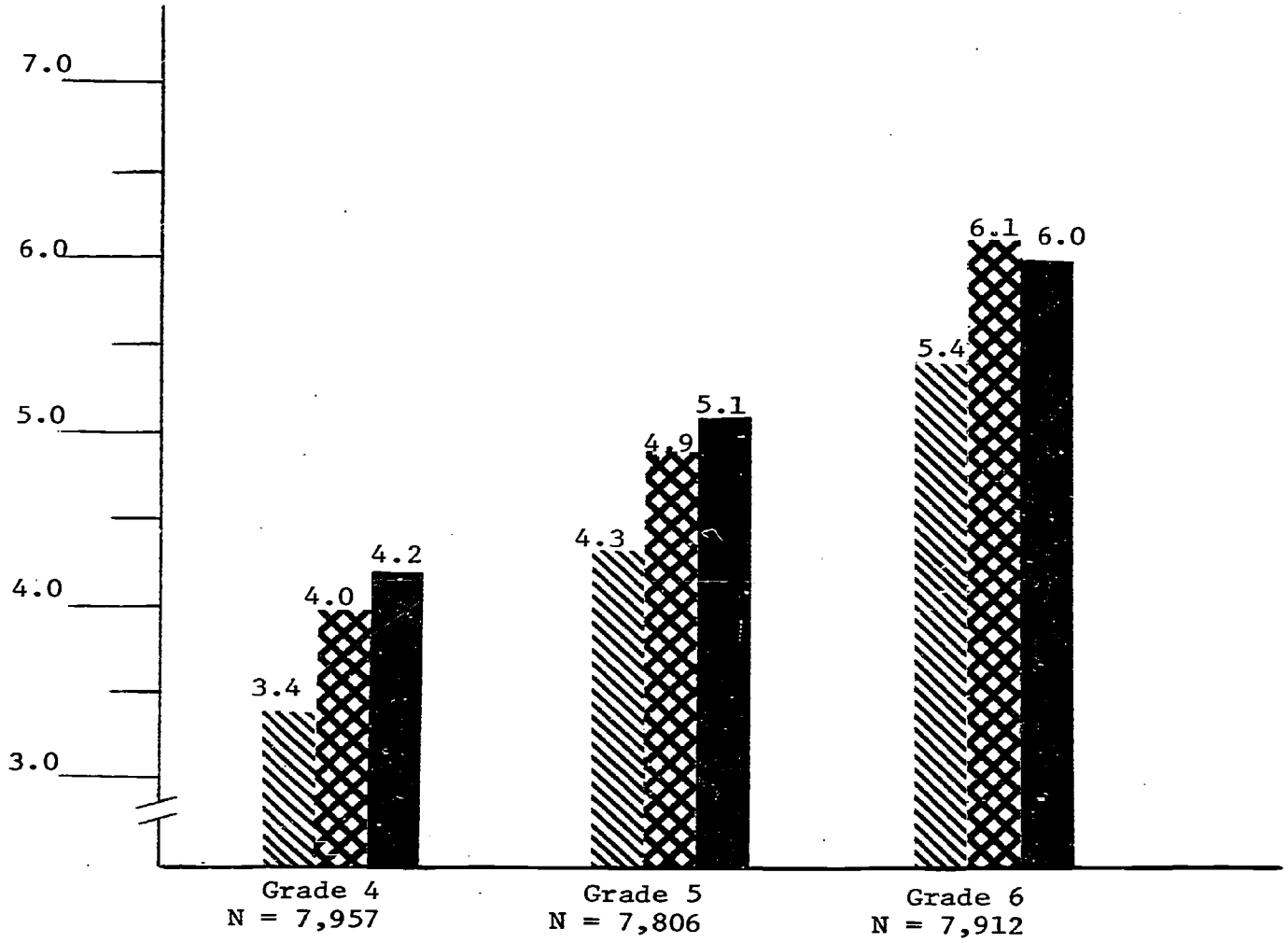


Figure 5. Comparison of Pre-Test, Expected Post-Test, and Actual Post-Test ITBS Scores:

READING

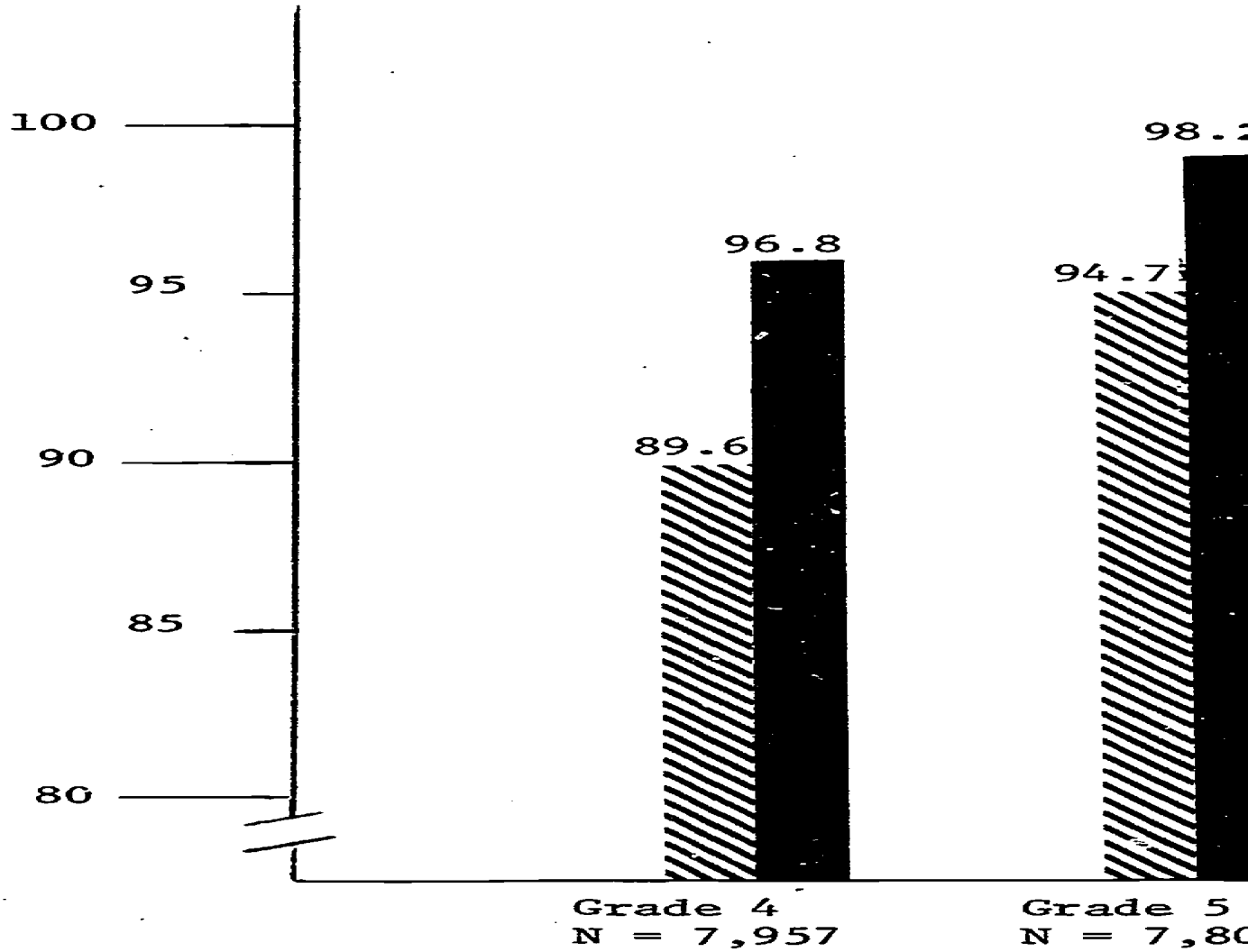


September, 1969

Expected Gain (Based on Prior Rate of Learning)

May, 1970

Figure 6. Changes in Lorge-T



ndike IQ.

100.

94.1

Grade 6
N = 7,91

and pre-test intelligence scores are compared with post-test scores. Second, the standardized test data are compared by subgroups.

Comparison between the expected and obtained achievements levels on the Reading, Vocabulary and Spelling subtests of the ITBS are presented in Figures 3, 4, and 5, respectively. With the single exception of the sixth grade reading, most gains were three to four months above the level expected. As can be noted from these data, the average learning rates of students during the project were considerably higher than the average learning rates obtained prior to the project.

Of particular interest is the pre-post intelligence test data displayed in Figure 6. The data were obtained from Forms A and B, respectively, of the Lorge-Thorndike Intelligence Tests. As can be noted from the figure, substantial gains of from 3.5 to 7.2 IQ points were found at the three grade levels. However, whether these gains are related to the project, testing procedures, or other variables is open to question.

The second set of analyses consist of examining the pre-post test difference scores by subgroups on the standardized tests. The subgroups were identified by intelligence level, race and socio-economic level as follows:

Intelligence	--High IQ, 95, or above on pre-test. Low IQ, below 95 on pre-test.
Race	--Black, school at least 90% black. Mixed, school between 10% and 90% black. White, school at least 90% white.
Socio-economic level	--Title I school, at least 23% on ADC. Non-Title I school, less than 23% on ADC.

Eighteen 2 by 3 by 2 factorial analyses were run. These included comparisons on ITBS Composite, Vocabulary, Reading and Spelling scores and Lorge-Thorndike Verbal and Quantitative IQ scores for the fourth, fifth and sixth grade students. The results on the analyses are presented in Table 3. Since the number

TABLE 3

Summary of Factorial Analyses:
Spring - Fall

Grade	Variable	Source of Variance	SS	DF	MS	F
4	ITBS Composite	IO	38.297	1	38.297	47.863*
		Race	148.344	2	74.172	92.699*
		Title	65.422	1	65.422	81.764*
		IO by Race	22.906	2	11.453	14.314*
		IO by Title	5.055	1	5.055	6.317
		Race by Title	18.262	2	9.131	11.412*
		IO by Race by Title	17.719	2	8.859	11.072*
		Within Groups	3394.172	4242	0.800	
4	ITBS Vocabulary	IO	14.974	1	14.974	23.827*
		Race	62.050	2	31.025	49.368*
		Title	27.717	1	27.717	44.105*
		IO by Race	4.126	2	2.063	3.283
		IO by Title	1.580	1	1.580	2.514
		Race by Title	6.074	2	3.037	4.833*
		IO by Race by Title	5.438	2	2.719	4.327
		Within Groups	2657.654	4229	0.628	
4	ITBS Reading	IO	49.076	1	49.076	58.080*
		Race	68.152	2	34.076	40.327*
		Title	32.170	1	32.170	38.072*
		IO by Race	0.041	2	0.020	0.024
		IO by Title	0.005	1	0.005	0.006
		Race by Title	3.778	2	1.889	2.235
		IO by Race by Title	2.940	2	1.470	1.740
		Within Groups	3531.167	4179	0.845	

TABLE 3 (continued)

Grade	Variable	Source of Variance	SS	DF	MS	F
4	ITBS Spelling	IQ	125.469	1	125.469	121.033*
		Race	15.906	2	7.953	7.672*
		Title	7.023	1	7.023	6.775*
		IQ by Race	25.340	2	12.670	12.222*
		IQ by Title	13.535	1	13.535	13.057*
		Race by Title	1.297	2	0.648	0.626
		IQ by Race by Title	3.586	2	1.793	1.730
		Within Groups	4338.379	4185	1.037	
4	Lorge-Thorndike Verbal Intelligence	IQ	16044.625	1	16044.625	215.791*
		Race	7429.313	2	3714.656	49.960*
		Title	3793.875	1	3793.875	51.025*
		IQ by Race	2674.313	2	1337.156	17.984*
		IQ by Title	232.500	1	232.500	3.127
		Race by Title	2909.625	2	1454.813	19.566*
		IQ by Race by Title	1687.625	2	843.813	11.349*
		Within Groups	307968.563	4142	74.353	
4	Lorge-Thorndike Non Verbal Intelligence	IQ	3344.875	1	3344.875	29.304*
		Race	10393.313	2	5196.656	45.527*
		Title	3387.375	1	3387.375	29.676*
		IQ by Race	882.188	2	441.094	3.864
		IQ by Title	239.563	1	239.563	2.099
		Race by Title	1832.750	2	916.375	8.028*
		IQ by Race by Title	52.188	2	26.094	0.229
		Within Groups	474841.188	4160	114.145	

* Significant at the .01 level.

TABLE 3

Summary of Factorial Analyses:
Spring - Fall

Grade	Variable	Source of Variance	SS	DF	MS	F
5	ITBS Composite	IQ	92.051	1	92.051	92.260*
		Race	27.914	2	13.957	13.989*
		Title	2.172	1	2.172	2.177
		IQ by Race	8.523	2	4.262	4.271
		IQ by Title	6.203	1	6.203	6.217
		Race by Title	1.746	2	0.873	0.875
		IQ by Race by Title	24.391	2	12.195	12.223*
		Within Groups	5373.773	5386	0.998	
5	ITBS Vocabulary	IQ	14.684	1	14.684	13.247*
		Race	42.160	2	21.080	19.017*
		Title	9.004	1	9.004	8.123*
		IQ by Race	6.617	2	3.309	2.985
		IQ by Title	0.422	1	0.422	0.381
		Race by Title	0.680	2	0.340	0.307
		IQ by Race by Title	3.430	2	1.715	1.547
		Within Groups	5904.887	5327	1.108	
5	ITBS Reading	IQ	25.109	1	25.109	26.392*
		Race	10.809	2	5.404	5.680
		Title	3.777	1	3.777	3.970
		IQ by Race	2.809	2	1.404	1.476
		IQ by Title	2.820	1	2.820	2.964
		Race by Title	4.805	2	2.402	2.525
		IQ by Race by Title	16.602	2	8.301	8.725*
		Within Groups	5049.129	5307	0.951	

TABLE 3 (continued)

Grade	Variable	Source of Variance	SS	DF	MS	F
5	ITBS Spelling	IO	179.902	1	179.902	142.147*
		Race	26.742	2	13.371	10.565*
		Title	6.172	1	6.172	4.877
		IO by Race	1.672	2	0.836	0.661
		IO by Title	3.551	1	3.551	2.806
		Race by Title	41.316	2	20.658	16.323*
		IO by Race by Title	0.180	2	0.090	0.071
		Within Groups	6789.996	5365	1.266	
5	Lorge-Thorndike Verbal Intelligence	IO	4378.313	1	4378.313	74.137*
		Race	1302.250	2	651.125	11.025*
		Title	3119.625	1	3119.625	52.824*
		IO by Race	4.313	2	2.156	0.037
		IO by Title	474.438	1	474.438	8.034*
		Race by Title	540.688	2	270.344	4.578
		IO by Race by Title	651.188	2	325.594	5.513
		Within Groups	307626.563	5209	59.057	
5	Lorge-Thorndike Non Verbal Intelligence	IO	10848.938	1	10848.938	122.334*
		Race	2449.375	2	1224.688	13.810*
		Title	1888.188	1	1888.188	21.292*
		IO by Race	637.938	2	318.969	3.597
		IO by Title	892.375	1	892.375	10.063*
		Race by Title	514.000	2	257.000	2.898
		IO by Race by Title	56.938	2	28.469	0.321
		Within Groups	462745.875	5218	88.683	

* Significant at the .01 level.

TABLE 3

Summary of Factorial Analyses:
Spring - Fall

Grade	Variable	Source of Variance	SS	DF	MS	F
6	ITBS Composite	IO	53.119	1	53.119	40.384*
		Race	87.025	2	43.512	33.081*
		Title	0.655	1	0.655	0.497
		IO by Race	3.427	2	1.713	1.303
		IO by Title	4.537	1	4.537	3.449
		Race by Title	30.333	2	15.166	11.530*
		IO by Race by Title	2.568	2	1.284	0.976
		Within Groups	7373.809	5606	1.315	
6	ITBS Vocabulary	IO	87.254	1	87.254	55.594*
		Race	83.000	2	41.500	26.442*
		Title	4.047	1	4.047	2.579
		IO by Race	20.258	2	10.129	6.454
		IO by Title	2.906	1	2.906	1.852
		Race by Title	15.688	2	7.844	4.998
		IO by Race by Title	8.957	2	4.479	2.854
		Within Groups	8671.426	5525	1.569	
6	ITBS Reading	IO	10.249	1	10.249	8.551*
		Race	33.388	2	16.694	13.927*
		Title	0.227	1	0.227	0.189
		IO by Race	1.004	2	0.502	0.419
		IO by Title	5.771	1	5.771	4.814
		Race by Title	2.809	2	1.404	1.172
		IO by Race by Title	2.456	2	1.228	1.024
		Within Groups	6598.477	5505	1.199	

TABLE 3 (continued)

Grade	Variable	Source of Variance	SS	DF	MS	F
6	ITBS Spelling	IQ	223.207	1	223.207	166.949*
		Race	55.188	2	27.594	20.639*
		Title	1.012	1	1.012	0.757
		IQ by Race	31.574	2	15.787	11.808*
		IQ by Title	1.355	1	1.355	1.014
		Race by Title	28.441	2	14.221	10.637*
		IQ by Race by Title	22.926	2	11.463	8.574*
		Within Groups	7536.535	5637	1.337	
6	Lorge-Thorndike Verbal Intelligence	IQ	11289.688	1	11289.688	177.207*
		Race	3345.063	2	1672.531	26.253*
		Title	0.750	1	0.750	0.012
		IQ by Race	10.250	2	5.125	0.080
		IQ by Title	11.313	1	11.313	0.178
		Race by Title	794.938	2	397.469	6.239
		IQ by Race by Title	614.563	2	307.281	4.823
		Within Groups	346577.813	5440	63.709	
6	Lorge-Thorndike Non Verbal Intelligence	IQ	4911.875	1	4911.875	63.850*
		Race	1697.313	2	848.656	11.032*
		Title	0.625	1	0.625	0.008
		IQ by Race	1213.000	2	606.500	7.884*
		IQ by Title	3.625	1	3.625	0.047
		Race by Title	1994.563	2	997.281	12.964*
		IQ by Race by Title	129.188	2	64.594	0.840
		Within Groups	421182.313	5475	76.928	

* Significant at the .01 level.

of students in each subgroup was not equal, the "equal number within rows" method of analysis was used (Snedecor and Cochran, 1967). For this form of analysis, the statistics were determined as though there were equal numbers of students from each racial category and economic level within an IQ group. Using this method, the difference between subgroups and their interactions could be examined with a minimum of confounding from the interrelations among the subcategories.

Tables of means associated with these analyses are presented in Appendix B. Of particular note was that significant differences emerged among the racial groups on 17 variables. Thirteen of these differences favored the students from predominantly black schools with only small differences between those students from mixed and white schools. For grade four, this order of differences emerged on all six analyses. The adjusted mean growth scores for blacks were above one grade equivalent on the four achievement measures: ITBS Composite, 1.246; ITBS Vocabulary, 1.117; ITBS Reading, 1.038; and ITBS Spelling, 1.375. This is particularly interesting in that past experience and research would suggest that for the students in metropolitan black schools the growth scores over a nine-month period would be considerably less than one grade equivalent and that they would be lower than those scores obtained for students in white schools. Yet, the opposite result was found for the duration of the Vocabulary Development Project. As generally might be anticipated, the growth scores for the other groups of students ran about .75 to about .90. The one exception was the ITBS Spelling scores which had an adjusted mean of 1.256 for students from mixed schools and 1.235 for students from white schools. However, even in this instance, the blacks scored significantly higher than the other two groups. Furthermore, as previously noted, there were large gains in IQ for all groups. Again, those students from black schools obtained significantly larger changes with an adjusted mean of 10.010 and the mixed and white groups were almost identical with adjusted mean changes of 7.229 and 7.119, respectively.

For all analyses, significant differences in adjusted means were also found between groups categorized by intelligence or by title. These differences were all in the expected direction with the greatest changes associated with the high IQ group and with

the Non-Title I group. Several of the interactions were significant. For the most part, these interactions included the race variable with the high IQ blacks or the Non-Title I blacks displaying the highest adjusted means.

The results in achievement for the fifth and sixth grade students were similar to those found for the fourth grade except that the magnitude of the differences were not as striking. For the fifth grade, adjusted means were above one grade equivalent for the students in the black schools on three of the four achievement variables and for the sixth grade above one on two of the four achievement variables. Similar depressions of the change scores were found for the mixed and white groups at these grade levels as compared to the fourth grade. At the three grade levels, the smallest growth scores were in Reading and the largest were in Vocabulary and Spelling.

At the fifth and sixth grade levels, the differences in IQ change scores were opposite those found at the fourth grade with the white group obtaining the highest adjusted means. Little difference can be noted between the mixed and black groups at the fifth grade but the mixed group had considerably lower adjusted means at the sixth grade. Changes in IQ were considerably less for these grades as compared with the fourth grade with adjusted means running from about 4.0 to 6.0.

In composite, these results may reflect any of several factors: pupils inexperience in test taking at the fourth grade level, differences in general curriculum and teaching strategies, regression effects differentially affecting initial high and low groups, and effects of the Vocabulary Development Project.

The general consistency between shifts in general vocabulary achievement and shifts in reading, spelling and composite achievement scores would seem to indicate that the Vocabulary Development Project has a positive impact on these several areas of achievement. The results further suggest that the project may have its greatest impact at the fourth grade level. Of particular import, the associative learning of vocabulary seems to be most effective for students in black schools regardless of their relative level of measured intelligence or general socio-economic level.

To further determine the effects of the Vocabulary Development Project on growth in the other achievement areas and IQ, gains in Vocabulary Development score (VDP) were correlated with changes on the other measures. Changes in VDP were determined by calculating the difference between percent correct scores on the pre-tests and mastery tests utilized in the project. Due to the restriction that VDP scores were identifiable only by classroom, the mean scores for classrooms were the units of measurement used in the correlations.

Consequently, there were two major factors which could be expected to depress the obtained correlations. The first and most serious of these is the magnitude of error typically found in difference scores. The reliability of difference scores on tests like the ITBS and Lorge-Thorndike tends to be particularly low since the tests are designed to have high stability coefficients between equivalent forms. Since the obtained correlations could be expected to be deceptively low because of the built-in error, they were corrected for attenuation. The second factor that could depress the correlations was the homogeneity of distributions of means as compared to the distributions of individual scores. No correction was applied for this factor. However, it needs to be kept in mind when interpreting the correlations.

Estimates of the reliabilities of the difference scores are presented in Table 4. The test reliabilities were obtained for the VDP tests using Kuder-Richardson formula 21 and for the ITBS subtests and Lorge-Thorndike using odd-even correlations reported in the manuals.

TABLE 4

Estimates of the Reliabilities of Change Scores

Grade Level	VDP	ITBS			Lorge-Thorndike Intelligence
		Vocabulary	Reading	Spelling	
4	.59	.353	.533	.444	.550
5	.79	.267	.500	.286	.375
6	.79	.357	.471	.100	.178

The obtained and corrected correlations between VDP gains and ITBS Vocabulary, ITBS Reading, ITBS Spelling and Lorge-Thorndike IQ gains are presented in Tables 5 and 6, respectively. As can be noted from Table 6, VDP gains correlated most highly with reading and with vocabulary. In general, these correlations are moderate, ranging in the .40's, .50's and .60's. The 1.00 correlation with spelling at the sixth grade level indicates that VDP gains could account for all the non error variance in spelling gains.

TABLE 5

Obtained Correlations Between VDP Gain and Gains on Other Verbal Measures

	ITBS			
Grade Level	Vocabulary	Reading	Spelling	Lorge-Thorndike Intelligence
4	.19	.10	.33	.02
5	.24	.08	.20	.13
6	.22	.21	.29	.10

However, this extreme value is most likely an artifact of the extreme unreliability of ITBS change scores at this grade level. In general, about 25% of the changes in spelling or general vocabulary are associated with changes in specific vocabulary scores. This magnitude of association is of practical value and is consistent with that reported in the literature.

TABLE 6

Correlations Between VDP Gain and Gains on
Other Verbal Measures: Corrected for Attenuation

Grade Level	ITBS Vocabulary	ITBS Reading	ITBS Spelling	Lorge-Thorndike Intelligence
4	.42	.18	.64	.04
5	.52	.13	.42	.24
6	.41	.34	1.00	.27

The association of VDP gains with reading gains and IQ gains seems to be questionable. However, it can be noted that the association is greater at higher grade levels.

Even though causal associations cannot be determined from these data, the correlations coupled with the results of the factorial analyses would seem to indicate that:

1. increases in specific vocabulary are directly related to growth in general vocabulary and spelling.
2. increases in specific vocabulary have small but possibly accumulative effects on reading and intelligence.
3. associative learning as approached through the Vocabulary Development Project seems to have a greater impact on students in black schools than students in mixed and white schools.

The moderate correlations between VDP gains and the other verbal variables and the consistency of factorial analysis results suggest that the Vocabulary Development Project does have an impact on learning and that this impact is not the same for all subgroups of students.

The final aspect of the evaluation was the obtaining of teachers' opinions and feeling toward the project. Regardless of the educational quality of the project, its success is dependent upon the classroom teacher. Much of the routine associated with the teaching of vocabulary is removed from the teacher. The lessons

are presented over the radio. Pre-tests, re-tests and mastery tests are centrally prepared, distributed to the teachers, and scored for the teachers. Teachers are requested to set a receptive tone in their classrooms and to actively reinforce the vocabulary instruction. However, by failing to comply with these requests, a teacher could easily negate the possible affects of the centrally administered vocabulary instruction. Therefore, it is imperative that the attitudes of teachers toward and receptiveness to the Vocabulary Development Project be determined.

Toward this end, a 53 item questionnaire was administered to the teachers in May, 1970. The questionnaire was responded to by about 85 percent (746) of the 900 teachers involved with the project. The questions sought information on the teachers' perceptions of the value of the program, feelings toward the adequacy of content and presentations, and general attitudes toward it.

In general, the teachers expressed positive attitudes toward the project. (See Appendix A for the questions and a summary of responses.) More than 70 percent of the teachers responded positively to each of the following seven questions.

I agree with the principle that successful vocabulary development requires frequent exposure to a large number of words over a long period of time. (YES 82%; NO, 10%)

The quality of the instruction as presented over the radio is good. (YES, 77%; NO, 12%)

I resent the radio method of teaching vocabulary because of its impersonality. (YES, 9%; NO, 77%)

I resent the idea of having someone else teach my class vocabulary. (YES, 4%; NO, 80%)

I use the words more frequently in class as a result of the lessons. (YES, 73%; NO, 8%)

I feel actively involved with the students as they receive vocabulary instruction. (YES, 73%; NO, 11%)

I consider myself a vital element in the process of vocabulary instruction. (YES, 78%; NO, 9%)

The questionnaire contained 45 Likert-type items and eight descriptive items. Of the 45 Likert-type items, 26 were responded to by the teachers as reflecting positive attributes of the project. They responded negatively to only the following three items.

> I would like to have more opportunity to improve VDP. (YES, 55%; NO, 11%)
>
> Slow students respond well to the project. (YES, 16%; NO, 61%)
>
> I think that the radio programs should be aired at a different time of day. (YES, 50%; NO, 22%)

These three items reflect concerns in the project which should be carefully examined and dealth with. Perhaps the participation of teachers in planning should be more actively sought. Greater teacher involvement might produce a solution to the indicated time problem.

Responses to the final item offer additional information concerning the teachers' feeling that the project does not reach the slow student. The majority of teachers felt that too many words were given during the year. This warrants further examination. Since the number of words for fourth graders was reduced with no negative results, it would seem advisable to study the issue systematically to determine the optimum number of words per lesson for each grade.

Of further note were the responses of teachers that they are providing instruction in vocabulary to their students beyond that in the Vocabulary Development Project.

In summary, the results of the 1969-1970 evaluation of the Vocabulary Development Project indicate that:

1. it has had a positive effect on measured achievement growth in general vocabulary and spelling.

2. it has had a small, but positive, effect on measured changes in reading achievement and intelligence.

3. the effects on achievement variables are greatest for students in predominantly black schools.

4. in general, teachers view the project positively.

5. the number of words presented through the project should be reviewed.

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APPENDIX A

TEACHER QUESTIONNAIRE

SUMMARY

QUESTIONNAIRE RESULTS

In the original questionnaire, five responses were available for items in Part I: Disagree Strongly, Disagree, Neither Agree nor Disagree, Agree, and Agree Strongly. To save space, we present here only the total percentage of negative and positive responses. The number to the left in the margin is the % of negative responses--the combined total of Disagree Strongly and Disagree. The number on the right is the total of Agree and Strongly Agree. N = 769 (85% return).

% −	% +		
35	55	1.	The Vocabulary Development Project fits easily into the classroom schedule.
33	58	2.	The lessons are suitable to most children in my class.
3	41	3.	Parents I have spoken with approve of the Vocabulary Development Project.
15	43	4.	It appears that the VDP has improved students' reading ability.
11	55	5.	I would like to have more opportunities to improve the VDP.
25	50	6.	My students enjoy the radio lessons.
42	20	7.	I could teach vocabulary more effectively on my own.
32	29	8.	I would like to be more directly involved in the project.
10	82	9.	I agree with the principle that successful vocabulary development requires frequent exposure to a large number of words over a long period of time.
36	34	10.	I feel a more individualized approach to vocabulary instruction would be more valuable than the radio programs.
24	36	11.	Most teachers at my school approve of the Vocabulary Development Project.
12	77	12.	The quality of the instruction as presented over the radio is good.
25	45	13.	Students show greater ability to use words precisely after participating in the Vocabulary Development Project.
42	34	14.	Scheduling difficulties resulting from the VDP hamper pupils' progress in other areas.
79	9	15.	I resent the radio method of teaching vocabulary because of its impersonality.
20	66	16.	The atmosphere in my room is one of attentiveness while the instruction over the radio is taking place.

% −	% +		
3	75	17.	My principal approves of the Vocabulary Development Project.
8	88	18.	Most children have little or no difficulty in using the Digitek answer sheet.
11	44	19.	After experience with the VDP, students show less anxiety when taking other types of tests.
80	4	20.	I resent the idea of having someone else teach my class vocabulary.
36	41	21.	Vocabulary is the single most important skill for children at this age to develop.
13	57	22.	The computer print-outs provide me with information which I find useful in teaching vocabulary.
12	69	23.	I enjoy the radio lessons.
27	33	24.	It appears that the VDP has improved students' spelling ability.
20	50	25.	The students appreciate the classical background that the myths and fables offer them.
34	52	26.	The students have no problem understanding the stories even though there is a high concentration of new words in them.
4	86	27.	Bright students respond well to the project.
13	74	28.	The Vocabulary Development Project is well organized and clearly explained to the teachers and students.
8	73	29.	I use the words more frequently in class as a result of the lessons.
61	16	30.	Slow students respond well to the project.
26	51	31.	I see evidence of children using the words in context other than the vocabulary lessons.
13	65	32.	Students are showing a general increase in sensitivity to words as the year has progressed.
23	58	33.	Most students respond enthusiastically to the stories that accompany the lessons.
16	61	34.	I am willing to sacrifice time from other curricular areas for this instruction.
22	63	35.	My students listen attentively to the programs.

% −	% +		
25	35	36.	As a result of the Vocabulary Development Project, students see a need in their lives for improving their verbal ability.
11	73	37.	I feel actively involved with the students as they receive vocabulary instruction.
27	42	38.	Students use a greater variety of words after participating in the VDP.
9	78	39.	I consider myself a vital element in the process of vocabulary instruction.
17	60	40.	The project provides better vocabulary instruction than most teachers could do on their own.
10	65	41.	The students need the classical background that the myths and fables offer them.
24	49	42.	"Real" learning takes place during the radio broadcasts.
50	22	43.	I think the radio programs should be aired at a different time of the day. (Note: You may discuss your answer in more detail in Part III if you wish.)
43	36	44.	During the radio programs, my children are quiet and polite but are not really listening to the lessons.
19	74	45.	The radio in my room gives adequate reception.

QUESTIONNAIRE RESULTS....PART II

46. Before the administration of a new test or retest, I give my children additional vocabulary instruction.

17% (1) hardly ever
23% (2) sometimes
23% (3) usually
35% (4) most of the time

47. For the students I teach, the VDP lessons are

1% (1) very easy
4% (2) easy
50% (3) about right
36% (4) hard
9% (5) very hard

48. On the average, how many minutes in addition to the time taken for the regular radio program do you and your class spend on vocabulary each day?

10% (1) 0-10
42% (2) 10-20
29% (3) 20-30
14% (4) 30-40
5% (5) more than 40

49. After the administration of a test or retest, I immediately provide my students with correct answers.

43% (1) rarely
24% (2) sometimes
14% (3) usually
17% (4) almost always

50. I believe the time spent on the VDP

13% (1) should be shortened a lot
28% (2) should be shortened a little
52% (3) is about right
6% (4) should be increased a little
1% (5) should be increased a lot

51. I think the total number of words presented during the school year is

20% (1) far too many
41% (2) too many
47% (3) about right
1% (4) too few
0 (5) far too few

APPENDIX B

Adjusted Means for Difference Scores

TABLE B.1

Adjusted Means for Fourth Graders on ITBS Composite

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	0.953	1.193			
Black, Non-Title I	1.287	1.702			
Mixed, Title I	0.684	1.057			
Mixed, Non-Title I	0.841	1.016			
White, Title I	0.795	0.554			
White, Non-Title I	0.885	1.094			
Title I	0.8109	0.9351		0.8586	
Non-Title I	1.0045	1.2705			1.1066
Black	1.1202	1.4478	1.2460	1.0456	1.4463
Mixed	0.7628	1.0365	0.8679	0.8276	0.9082
White	0.8401	0.8240	0.8339	0.7026	0.9653
Overall	0.9077	1.1028			
Number	272.	437.			

TABLE B.2

Adjusted Means for Fourth Graders on ITBS Vocabulary

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	0.974	1.072			
Black, Non-Title I	1.235	1.202			
Mixed, Title I	0.818	0.937			
Mixed, Non-Title I	0.827	1.067			
White, Title I	0.626	0.895			
White, Non-Title I	0.933	0.973			
Title I	0.8061	0.9683		0.8678	
Non-Title I	0.9981	1.0807			1.0295
Black	1.1045	1.1373	1.1170	1.0115	1.2225
Mixed	0.8223	1.0022	0.8907	0.8534	0.9181
White	0.7794	0.9339	0.8382	0.7386	0.9479
Overall	0.9021	1.0245			
Number	438.	269.			

TABLE B.3

Adjusted Means for Fourth Graders on ITBS Reading

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	0.834	1.033			
Black, Non-Title I	1.068	1.323			
Mixed, Title I	0.619	0.802			
Mixed, Non-Title I	0.695	0.967			
White, Title I	0.607	0.900			
White, Non-Title I	0.828	0.963			
Title I	0.6867	0.9118		0.7724	
Non-Title I	0.8637	1.0842			0.9477
Black	0.9509	1.1783	1.0375	0.9100	1.1651
Mixed	0.6569	0.8843	0.7435	0.6884	0.7987
White	0.7177	0.9314	0.7991	0.7189	0.8793
Overall	0.7752	0.9980			
Number	433.	266.			

TABLE B.4

Adjusted Means for Fourth Graders on ITBS Spelling

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	1.333	1.572			
Black, Non-Title I	1.285	1.391			
Mixed, Title I	1.113	1.529			
Mixed, Non-Title I	1.144	1.394			
White, Title I	1.000	1.764			
White, Non-Title I	1.040	1.401			
Title I	1.1487	1.6214		1.3294	
Non-Title I	1.1563	1.3952			1.2476
Black	1.3087	1.4812	1.3747	1.4241	1.3252
Mixed	1.1286	1.4613	1.2558	1.2721	1.2394
White	1.0201	1.5823	1.2350	1.2918	1.1781
Overall	1.5083	1.1525			
Number	432.	267.			

TABLE B.5

Adjusted Means for Fourth Graders on Lorge-Thorndike Verbal IQ

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	9.353	5.488			
Black, Non-Title I	15.390	6.837			
Mixed, Title I	8.310	4.111			
Mixed, Non-Title I	8.994	5.713			
White, Title I	7.892	5.273			
White, Non-Title I	8.017	6.245			
Title I	8.5183	4.9572		7.1638	
Non-Title I	10.8002	6.2648			9.0751
Black	12.3712	6.1624	10.0097	7.8826	12.1368
Mixed	8.6520	4.9118	7.2294	6.7131	7.7458
White	7.9544	5.7587	7.1193	6.8957	7.3429
Overall	9.6592	5.6110			
Number	429.	263.			

TABLE B.6

Adjusted Means for Fourth Graders on Lorge-Thorndike Non-Verbal IQ

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	9.848	7.479			
Black, Non-Title I	13.749	9.744			
Mixed, Title I	7.672	6.878			
Mixed, Non-Title I	7.953	6.588			
White, Title I	6.421	5.524			
White, Non-Title I	8.766	7.104			
Title I	7.9803	6.6269		7.4706	
Non-Title I	10.1549	7.8123			9.2728
Black	11.7967	8.6117	10.5974	8.9558	12.2390
Mixed	7.8127	6.7330	7.4061	7.3729	7.4394
White	7.5934	6.3140	6.1116	6.0832	8.1400
Overall	9.0676	7.2196			
Number	434.	262.			

TABLE B.7

Adjusted Means for Fifth Graders on ITBS Composite

	Low IQ	High IQ	Race	Title I	Non-Title I
Black Title I	0.884	1.099			
Black, Non-Title I	0.974	1.096			
Mixed, Title I	0.733	0.901			
Mixed, Non-Title I	0.731	1.069			
White, Title I	0.567	1.172			
White, Non-Title I	0.800	0.921			
Title I	0.7282	1.0573		0.8908	
Non-Title I	0.8353	1.0287			0.9309
Black	0.9293	1.0975	1.0125	0.9906	1.0343
Mixed	0.7321	0.9850	0.8571	0.8159	0.8982
White	0.6839	1.0463	0.8630	0.8659	0.8600
Overall	0.7818	1.0430			
Number	455.	445.			

TABLE B.8

Adjusted Means for Fifth Graders on ITBS Vocabulary

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	1.221	1.480			
Black, Non-Title I	1.221	1.338			
Mixed, Title I	1.060	1.205			
Mixed, Non-Title I	1.032	1.109			
White, Title I	1.242	1.208			
White, Non-Title I	1.079	1.144			
Title I	1.1745	1.2977		1.2354	
Non-Title I	1.1107	1.1971			1.1534
Black	1.2208	1.4090	1.3139	1.3490	1.2788
Mixed	1.0464	1.1569	1.1010	1.1318	1.0703
White	1.1606	1.1762	1.1683	1.2255	1.1112
Overall	1.1426	1.2474			
Number	450.	440.			

TABLE B.9

Adjusted Means for Fifth Graders on ITBS Reading

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	0.901	1.062			
Black, Non-Title I	0.772	0.994			
Mixed, Title I	0.788	0.833			
Mixed, Non-Title I	0.786	0.900			
White, Title I	0.784	1.130			
White, Non-Title I	0.893	0.830			
Title I	0.8246	1.0082		0.9152	
Non-Title I	0.8169	0.9082			0.8619
Black	0.8364	1.0281	0.9310	0.9805	0.8816
Mixed	0.7871	0.8662	0.8262	0.8103	0.8421
White	0.8387	0.9801	0.9085	0.9547	0.8622
Overall	0.8208	0.9582			
Number	449.	437.			

TABLE B.10

Adjusted Means for Fifth Graders on ITBS Spelling

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	1.107	1.536			
Black, Non-Title I	1.167	1.477			
Mixed, Title I	0.877	1.319			
Mixed, Non-Title I	1.016	1.388			
White, Title I	1.215	1.596			
White, Non-Title I	0.966	1.227			
Title I	1.0665	1.4838		1.2734	
Non-Title I	1.0498	1.3642			1.2057
Black	1.1369	1.5067	1.3203	1.3199	1.3206
Mixed	0.9466	1.3537	1.1485	1.0962	1.2007
White	1.0908	1.4115	1.2498	1.4040	1.0957
Overall	1.0581	1.4240			
Number	452.	444.			

TABLE B.11

Adjusted Means for Fifth Graders on Lorge-Thorndike Verbal IQ

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	5.083	2.936			
Black, Non-Title I	5,847	4.483			
Mixed, Title I	3.744	2.915			
Mixed, Non-Title I	5.779	2.917			
White, Title I	4.189	3.478			
White, Non-Title I	7.807	4.729			
Title I	4.3387	3.1099		3.7345	
Non-Title I	6.4776	4.0429			5.2805
Black	5.4653	3.7096	4.6021	4.0279	5.1763
Mixed	4.7615	2.9159	3.8541	3.3363	4.3719
White	5.9976	4.1035	5.0664	3.8394	6.2933
Overall	5.4081	3.5764			
Number	442.	428.			

TABLE B.12

Adjusted Means for Fifth Graders on Lorge-Thorndike Non-Verbal IQ

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	1.107	1.536			
Black, Non-Title I	1.167	1.477			
Mixed, Title I	.877	1.319			
Mixed, Non-Title I	1.016	1.388			
White, Title I	1.215	1.596			
White, Non-Title I	.966	1.227			
Title I	1.0665	1.4838		1.2734	
Non-Title I	1.0498	1.3642			1.2057
Black	1.1369	1.5067	1.3203	1.3199	1.3206
Mixed	.9466	1.3537	1.1485	1.0962	1.2007
White	1.0908	1.4115	1.2498	1.4040	1.0957
Overall	1.0581	1.4240			
Number	452.	444.			

TABLE B.13

Adjusted Means for Sixth Graders on ITBS Composite

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	.855	1.100			
Black, Non-Title I	.795	1.076			
Mixed, Title I	.495	0.605			
Mixed, Non-Title I	.680	.863			
White, Title I	.800	.858			
White, Non-Title I	.555	.847			
Title I	.7166	.8547		.7910	
Non-Title I	.6768	.9288			.8125
Black	.8251	1.0884	.9669	.9872	.9466
Mixed	.5873	.7343	.6665	.5543	.7787
White	.6776	.8525	.7718	1.8314	.7122
Overall	.6967	.8917			
Number	432.	504.			

TABLE B.14

Adjusted Means for Sixth Graders on ITBS Vocabulary

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	1.223	1.539			
Black, Non-Title I	.947	1.446			
Mixed, Title I	.823	1.127			
Mixed, Non-Title I	.979	1.148			
White, Title I	1.102	1.100			
White, Non-Title I	.911	1.136			
Title I	1.0497	1.2555		1.1612	
Non-Title I	.9458	1.2438			1.1072
Black	1.0851	1.4928	1.3059	1.3945	1.2174
Mixed	.9013	1.1379	1.0295	.9881	1.0708
White	1.0068	1.1182	1.0672	1.1010	1.0334
Overall	.9977	1.2497			
Number	423.	500.			

TABLE B.15

Adjusted Means for Sixth Graders on ITBS Reading

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	.649	.779			
Black, Non-Title I	.702	.820			
Mixed, Title I	.505	.667			
Mixed, Non-Title I	.590	.551			
White, Title I	.518	.680			
White, Non-Title I	.549	.535			
Title I	.5573	.7085		.6380	
Non-Title I	.6137	.6352			.6252
Black	.6754	.7993	.7415	.7183	.7648
Mixed	.5478	.6089	.5804	.5915	.5694
White	.5332	.6074	.5728	.6043	.5414
Overall	.5855	.6719			
Number	429.	491.			

TABLE B.16

Adjusted Means for Sixth Graders on ITBS Spelling

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	1.044	1.464			
Black, Non-Title I	.666	1.467			
Mixed, Title I	.688	1.100			
Mixed, Non-Title I	.985	1.152			
White, Title I	.848	1.119			
White, Non-Title I	.749	1.070			
Title I	.8601	1.2274		1.0571	
Non-Title I	.7999	1.2298			1.0305
Black	.8546	1.4652	1.1821	1.2689	1.0954
Mixed	.8366	1.1261	.9919	.9092	1.0745
White	.7988	1.0944	.9574	.9932	.9215
Overall	.8300	1.2286			
Number	437.	505.			

TABLE B.17

Adjusted Means for Sixth Graders on Lorge-Thorndike Verbal IQ

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	6.284	4.325			
Black, Non-Title I	6.262	2.288			
Mixed, Title I	5.927	2.414			
Mixed, Non-Title I	5.912	3.579			
White, Title I	7.510	4.600			
White, Non-Title I	7.764	5.145			
Title I	6.5737	3.7797		5.0814	
Non-Title I	6.6463	3.6707			5.0570
Black	6.2730	3.3065	4.6886	5.2375	4.139
Mixed	5.9197	2.9968	4.3586	4.0509	4.6663
White	7.6372	4.8723	6.1604	5.9558	6.3650
Overall	6.6100	3.7252			
Number	423.	485.			

TABLE B.18

Adjusted Means for Sixth Graders on Lorge-Thorndike Non-Verbal IQ

	Low IQ	High IQ	Race	Title I	Non-Title I
Black, Title I	6.123	5.391			
Black, Non-Title I	4.824	3.461			
Mixed, Title I	5.338	3.875			
Mixed, Non-Title I	5.615	4.216			
White, Title I	7.294	3.646			
White, Non-Title I	8.089	5.317			
Title I	6.2519	4.3040		5.2146	
Non-Title I	6.1761	4.3314			5.1937
Black	5.4737	4.4260	4.9158	5.7335	4.0981
Mixed	5.4764	4.0457	4.7146	4.5589	4.8702
White	7.6917	4.4813	5.9821	5.3513	6.6129
Overall	6.2140	4.3177			
Number	428.	487.			