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ABSTRACT

Individual pupil scores, school characteristics, and characteristics of reading programs were assessed in elementary school programs in 36 communities, forming a data bank of information on 6,753 students from grades one through six enrclled in special reading programs across the ccuntry. A series of analyses were performed to determine the school and program characteristics associated with greater reading achievement gains for the lowest-achieving students and to assess the stability of these relationships across grade levels. This report discusses the construction of the data base, characterisitics of the sample, data analyses, and conclusions. Among the program characteristics that appeared frequently in conjunction with higher scores of reading-achievement gain were individual or small group instruction, the use of reading specialists, inservice training of teachers, and parental involvement through advisory councils. Appendixes provide further details of the sample and discuss coding of data and analyses. (AA)

FINAL REPORT

Contract No. 400-75-0064

A STUDY OF THE RELATIONSHIP OF STUDENT ACHIEVEMENT TO COMPONENTS OF READING PROGRAMS AND ENVIRONMENTAL CHARACTERISTICS

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VOLUME I

THE RELATIONSHIP OF STUDENT ACHIEVEMENT TO COMPONENTS OF READING PROGRAMS AND ENVIRONMENTAL CHARACTERISTICS IN 36 COMMUNITIES

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The authors wish to thank the following research assistants who contributed to the research project during every phase: Judith McCaffrey, Marsha Roit, Sandra Stotsky, Caroline Tompkins, Linda Wolfson, and Maureen Longmire, as well as other individuals who worked at various times during the project and their contributions are also appreciated.

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I. INTRODUCTION

Currently, local educational funds and national compensatory funds are heavily focused on special reading programs intended to improve the reading achievement of elementary students across the country. This report examines characteristics of these many different reading programs, and is directed toward identifying those characteristics which are associated with reading achievement test gains. Such information should be helpful to both educators and policy makers as it increases our understanding of the effects of the allocation of resources within the schools for reading programs.

To date, studies which evaluate reading programs in the elementary grades have been, at best, equivocal or confusing in their conclusions (Chall, 1967; Corder, 1971). Accurate estimates of the effect of one or more program components on reading achievement have not been forthcoming for several reasons including the following: the exact nature of the program has rarely been observed, an array of different standardized tests have been used as performance measures, and analyses have lacked statistical sophistication. Evaluations often synthesize the results of large numbers of compensatory or other reading programs, using the study as an experimental unit and the "mean achievement" of experimental and control groups as their data. Few secondary evaluations, if any, have attempted to recover individual student data in order to obtain a true picture of the effect of these programs on groups of children which differ

in their achievement levels. That is, often when significant mean differences in achievement scores are compared between programs, one can only ponder whether the larger mean gains came mostly from superior pupils in one program achieving more, or whether the low-achieving students made greater gains, or exactly which groups of students contributed most to the mean gain.

To avoid some of these problems and to gain more insight into the relationships of achievement gains with school and program characteristics for this study, individual pupil's scores (rather than class means) were obtained. Data on descriptive variables for each participating school and their reading programs were also procured. These data were obtained from programs in 36 communities and were pooled together, forming a data bank of information on 6,753 students from grades 1 through 6 in special reading programs across the country. A series of analyses were performed to determine the school and program characteristics associated with greater reading achievement gains for the lowest achieving students and the stability of these relationships across different grade levels. In addition we examined the differences in the reading achievement gains at the lower elementary grades compared to the upper elementary grades and analyzed the tests used to measure these gains. These test analyses are important in determining the type of reading which needs to be mastered at the different grade levels and in interpreting test results. The test analyses and differential gains by grade level are incorporated in Volume II of this report.

We focused our analyses on the low achieving readers[1] because they are of the greatest concern nationally. Our culture's commitment to literacy has increased partially because group instruction in schools depends so heavily on verbal learning. Schools are eager to make a substantial improvement in their reading programs and they need increased resources to deal with the variety of capabilities in their students, and especially they need resources which will be allocated to students who are having difficulties in reading. Such students need to meet success in order to be assured that the effort they are asked to expend is worthwhile. And the decision for them that it is worthwhile is most likely to come during the elementary school years where reading is an important social goal for the youngsters as well. Investigations such as this one, that can suggest a sound rationale for the allocation of resources are necessary and important.

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[1]Time and budget constraints did not permit us to do all analyses on all groups, but the data are stored on tape and are available for further analyses.

II. CONSTRUCTING THE DATA BASE

Pre- and post-test reading achievement data was gathered on students from a wide variety of special reading programs. Also data was collected on characteristics of the schools and programs involved which might be expected to have contributed to differences in those achievement scores. Correlational relationships between the characteristics and the achievement scores led to some hypotheses which are presented in Section IV.

Locating Studies

A computer search of ERIC documents since 1970 and a review of the Current Index to Journals in Education (CIJE) and Dissertation Abstracts International were used to identify relevant studies and/or documents. Others were obtained from the national and several state offices of Title I, ESEA; Title III, ESEA; and the Right-to-Read in addition to several obtained through personal contacts. Altogether, almost 1400 documents were identified as potential sources for data which would meet the following minimal criteria for inclusion in our project:

1) a high probability that detailed program components could be described
2) pre- and post-testing with a standardized achievement test
3) availability of individual test data
4) grade level between and including grads 1 through 6
5) post 1970

These documents were read and screened for the criteria of acceptability listed above. Many of the studies located did not meet one or more of the criteria and the rejection rate was very high. In some cases, it was impossible to discern exactly what the "program" or treatment was. Many studies had no pre- and post-testing and other studies relied on pre- and post-tests that could not be compared across studies; that is, they were locally constructed, criterion-referenced, and/or non-standardized. Some programs were very short term, only a few months. In other instances, issues of confidentiality prohibited data contribution to our project. After contact was made with the original investigators or school personnel, 36 studies remained which met our criteria. The communities which subsequently contributed the necessary data are listed in Appendix A.

Data Collection

Information was obtained on three levels of variables for each individual child in the special programs[1]: information on school characteristics[2], program characteristics[3], and individual student data.

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[1] Special reading program, program, and program under study, all refer to the programs implemented in the individual studies and from which we obtained student data.

[2] School characteristics, school variables, school descriptors, and/or school factors are terms used that refer to those aspects which describe the schools where the programs were implemented. See Appendix D for a list and Appendix B for the instrument used in eliciting this information.

[3] Program characteristics, program variables, program descriptors, and/or program factors are terms which encompass only those aspects of the program which are different from what would have been found in each school if there had been no program. See Appendices C and E.

In order to obtain this information, two questionnaires were developed (Appendices B & C). The first elicited information on characteristics of the schools. The second was used to describe the special reading program; this instrument repeated many of the questions from the first, but it referred only to the special program. These instruments include questions on the number of pupils; urban/suburban population; socio-economic status of the pupils; ethnicity; first language; information on teacher training; presence/absence of teacher aides, tutors, reading specialists, consultants; information on instructional grouping, hours of reading instruction, method of reporting, type of reading program, parent groups, pupil personnel services, and source and amount of funding. These variables were selected because earlier studies and our discussions led to hypotheses that they would be related to program outcomes. Also it was expected that information on them would be available on a post-hoc basis from most communities. All 36 communities were contacted either by phone or with a site visit by a member of our research staff. The data collection was thus done on a personal basis to increase the reliability of the questionnaires. In addition to the information requested in the questionnaires, the liason in each community provided us with individual data on the students participating in the program where it was available: age, grade, length of time in the program, pre-test scores and post-test scores, name of test administered and dates of testing.

The dependent variable, or the measure of program effectiveness for all analyses in our investigations was the individual students' raw score gains from pre- to post-testing divided by the number of months between the administration of these tests, or raw score "gains per month." Scores were reported for a variety of tests; and for grades 4-6, the ETS Anchor Study's (1974) tables were used to convert scores from the various tests into equivalent terms.[1]

For grades 1, 2 and 3, scores were converted to one form and level for each of the tests used. (We eventually dropped those few first grade programs in which the pre-test was a readiness measure.)

When all this information was assembled, the data bank consisted of school, program, and student data on 6,753 students from grades one through six in thirty-six different communities across the country who had participated in special reading programs.

Clustering

Having collected the relevant information for each child, the data had to be combined from the 36 sites in such a way as to include children from as many sites as possible in a single unit of analysis (our "groups") while keeping the variance in their scores small (Light & Smith, 1971). Clustering students by grade level was

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[1]The complexity of this task was increased by the need to convert all the various forms of scores submitted at any one grade level to raw scores, to the same test level and the same test form and finally to convert these to the equivalent Metropolitan score via the Anchor Study Tables. Thus as many as four conversions might be necessary for a given set of scores. See Appendix I for tests used.

considered, but the variance in gain scores at each grade level was large. Therefore the approach was adopted of forming clusters of low, middle, and high achieving students on the basis of reading scores on the pretest. Those students scoring within one standard deviation of the mean at each grade level were assigned to the middle groups. Those scoring at or higher than one standard deviation above the mean (84th percentile) were assigned to the high groups, those at or lower than one standard deviation below the mean (16th percentile) to low groups.

Conversion tables were not available for equating test scores at the lower grade levels, so for grades 1, 2, and 3, groups were formed containing only students given the same pre-test. Thus for these grade levels there are low, middle and high groups for each different test administered. Cutoff points used for each test in forming the clusters are shown in Appendix F, Table 1. Since test scores for all students at the 4th, 5th and 6th grade levels had been converted to equivalents of the MAT, all students with total reading scores in these grades could be clustered into one of three groups for each grade level. (See Appendix F, Table 2, for sample size, means, and standard deviations of the 4th, 5th and 6th grade groups.) For the middle groups in general, the mean scores tended to be lower than the 50th percentile (they are actually low-middle groups), and their variance is greater than that for the high or low groups.

This clustering procedure yielded 39 different groups with a total of 6,242 students[1]. A third of these groups contained students from seven or more sites, but one half of 11 groups had three or fewer sites. Some of these groups were made up of children who had comprehension scores only; but twenty-four were groups on which total reading scores were available. The means and standard deviation of the gain scores per month[2] for these 24 are presented in Table 1.

[1]The sample of 6,753 was reduced to 6,242 by this clustering procedure as several groups created were too small to warrant analysis. Further, group 1 was deleted: its pretest score on the Metropolitan Readiness Test could not be converted. Group 28 was dropped for a combination of reasons: small N (52 compared to 125 and 151 for the other "high" groups) and the fact that we were not concentrating our efforts on high achievers. Consequently, data on 6,141 students in 37 groups created by clustering were analyzed.

[2]These raw score data should not be compared across grade levels. Different levels of the MAT are used at each grade level and the gains in raw scores on one level relate differently to grade equivalents than do gains on another level. For example, a gain of 12 points at the middle of second grade on the Elementary level MAT is equal to a gain of 1.6 grade equivalents while a gain of 12 points on the Intermediate Level MAT is equal to a gain of 1.2 grade equivalents. It should also be pointed out that a given raw score gain represents considerably different growth, in terms of the norms, according to whether those points are at the bottom, middle, or top of the scale. For instance, a gain of 12 raw score points in grade 5 on the Intermediate Level of the MAT represents growth of 2.5 grade levels at the very bottom of the scale, .9 grade levels in the mid range, and .8 at the very top. Additional differences also result at grades 1, 2, and 3 because different tests were used.

TABLE 1

GAIN SCORES

Means ($\bar{X}$) and Standard Deviation (SD) of Raw Score Gains Per Month on Total Reading Scores[1] for the Low-, Mid-, and High-Groups at each Grade Level

	Low Group		Mid Group		High Group	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Grade 2						
MAT	3.259	1.852	3.3369	1.6569	.5295	.7600
GMT	3.476	1.653	2.555	1.661		
SAT	3.6689	1.8182	2.4408	1.3793	1.8427	1.4473
CAT			2.9787	1.4067		
Grade 3						
MAT	1.8566	1.2131	1.7684	1.1618	.9653	.8410
GMT	3.4211	1.6909	2.1093	1.7532		
SAT	3.1060	1.6696				
CAT			2.1285	1.3956		
Grade 4						
MAT	2.9817	1.9905	1.7477	1.3773		
Grade 5						
MAT	1.4436	1.4446	1.1927	1.1964	.3421	.7734
Grade 6						
MAT	1.4645	1.1861	1.1564	1.0971	.0103	.5696

[1] Where different tests were used and could not be converted, separate entries are made. Grades 4, 5, and 6 statistics are reported for MAT converted scores.

III. CHARACTERISTICS OF THE SAMPLE

This section gives a general overview of the characteristics of our sample and the trends suggested by the co-occurrence of certain characteristics and/or the lack of variance for other characteristics. Then the latter part is devoted to a delineation of those variables generally associated with the lower achieving groups.

General Description of the Total Sample

As mentioned above, our data were collected from sites across the country. They include a diverse set of localities in many respects, so that although the sample was not randomly drawn and is not statistically representative of the nation's reading programs, it does include a wide range of programs serving a broad selection of communities.

Thirteen of the sites were in urban districts, five were small rural districts, eight were smaller cities or towns and ten were suburbs of larger cities. About eleven sites were from the northeast, seven in the midwest and the remainder were spread fairly evenly across the southeast, southwest, and northwest. Half of the large urban districts were eastern, three western, and three others from the midwest; the rural districts tended to be in the west with a few exceptions.

In general, the SES level was somewhat below average as half of the sites reported the presence of "low" SES children and an additional ten reported the presence of "low-middle" SES students. Only seven reported children in the "middle" range and one isolated case of "high"

was reported. All of the 36 sites were in districts receiving Title I funds, and seventeen of the programs were funded entirely by Title I, while another five were supported by Title III money. Ten programs were supported by their own school funds and five others were funded by a combination of sources.

The per pupil expenditures for the districts ranged from a low of $400-499 to a high of over $1000 with more than half spending more than $1000 per pupil per year.

Enrollments included the following ethnic groups: American Indian, Black, White, Chicano, Puerto Rican, French, Polish, and Portuguese. English was the first language of 90% or more of the students in most sites with only 6 sites having a significant number of English-as-a-second language students.

The programs themselves varied considerably. Twenty-three of them were supplemental programs providing instruction which was in addition to the regular classroom reading lessons. Nineteen of these 23 and four additional were "pull-out programs," that is, participating students left their respective classrooms and received their special program instruction in a separate place. The remainder were given additional help within their classroom setting.

The time devoted to these programs also varied considerably from about 1 1/2 hours per week at three sites to 10 hours per week at two sites, but the majority ranged from 2 to 7 hours per week.

The lack of any variance for several of the variables we had collected data on suggested several trends, at least for our sites.

All sites had "developmental" or regular reading instruction for all grades 1 through 6 and most schools had parent groups at all grade levels as well. Another trend noticeable in our data was the fact that special programs which provided medical services to children often also provided guidance and/or social workers for children and their parents.

Characteristics of the Low Achieving Groups

Within the overall sample described above, analyses were focused on the low achieving groups. The school characteristics of these groups differed from the high achieving groups and we describe these differences below in a comparative manner.[1] It is important to note that the differences refer to the communities in our study only and they refer only to comparisons made between the characteristics more or less prevalent for the low groups as they are compared to the high groups. Many describe the situation as we would expect and none can be interpreted as causal; they describe co-occuring events. Data for the comparative statements made below came from the programs already underway, where school personnel were already aware of the reading problem and working on it. Therefore, in interpreting the statements the reader should realize they may well reflect the input of special programs and this is a strong reason to caution again against inferring causality.

[1]The percent of low group students for whom each school characteristic was present was compared with the percent of high group students for whom it was present. If these percentages differed by 15% or more, the low-group was considered to be different from the high group in that respect and is so described in statements 1 through 11. For example, at grade 2 the analysis for the variable concerned with teacher participation in curriculum development was assessed as follows and reported as a characteristic less apt to be found for teachers of the low groups because the percentage difference (50% and 78%) is greater than 15%.

	Total number of students	Number of students whose teachers participated in curriculum development	% of students whose teachers participated in curriculum development
Low Group	453	226	50%
High Group	241	188	78%

1. Schools with a larger percentage of our low groups tended to serve larger numbers of children, located in an urban area whose per pupil expenditures were smaller than for schools serving a larger percentage of the high groups. A lower socio-economic status also characterized the low groups.

2. Ethnicity - There are differences across grade levels, but most often the low groups were characterized as having fewer white students than the high groups.

3. Grouping for instruction - Low groups were more apt to be homogeneously grouped and more often their classrooms were graded as opposed to the high groups.

4. Schools serving the low groups in grades 4-6 were less apt to have teacher training, and the teachers were less apt to be involved in curriculum development for grades 2, 3, and 5.

5. There were more teacher aides in grade 2 in schools serving a larger percentage of low groups, but fewer in grades 3 through 6. There were more tutors in grades 2, 3, and 4 than for the high groups, but fewer in grades 5 and 6.

6. There were more reading specialists in grades 2 through 4, but fewer in grade 5 in schools serving the low groups. There were fewer outside consultants at all grade levels.

7. Hours of reading instruction - The low groups came from schools where there were apt to be fewer hours of reading instruction in grades 3 and 6, but more hours in grade 2 than the high groups.

8. Remedial reading program[1] - The low groups came from schools where there were fewer remedial reading programs in grades 2, 3, and 4 but more in grades 5 and 6.

9. Enrichment activities[2] - The low groups came from schools where there were more enrichment activities in grades 2, 3 and 4 than for schools from which the high groups came. However, in grades 5 and 6 there were fewer enrichment activities in schools serving the low groups.

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[1]Remedial reading programs refer to special instructional programs designed for students who are reading far below grade level.

2. Enrichment activities include such offerings as trips to museums or cultural centers, dramatic productions, "field" rather than school related activities, etc.

10. Psychologists for parents - Schools serving the low groups tended to have more psychologists working with parents of children than those serving the high groups in grades 2, 3, and 4 but fewer for parents with children in grades 5 and 6. This means that for the upper grades the parents of children in the higher groups were more likely to have access to a psycholgist than the parents of the low group.

11. Social worker for parents - Schools serving the low groups had more social workers for parents with children in grades 2, 3, and 4 than schools containing the high groups. However, similar to the psychologists, there were fewer social workers for parents of low children in grades 5 and 6 than for the high groups. Social workers for the children themselves were more apt to be available for the low groups compared to the high groups.

Some other generalizations can be drawn about the low groups without comparing them to the high groups. A selected set of their characteristics are given in Table 2 and it may be noted that various ethnic groups and degrees of urbanicity were represented. The data also indicated that more special services were available to the low groups in the lower grades: tutors, teacher aides, reading specialists, enrichment activities, psychologists and social workers; and yet there were more remedial reading programs in grades 5 and 6.

These few general statements are intended to give a flavor for the composition of the low groups as well as to describe the situations in which the low groups were more often found.

TABLE 2

GROUP CHARACTERISTICS

Characteristics	6	9	12	16	20	22	27	32	37
Grade	2	2	2	3	3	3	4	5	6
Number of Students*	80	189	184	136	252	156	430	295	243
Number of Sites	6	9	3	7	8	3	19	19	12
Ethnicity**									
Indian		+			+		+	+	+
Black		+			+		+	+	+
White	+	+	+	+	+	+	+	+	+
Spanish	+		+	+	+	+	+	+	+
Other	+	+		+	+		+	+	+
School District**									
Urban	+	+		+	+		+	+	+
Rural	+	+		+	+	+	+	+	+
Suburban	+	+	+	+	+	+	+	+	+
Average Age (yrs.)	7.5 n=44	7.4 n=86	8.2 n=38	8.7 n=108	8.7 n=13	7.9 n=7	9.6 n=302	10.4 n=172	11.7 n=126
Pre-Test Grade Equivalent	1.5	1.3	1.4	1.9	1.6	1.8	1.9	2.6	3.2
on which Test	MAT	GMT	SAT	MAT	GMT	SAT	all converted to MAT		
Mean gains per month (raw score)	3.17	3.17	3.67	1.83	3.28	3.11	2.94	1.44	1.55
Standard Deviation	1.8	1.7	1.8	1.2	1.7	1.7	1.9	1.1	1.2

*The number of students decreases somewhat in the regression analysis due to missing data on some students.

**A "+" in any one of these rows indicates that the particular ethnic group (or Urbanicity) was represented in the group indicated at the head of the column. For instance, the complete row of "+" marks for "suburban" indicates that all groups had some suburban representation.

IV. DATA ANALYSIS

The main focus of the study was to determine if there are school and/or program characteristics which are associated with greater achievement gains particularly for the lowest achieving students. Different levels of analysis were utilized to investigate certain questions with regard to these relationships: simple correlations, multiple regression analysis, partial correlations, and analysis of variance. The sections below discuss first the statistical techniques used to address specific questions posed and subsequently the results of the analyses and interpretations.

Questions and Analyses

The question central to the entire study was "What significant relationships are found between school, program, or individual student characteristics and achievement gains?" Pearsonian correlations were computed for all ordinal variables[1] separately for the low-, mid-, and high-groups at each grade level to answer this question for those variables. Correlations were also computed on the transformed nominal[2]

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[1]The ordinal level of measurement is achieved when the values for the variable can be rank-ordered according to some criterion. Many of our variables were not ordinal and for them, time and budget constraints permitted us to make analyses for the low-groups only.

[2]Nominal variables --those for which the values are names only and no assumptions can be made about ordering--had to be transformed prior to analysis. Appendix G should be read by those interested in the procedures for transforming variables. (At this point in the analysis certain other variables about which we had misgivings were dropped. For instance, our contacts with people at program sites led us to believe that they were reluctant to respond with any one answer to the question on program emphasis, and that responses to questions on curriculum development were less than reliable due to the way in which these questions were worded.)

and dichotomous variables for the low groups only.

Further we wanted to know "how consistent are these relationships across grade levels and for students from different achievement groups?" The correlations on the ordinal variables would respond to both grade level and achievement level groups; while for the nominal and dichotomous variables we would have to confine the responses to the low achieving group, but could compare across grade levels.

Our next question concerned the manner in which variables acted in combination in accounting for variance. "How much of the variance in gain scores for the low groups can be accounted for by a combination of the variables studied?" Subsequently, multiple regression analyses were undertaken entering SES and ETHNICITY first in order to determine the total contribution of selected program variables to achievement gains after controlling for these two influential factors over which educators have no control. Through multiple regression one can control for the variance associated with a set of characteristics one at a time and examine their total relationship to the gain scores.

Then one also wants to know the relative strengths of the individual variables for the low groups. "After SES and ETHNICITY have been accounted for, how much of the remaining variance in gain scores can be accounted for by individual program characteristics?" And "What hypotheses are suggested concerning the effectiveness of certain relevant program characteristics?" The multicollinearity of the variables was considerable. That is, there were strong relationships among other characteristics.

and between them and SES and ETHNICITY as well. Therefore, it was necessary to look at partial correlations, having first removed the variance in gain scores associated with SES and ETHNICITY. These partial correlations indicated the relevant additional contribution to the variance associated with each program variable, variables which might come under the control of educators and policy makers. To further suggest hypotheses concerning those variables that did contribute significantly, an informal inspection of the mean gain scores of values within each variable was undertaken. For example, with analyses of variance, it could be determined if, for the variable SOURCE OF INSTRUCTION for the different grades, there was a significant difference in the mean gain scores for those children who were in a program (1) run by their regular teachers, (2) by reading specialists, (3) by tutors, (4) by machines, (5) by teachers and specialists, (6) by tutors and specialists and (7) by teachers and machines, etc. Given the differences were significant, an inspection of the means for each of these values to discover patterns of differences could then lead directly to an hypothesis concerning the effectiveness of a given source of instruction for low-achieving students.

Results

Correlations

To date, most of the correlational data from other studies presents data on groups of students who have a wide range of abilities and achievement and the inference is drawn that the correlations found across this wide range holds for the poorer students. Often such studies control statistically for ability. Our approach has been different. We were interested in whether or not school and/or program characteristics were associated with the gains made by students at different achievement levels, when special attention is given to the reading program. Therefore our analyses were on groups of relatively homogeneous students and any significant correlations were noted for particular groups: high-, mid-, or low-, and for specific grade levels one through six.

There is another important difference in the correlations found in this study compared to many others: our question was, "What is associated with the change in achievement scores between time x and time y when students are in special reading programs?" rather than the usual question, "What is associated with achievement at time x?" The search is for characteristics associated with gain scores, not for those associated with higher post-test scores. Our approach is important, we believe, because any correlations consistently found particularly for low-achieving students cannot be ignored by persons concerned with funding programs nor by educators attempting to improve the reading of low-achievers.

As described in the previous section, correlations were performed on three types of variables: ordinal, transformed nominal, and dichotomous. Correlations for all groups on the ordinal variables associated with 10% or more of the variance in gain scores are presented in Table 3 and an overview of these findings along with some generalizations which can be made from simple correlational analysis alone follow. Comparisons of three levels of achievement groups can be made in this analysis only as no further analyses were computed on the mid- and high-groups. Table 4 then presents the correlations for the ordinal, transformed nominal and dichotomous variables for the low groups only.

Ordinal Variables for all Groups.

No one of the characteristics presented in Table 3 consistently accounted for 10% or more of the variance in gain scores for most groups. There were considerable differences in the correlations for (1) the various grade levels and (2) the various groups (high-, mid-, or low-). No school or program variables were equally important to all children in all grades. However, let us consider the correlations for several of these variables to determine if any generalizations can be made.

TABLE 3

CORRELATIONS OF INDEPENDENT VARIABLES WITH GAIN SCORES
Correlations for Ordinal Variables Associated with 10 percent or More of the Variance in the Gain Scores per Month

Grade	1				2									3							
Group Number	2	3	4	5	6	7	8	9	10	12	13	14	15	16	17	18	20	21	22	23	24
Low, Middle, High	High	Mid	Low	Mid	Low	High	Mid	Low	Mid	Low	High	Mid	Mid	Low	High	Mid	Low	Mid	Low	Low	Mid
Number of Sites	4	4	2	1	6	4	6	9	9	3	2	3	2	7	5	7	8	8	3	1	2
Number of Students	263	75	41	39	80	67	275	189	303	184	174	223	41	136	86	315	252	181	156	86	36
School Variables																					
Size	.32	.50		.49									-.57								
Socio-economic status				*						-.57			.41			.31			-.33		.38
Class size	*	*	*	*			.31			.61	*	*	-.41						.44		-.38
Hours of reading instruction		-.45		*		.42				.54	*		.37						.41		
Per pupil expense	.48	.36		.49	-.33					.54	*		.42	-.32					.43		.42
Program or Treatment Variable																					
Socio-economic status		.35								-.57			.41						-.33		.38
Hours of reading	-.42	-.45		*		.33		-.37		-.54			*	-.31		-.48			-.42		*
Hours in "other" treatment	*	*	*	*		-.33		*	*	-.35			*	*	*	*	*	*			*
Individual's Data																					
Age		.38			.34																
Length of program	-.30	-.34		*		.46			-.34	*		-*	*					-.44	*		*

*There was no variance in the variables for these groups.

TABLE 3 (continued)

CORRELATIONS OF INDEPENDENT VARIABLES WITH GAIN SCORES
Correlations for Ordinal Variables Associated with 10 percent or More of the Variance in the Gain Scores per Month

Grade	4							5			6				
Group Number	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
Low, Middle, High	Low	Mid	Low	High	Mid	Low	Mid	Low	High	Mid	Low	Mid	Low	Mid	High
Number of Sites	2	2	19	19	18	2	2	19	4	16	2	3	12	4	12
Number of Students	85	42	430	52	302	57	73	295	106	337	40	80	250	125	601
School Variables															
Size	.32	.36				.32					.44				
Socio-economic status															
Class size															
Hours of reading instruction	.40	.64				.41	.52				.53	.47			
Per pupil expense		.32		*		.33					.40				
Program or Treatment Variable															
Socio-economic status															
Hours of reading									.40					.36	
Hours in "other" treatment									-.52					-.41	
Individual's Data															
Age															
Length of program	-.53	-.77				-.47	-.60				-.37	-.42	-.38		

*There was no variance in the variables for these groups.

(1) SOCIO-ECONOMIC STATUS. Coding for the SES variable is presented in Appendix H and the majority of the programs were categorized in the three lowest values of the ten possible. Because of the character of the low-achieving groups (all children scored one standard deviation below the mean on the pre-test), the question answered by our correlational data for low groups is more properly--"How predictive is a general estimate of the socio-economic status of a group of low-achieving children to the gains they will make in a special reading program?" This seems to us to be a very important question. If all correlations had been large and positive, one would have to question the usefulness of programs for low-achieving children from low SES backgrounds. It would be difficult to find additional variance associated with program characteristics. However, the negative correlations found for two of the low-groups are encouraging. These negative correlations occurred when a considerable number of low SES students made greater gains. And evidence that such situations did exist indicates the possibility that effective programs can be planned for lower SES students.

In seeming contradiction, for three mid-groups, a higher SES was associated with greater gain scores yielding a positive correlation. Two of these are at third grade level. One might conjecture that changes to more literate language in the tests at about this level (see Volume II) contributed to this strong association. While we cannot attribute "cause" in these correlations, further investigation should be undertaken to determine if there is a causal relationship. That is, are

the mid-group students who are beginning to face reading materials that contain a more literate or "bookish" vocabulary at an advantage if they come from a higher socio-economic environment? If so, why? Are there more books in the home? Are the children read to more frequently? Are their classrooms better equipped with materials for gaining knowledge? All of the above?

The instability of the correlations is evidence that other more powerful factors were at work. The rather limited variance in our narrowly construed groups was sometimes positively associated with SES and sometimes negatively. They prompt us to hypothesize that it is possible for students from low SES backgrounds to achieve higher gain scores on reading achievement.

(2) PER PUPIL EXPENDITURES. At the first grade level, higher per pupil expenditure was associated with higher gains for the high- and mid-groups; whereas for the other grades, these differences were more apt to be apparent for the mid- and low-groups only. For two low-groups, the correlation was negative (one at second grade-group 6, and one at third grade-group 16) and one can only conclude that some programs underway in schools where the per-pupil cost was low were effective. Since we could obtain no comparable data on the costs of the programs themselves (because of the number of various ways used by the schools to compute such costs), we can only conjecture that in some instances program expenses may have counterbalanced low-school per pupil costs. That is, it is possible that high-program costs occurred where effective programs existed in otherwise low-budget schools. It is beyond the

limits of our data to test that suggestion, but we can say that for a third of the low- and mid-groups in grades 1-6 more than 10% of the variance in gain scores is positively associated with higher per pupil costs.

(3) LENGTH OF PROGRAM. Across many grade levels, the length of the program under study (mostly within a relatively narrow range of 6 to 10 months) yielded negative correlations. The short programs predicted greater gains-per-month on standardized tests administered before and after the program than the longer programs. The rate of gains per month achieved in the first six months or so of a program seem to have been difficult to maintain over a longer period. Therefore, the longer a program continued, the more diluted a gains-per-month average was. Also, it is possible that successful students were exposed to special programs for a shorter period because they met with success. This would have affected the correlation also. No conclusions can be drawn, however, for long term programs (i.e., over several years) because only one of our sites provided longitudinal data.

(4) HOURS OF REGULAR CLASSROOM READING INSTRUCTION. There were more high positive correlations for this variable that for any other variable It should be emphasized that, special programs notwithstanding, the importance of time and attention in the reular reading programs is associated with gain scores and that when students spend time "reading" in class, one can predict that their reading achievement will be greater.

Ordinal, Nominal, and Dichotomous Variables for Low Groups

Because correlations on the nominal variables across all groups were not computed, one cannot draw conclusions about these characteristics for the mid- and high-groups. However, one can inspect the correlations for the low-groups to see if any significant relationships are consistent across grade levels.

The correlations in Table 4 suggest that many of the program characteristics were indeed significantly correlated with gain scores at many grade levels for these low groups. As further discussed below, the multiple regression analyses and the partial correlations indicated that the multicollinearity of the data (the inter-relatedness of the characteristics) made it impossible to sort out differences in the strength of the relationships. It will also be revealed in the discussion of the analyses of variance that while particular characteristics maintained significant relationships, that significance may well be attributed to different comparisons being made within those characteristics for each group. We will discuss this further when we examine the association of each characteristic, but it should be noted here that the consistently high correlations for nominal variables (Table 4) have not necessarily indicated that the relationship was the same for each group.[1]

The correlations in Table 4 were useful in selecting strong variables for the multiple regression.

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[1]Different contrasts between the values on the transformed variables were used to maximize correlations and they are not always comparable from one group to the other.

TABLE 4

Significant Correlations of Variables with Gain Scores
Per Month for the Low Groups

Variables	Group / N[1]	#6 / 70	#9 / 107	#12 / 184	#16 / 130	#20 / 247	#22 / 148	#27 / 408	#32 / 302	#37 / 196
SES (O)				-.572***		.265***	-.344***	.100*	.246***	-.189**
Ethnicity (N)		———	.311*	.401***	.430***	.341***	.453***	.343***	.310***	.453***
Size of Instructional Group (N)			.602***	.609***		.427***	.453***	.261***	.375***	.303***
Hours of Reading in Program (O)			-.505***	-.536***	-.350***		-.453***		.189***	
Source of Instruction (N)			.461***	.611***	.629***	.238***	.453***	.286**	.318***	.347***
Location of Instruction (N)			.438***	.350***				.333***	.342***	
Teacher Training (N)			.441***		.576***	.211**		.270***	.348***	.376**
Parent Groups (N)			.550***		.631***	.419***		.309***	.375***	.199*
Type of Tutors (N)				.401***	.216*	.372***	.439***	.309***	.340***	
Social/Guidance Workers for Ss (L)						.286***		.322***	.243***	.198**
Reading Specialists (N)		.253*	.604***	.401***	.431***		.435***			
Selection of Students (N)			.471***	.611***			.435***	.275***	.290***	.181*
Developmental Reading Program (D)			.392***	.350***		.286***				
Remedial Reading Program (N)			.392***	.350***		.286***			.198***	
Enrichment Program (N)				.350***				.234***		
Hours in "Other than Reading Prgm"(N)				.350***		.286***			.114*	
Decoding Skills (N)			.314***	.350***				.164***	.233***	
Writing Skills (N)				.350***	.221*		.445***		.141*	.220**
Language Arts (N)				.350***	.604***				.352***	.262***
Speed Reading (D)			.300**			.128*		.169***	.118*	
Consultant's Role (N)			.580***	.401***	.607***	.406***	.435***	.332***	.384***	.199*
School Funding (per pupil expenses) (O)		-.332***		.543***	-.321***		.434***			
Program Added to regular Instruction (D)		-.289**	-.317***					-.121**		
Total Hours of Reading (O)		.224*								

*p .05
**p .01
***p .001

[1]This N represents the number of students in the regression analyses and is somewhat less than those reported in Table 1.

(O) = Ordinal Variable
(N) = Nominal Variable
(D) = Dichotomous Variable

Multiple Regression Analysis

The multiple regression analysis can respond specifically to the question of "How much of the variance in gain scores for the low-groups can be accounted for by a combination of the variables studied?"

Twelve variables were entered into stepwise multiple regression in order to determine their total contribution to the amount of variance in gain scores which was associated with the characteristics studied. The first two variables to be included were:

(1) SOCIO-ECONOMIC STATUS. Because so much of the variance in achievement scores is often attributed to socio-economic status (Coleman, 1966; Thorndike, 1973) and because it is essentially not readily changed by programming, this variable was taken into account at the outset. We assigned 10 possible values of SES from responses to the questionnaire (see Appendix H) which represent a range from those programs where all of the children were of low SES to those where all were of high SES. This coding allowed us to treat the SES variable as an ordinal scale across all studies, although the majority of sites for low-groups reported SES in our three lowest coded values.

(2) ETHNICITY. Because this characteristic is also not alterable, it was decided to account for it immediately. It was intended that ETHNIC categories would reflect cultural groupings which might include some combination of race, ethnicity and religion. Therefore race and ethnicity are somewhat combined in this variable. The categories of "American Indian," "Black," "White," "Spanish-speaking or surname" (included both Chicano and Puerto Rican), "Other" (Portuguese, Polish,

Irish, French, etc.) were used. Combinations of these categories were also coded. "White" was the category used for white children for whom we had no evidence of an identifiable strong cultural influence.

It is important to note that our information on these two variables was not based on the actual SES or ethnicity of the individual child. (Such data were generally not available.) The data came from a description given of the group of students in the programs.

The remaining variables selected for inclusion in the regression equation were chosen because a) they showed a high correlation with gain scores for the low-groups (Table 4), b) they could be susceptible to program direction or control, and c) the amount of missing data was insignificant. Previous research and conventional wisdom supported our selections in most instances. The variables included were:

3. SIZE OF INSTRUCTIONAL GROUP. Specific teacher-student ratios and combinations of these were necessary.

4. HOURS OF READING INSTRUCTION IN PROGRAM. Actual number of hours per week students were given reading instruction in the program.

5. SOURCE OF INSTRUCTION. Who or what gave students reading instruction in the program? (classroom teachers, specialists, tutors, machines, etc.)

6. LOCATION OF INSTRUCTION. Where were students given instruction under the program? (classroom, lab or resource room, reading center in another building, etc.)

7. TEACHER TRAINING. If available, was training given during the program or prior to it, was it general or specific to the program?

8. PARENT GROUPS INITIATED AS PART OF THE PROGRAM. If present; advisory council only, general support meetings, support groups or home visits, combination

9. STUDY SKILLS. the extent to which study skills were emphasized in program

10. LANGUAGE ARTS. the extent to which the integration of language arts was emphasized in program

11. ROLE OF PROJECT CONSULTANT: management, inservice, training, work with teachers, work with students, other, combination

12. CHILD WORKER. social worker, psychologist, or guidance for children provided by the program (beyond the school's usual practice): yes or no

A description of the other program variables included in Table 4 is included below for reference only. No further analyses were computed for these variables.

TUTORS. Present or not, volunteer, paraprofessionals, specialists, machines, mix

STUDENT SELECTION: how were students chosen to participate in the program? achievement, SES, combination, randomly, or other

DEVELOPMENTAL READING AS PART OF THE PROGRAM: yes or no

REMEDIAL PROGRAM. extent to which program was remedial in nature

ENRICHMENT PROGRAM. extent to which program included enrichment activities

"OTHER" PROGRAM. Extent to which program included treatments other than reading (e.g., perceptual-motor training)

DECODING SKILLS: the extent to which decoding was emphasized in program

COMPREHENSION. the extent to which comprehension was emphasized in program

WRITING SKILLS: the extent to which writing skills were emphasized in program

SPEED READING AS PART OF THE PROGRAM. yes or no

TABLE 5

MULTIPLE REGRESSION OF VARIABLES ON GAIN SCORES

Cumulative Proportion of Variation in Gain Scores Associated with Variables Entered into Regression Equation (R^2)

Group	Grade	Variables								
		SES	Ethnicity	Size of Instructional Groups	Hours of Reading Instruction	Source of Instruction	Location of Instruction	Teacher Training	Parent Groups	Language Arts
#9	2	.004	.263	.375	.378	.378[1]	.384			
#16	3	.027	.261	.341	.342	.431				
#20	3	.070	.116	.245	.320	.321				
#27	4	.010	.121	.233	.248	.340	.352	.358	.364	
#32	5	.061	.100	.227	.249	.266	.283	.283		.288
#37	6	.036	.263	.303	.303[1]	.351				

[1] Partial correlation of this variable was 0.0 at this point in regression

As indicated in Table 5, the amount of variance in the gain scores which can be accounted for by the variables studied varies somewhat for the different grade levels. Generally, however, between 30% and 40% of the variance in gain scores is associated with the variables studied, and no more than eight of the twelve variables contributed to the variance for any group.

The contribution of program variables after SES and ETHNICITY had been accounted for was considerable. Their additional contribution to the variance was from a low of 9% for the sixth grade group to a high of 24% for the fourth grade group with the others in between. These percentages are quite substantial when one considers that the total variance in gain scores under investigation was very small, approximately 1.5 to 3.5 raw score points per month. What we have found is that 10% to 25% of the differences in gains scores between a pre- and post-test in reading for groups consisting of only low achieving students was accounted for by the specific characteristics of their reading programs.

In Table 5 the additional amount of variance accounted for by each variable is a function of the order in which the variables were entered. Had any one variable been entered first after SES and ETHNICITY, its contribution would probably have been greater. Therefore it is more appropriate to assess the contribution of individual variables, after SES and ETHNICITY have been accounted for, by inspecting partial correlations.

Partial Correlations and Analyses of Variance

The results of these analyses will be discussed together because while the first indicated the relative strength of the association of individual program characteristics with gain scores, the analyses of variance must be referred to in order to determine if there was a pattern of relationships between the program characteristics and the gain scores. A significant contribution to the variance evidenced by a high partial correlation can be elusive. Not infrequently the pattern of relationship was not clear because no one treatment (or value) for a given variable had higher gain scores across grade levels. And the pattern of change across the grade levels was not clear either. This was particularly true for the transformed nominal variables where different contrasts occurred at various grade levels. There are many reasons why such inconsistencies occurred, but it is best to bear in mind that for every group on each variable the findings are always relative to one another, they are not absolute. They are influenced (1) by the number of categories or values on each variable actually present for that group, (2) by the number of sites represented, (3) by the number of children from each site, (4) perhaps by other inter-related variables and, of course, (5) by the effectiveness of the program at each site represented.

ETHNICITY.

Before we discuss the program characteristics we ought to consider the increase in variance in gain scores accounted for when ETHNICITY

was entered into the regression statement after SES (see Table 5). Similar to the positive and negative correlations for the SES variable (see discussion on page 20), no clear patterns emerged across grade levels. An inspection of the anova table reveals that in grade 2 (Group 9) "White" children made the greatest gains (Table 6). In grade 3 "Spanish and White" were superior and some mix of ethnic groups for Group 20; "Black" students were superior at grade 4 and "White" again for grades 5 and 6. The contrasts within the ethnicity variable were not the same from group to group. Given the contrasts that did exist, the achievement of higher mean gains by different ethnic groups was nevertheless encouraging. One cannot conclude that one ethnic group consistently performed better than any other. We can then infer that students from various ethnic backgrounds can be expected to achieve greater or lesser reading achievement gain scores depending on factors other than ethnicity.

TABLE 6

ANALYSIS OF VARIANCE
Mean gain scores (standard deviations), and N for various values of ETHNICITY and probability of mean differences

Group	Grade	Indian	Black	White	Black & White	Spanish & White	Other	F	P
		mean (SD)	mean (SD)	mean (SD)	mean (SD)	mean (SD)	mean (SD)		
9 (N = 189)	2	2.03 (.6) N = 4	2.09 (1.8) N = 17	3.72 (1.6) N = 86	3.22 (1.7) N = 78	-----	3.25 (1.7) N = 4	4.27	.01
16 (N = 136)	3	-----	-----	1.81 (1.0) N = 19	-----	2.64 (1.5) N = 37	1.47 (.8) N = 80	14.87	.001
20 (N = 252)	3	2.43 (.9) N = 12	2.71 (1.7) N = 38	4.10 (1.8) N = 70	3.09 (1.7) N = 112	2.86 (1.1) N = 16	4.14 (1.0) N = 4	5.85	.001
27 (N = 430)	4	1.85 (1.3) N = 24	5.16 (1.8) N = 10	3.57 (2.4) N = 126	2.51 (1.7) N = 183	3.28 (2.0) N = 50	2.58 (1.9) N = 37	10.29	.001
32 (N = 306)	5	.90 (.9) N = 21	1.24 (.9) N = 37	1.97 (1.1) N = 83	1.28 (1.1) N = 108	1.23 (1.3) N = 41	1.46 (.9) N = 16	6.16	.001
37 (N = 250)	6	1.05 (.82) N = 7	1.37 (1.5) N = 43	1.89 (1.2) N = 45	1.66 (1.1) N = 117	1.06 (1.02) N = 24	1.18 (.82) N = 14	2.42	.05

Program Characteristics

The relative strength of individual program characteristics after the background characteristics of SES and ETHNICITY have been partialed out are found in Table 7. The partial correlations tended to be greater at the second and third grade level than for grades 4, 5, and 6. This was particularly noticeable for the SIZE OF INSTRUCTIONAL GROUPS, TEACHER TRAINING, PARENT GROUPS, and for CONSULTANTS. Further investigation of these variables at the lower grade levels will probably have more payoff than at the upper grade levels. SOURCE OF INSTRUCTION achieved the highest correlations across most groups but different variables were strongest at the various grade levels. The three variables with the highest correlations were SIZE OF INSTRUCTIONAL GROUP, SOURCE OF INSTRUCTION and PARENT GROUPS.

Our correlations and associated variance estimates indicated that the school program characteristics did add considerably, though differently, at different grade levels. The data emphasize the importance of different aspects of special programs designed to improve reading instruction. Program characteristics make a difference to low achieving students. Let us now explore the nature of these differences and make some related hypotheses.

TABLE 7

PARTIAL CORRELATIONS

Partial Correlations (R) and Variance (R^2) for Selected Program Varinbles with Gain Scores after SES and ETHNICITY were entered into Multiple Regression on Gain Scores for Selected Variables

Group	Grade	Variables																			
		Size of Instructional Groups		Hours of Reading Instruction		Source of Instruction		Location of Instruction		Teacher Training		Parent Groups		Study Skills		Language Arts		Consultants		Child Social/Other Worker	
		R	R^2	R	R^2	R	R^2	R	R^2	R	R^2	R	R^2	R	R^2	R	R^2	R	R^2	R	R^2
#9	2	.362[z]	.131[z]	-.159	.025	.370[z]	.137[z]	.237[z]	.056[z]	.359[z]	.129[z]	.351[z]	.123[z]	.097[z]	.009[z]	.148	.022	.303[z]	.092[z]	o	o
#16	3	.305[z]	.093[z]	.094	.009	.307[z]	.094[z]	.391	.153	.466[z]	.217[z]	.315[z]	.099[z]	.139[z]	.019[z]	.278[z]	.077[z]	.232[z]	.054[z]	.097	.009
#20	3	.340[z]	.116[z]	.159	.025	.197[z]	.039[z]	*	*	.292[z]	.085[z]	.291[z]	.085[z]	.411[z]	.169[z]	o	o	.297[z]	.088[z]	.318	.101
#27	4	.168[z]	.028[z]	.080	.006	.222[z]	.049[z]	.254[z]	.065[z]	.127[z]	.016[z]	.171[z]	.029[z]	.208[z]	.043[z]	*	*	.159[z]	.025[z]	.290	.084
#32	5	.239[z]	.057[z]	.148	.022	.291[z]	.085[z]	.211[z]	.045[z]	.193[z]	.037[z]	.190[z]	.036[z]	.172[z]	.030[z]	.308[z]	.095[z]	.141[z]	.020[z]	.218	.048
#37	6	.195[z]	.038[z]	.228	.052	.291[z]	.085[z]	.175[z]	.031[z]	.198[z]	.039[z]	.227[z]	.052[z]	.101[z]	.010[z]	.144	.021	.249[z]	.062[z]	.123	.015

*Not computed, not enough data available
[o]No variance
[z]The greatest partial correlation from set of contrasts for this transformed variable is given as an approximation of the minimal total variance for that variable.

What hypotheses are suggested concerning the effectiveness of certain program characteristics?

SIZE OF INSTRUCTIONAL GROUPS. This variable added considerably to the variance accounted for, particularly in the primary grades (Table 7). Across all grade levels the highest gain scores were achieved in small groups (2 to 5) and/or individual instruction[1], except for grade 5 (Table 8). The fifth graders who achieved the highest mean gains were in instructional groups of ten or more. An inspection of the original data revealed that the 16 students who contributed to that high mean gain were in a program where the whole class worked in their classroom with a teacher trained to manage the diagnosis of reading problems, to plan individualized instruction and to assess progress continuously. More generally, small groups are more likely to allow for such accomodation of instructions to fit the individual. When we examined the data from those sites effecting the greater mean gains, all but one of the fourteen reported a program of instruction tailored to the individual needs of the child, most often determined by diagnostic or criterion referenced testing. The instructional program was then followed through with an individual, a small group or, as for grade 5, a larger group but diagnostic, individualized teaching.

[1]Two recent studies found essentially the same results (McDonald, 1976 and Stallings, 1975).

TABLE 8

ANALYSIS OF VARIANCE
Mean gain scores (standard deviations), and N for various values of SIZE OF INSTRUCTIONAL GROUP and probability of mean differences

Group	Grade	1:1	1:2 to 1:5	1:[illegible] to 1:10	1:10+	1:1 and 1:2 to 1:5	1:1 and other	F	P
		mean (SD)	mean (SD)	mean (SD)	mean (SD)	mean (SD)	mean (SD)		
9 (N = 189)	2	3.58 (1.5) N = 63	4.80 (1.6) N = 32	1.47 (1.3) N = 15	-----	3.08 (1.4) N = 34	2.69 (1.6) N = 45	16.44	.001
16 (N = 136)	3	2.09 (1.5) N = 49	-----	1.82 (1.0) N = 53	1.46 (.3) N = 6	-----	1.49 (1.0) N = 28	1.82	----
20 (N = 252)	3	3.49 (1.5) N = 48	4.47 (1.7) N = 55	-----	-----	2.52 (1.3) N = 64	2.97 (1.7) N = 85	16.94	.001
27 (N = 430)	4	3.24 (1.8) N = 65	3.36 (2.1) N = 137	1.83 (1.4) N = 37	2.90 (1.9) N = 5	2.93 (1.8) N = 96	2.55 (1.9) N = 90	5.02	.001
32 (N = 306)	5	1.74 (.93) N = 27	1.75 (1.1) N = 97	.72 (.62) N = 31	2.34 (1.4) N = 16	1.55 (.95) N = 41	1.07 (1.1) N = 94	9.96	.001
37 (N = 250)	6	1.55 (1.1) N = 18	2.05 (1.3) N = 62	.72 (.7) N = 18	1.46 (1.7) N = 6	1.70 (1.2) N = 86	1.07 (.99) N = 60	6.77	.001

The SIZE OF INSTRUCTIONAL GROUP was apparently very important to the reading achievement of pupils in the studies investigated. Our data suggested the hypothesis that individual and small group instruction will yield higher gain scores on reading achievement tests for low achieving students.

HOURS OF READING INSTRUCTION refers only to the time spent on reading in the various special reading programs under study (not the variable "hours of regular reading instruction" discussed on page 22)[1]. In some cases these hours were in addition to the regular classroom reading and in others they were a substitute for it. The correlations of this variable with gain scores were generally negative (Table 4), and one can only speculate as to "why?". Our questionnaire may not have been sensitive to differences in the hours per week spent in reading instruction for the programs under study. Another question to raise concerns the actual amount of reading done by students in programs where more hours were reported, especially when larger instructional groups were used. Such large groups would report "exposure" time, but the time spent actually attending to the task may have been considerably different. On the other hand, the hours of reading instruction for the child who received individual attention or who was in a small group would be reported as less, though it may have been less exposure time and more time on task.[2]

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[1]While the correlations with "hours of regular reading instruction" were generally high and positive, this variable was not a program variable and therefore not analyzed further.

[2]A more appropriate measure, used by Stallings (1975) and others, reports on observed reading activity for individual children. She concluded "...the average time a child spends engaged in a reading activity (is) related to higher reading scores in both first and third grade (p.100)."

When SES and ETHNICITY are controlled for, the partial correlations of HOURS OF READING INSTRUCTION with gain scores were very small except for grade 6 (Table 7), smaller in fact than most of the other variables under consideration. Unfortunately an analysis of variance was not computed for this variable. Such an analysis would help in specifying the point at which more instructional hours produced negative correlations and also would make it possible to trace the data back to specific sites and look at the interaction with INSTRUCTIONAL GROUP SIZE. The predictive power of hours of instruction per week in special reading programs to reading achievement gains for low achieving students is not very great when SES and ETHNICITY are accounted for first.

The SOURCE OF INSTRUCTION indicates who instructed the students in the program: classroom teacher, specialist, tutor, machine, (e.g., the EDL controlled reader, audio cassettes, etc.), a certified teacher who had been given training in order to function as a specialist (usually in reading resource rooms), the classroom teacher in cooperation with a reading specialist, the teacher and a tutor, the teacher and a machine, a tutor in cooperation with a specialist, a specialist and machines, or the teacher and tutors and machines combined.

This variable was a strong predictor after SES and ETHNICITY were partialed out (Table 7). At the fifth and sixth grade levels it had a higher partial correlation than any of the other variables.

For all but two of the groups, the programs undertaken by reading specialists were consistently better (Table 9). In one exception (grade 2), specialist and tutor groups achieved the highest gains.

TABLE 9

ANALYSIS OF VARIANCE
Mean gain scores (standard deviations), and N for various values of SOURCE OF INSTRUCTION and probability of mean differences

Group	Grade	Teacher	Specialist	Tutors	Teacher as Specialist	Teacher and Specialist	Teacher and Machines	Specialist and Tutor	Specialist and Machines	Teacher, Tutors & Machines	F	P
		mean SD	mean SD	mean SD	mean SD	mean SD	mean SD	mean SD	mean SD	mean SD		
9 (N = 189)	2	1.47 (1.3) N = 15	3.35 (1.6) N = 79	-----	3.12 (1.6) N = 13	--- -	-----	3.65 (1.7) N = 82	-----	-----	7.63	.001
16 (N = 136)	3	1.76 (.8) N = 51	2.07 (.9) N = 30	-----	-- --	1.54 (1.0) N = 35	3.47 (1.2) N = 20	-----	-----	-----	23.83	.001
20 (N = 252)	3	-----	3.61 (1.9) N = 115	-----	2.38 (1.2) N = 37	-----	-----	3.24 (1.6) N = 100	-----	-----	7.78	.001
27 (N = 430)	4	1.92 (1.5) N = 13	3.63 (2.2) N = 109	2.14 (1.3) N = 34	2.94 (2.0) N = 34	2.24 (1.5) N = 39	-----	3.09 (2.0) N = 142	2.11 (.9) N = 43	3.33 (1.6) N = 16	5.81	.001
3 (N = 306)	5	1.70 (1.2) N = 34	1.99 (1.1) N = 66	1.01 (1.0) N = 14	1.34 (1.2) N = 22	.95 (.8) N = 41	1.04 (.8) N = 3	1.27 (1.1) N = 106	1.64 (1.05) N = 13	1.45 (.6) N = 7	4.26	.001
37 (N = 250)	6	1.46 (1.7) N = 6	2.25 (1.1) N = 54	-----	1.69 (1.7) N = 14	.88 (.72) N = 21	.76 (.67) N = 7	1.42 (1.2) N = 134	1.40 (.9) N = 14	-----	5.49	.001

This combination was very effective at other grade levels as well. In another exception (in the third grade), the "teacher plus machines" was most effective. The "machines" for these students were tape cassettes and film projectors used to introduce new vocabulary and to supplement instruction in reading. In addition, children taped their own reading and listened to it leading to increased expression in oral reading. These results were from 20 children in an experimental program run by the teacher.

At the third and fourth grade levels, programs administered by the classroom teachers were least effective raising the possibility that pre- and in-service training of teachers in reading instruction may be useful.[1] The gap between the expertise of the reading specialists who achieved better results and the classroom teachers bears further investigation.

The hypothesis suggested on the basis of the strong correlation of SOURCE OF INSTRUCTION with gains and the difference in mean gains is: programs for low achieving children offered by reading specialists will generally yield greater gain scores on reading achievement tests than other programs.

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[1]A major recommendation of the National Academy of Education in Toward a Literate Society (1975) was that a larger part of the reading problem can be solved by attention to teacher training.(Carroll and Chall,1975)

In grades 5 and 6, the combination of a "specialist and teacher" was associated with low gain scores. Since only two sites had this combination, it was possible to examine their program descriptions to determine how the specialists functioned. In one case the specialists' roles were defined as primarily working with individuals on language development and perceptual skills, not reading per se. At the other site one specialist was available for all 18 learning centers. This same site had much better than average gain scores at grades 2 and 3, but not for grades 5 and 6. It is perhaps safe to assume that it was impossible for the specialist to influence instruction at all levels with such a heavy responsibility.

LOCATION OF INSTRUCTION. Three different types of "locations" were defined: classroom (when the reading program under study consisted of work done right in the classroom), laboratory or resource rooms (this term encompasses reading rooms, etc. by whatever name, as long as they were located within the school building) and reading centers located outside the school building.

The partial correlations indicated this to be a relatively strong variable for four of the six groups. No single type of location was consistently related to higher gains (Table 10); however, further investigation with our own data could determine the interaction between this variable and SOURCE OF INSTRUCTION which could help to indicate the circumstances under which specific locations are best.

We must conclude from our data as analyzed that successful programs can be mounted in all types of settings: classrooms, reading resource rooms, and reading centers located in other buildings.

TABLE 10

ANALYSIS OF VARIANCE
Mean gain scores (standard deviations), and N for various values of LOCATION OF INSTRUCTION and probability of mean differences

Group	Grade	Classroom mean (SD)	Lab or Resource Room mean (SD)	Reading Center mean (SD)	F	P
9 (N = 189)	2	1.47 (1.3) N = 15	3.55 (1.7) N = 162	2.55 (1.1) N = 12	12.74	.001
16 (N = 136)	3	1.88 (1.3) N = 71	1.78 (1.0) N = 65	-----	.22	----
20 (N = 252)	3	-----	3.35 (1.7) N = 243	1.54 (.7) N = 9	9.99	.01
27 (N = 430)	4	3.55 (2.0) N = 35	3.11 (1.9) N = 334	1.51 (1.1) N = 52	18.74	.001
32 (N = 306)	5	2.47 (1.5) N = 25	1.45 (1.0) N = 237	.806 (.742) N = 43	19.88	.001
37 (N = 250)	6	1.77 (1.5) N = 12	1.51 (1.2) N = 230	2.39 (1.6) N = 8	2.29	----

TEACHER TRAINING. The partial correlations (Table 7) indicated that this variable was associated with gain scores but the pattern of association was unclear (Table 11). Perhaps our categories of "specific" and "general" training as well as "pre-program" or "during program" training were too ambitious and diluted the simple effects of training versus no training.

In going back to the fourteen individual sites where gain scores were obviously higher than others within any given group, certain commonalities on TEACHER TRAINING became apparent and were consistent with the correlations. All these sites had provided training for the teachers. School (systems) concerned about teacher growth usually provide training and, of course, it may well be that such systems are in general more supportive of teachers.

The hypothesis suggested (data from one group notwithstanding) is that some teacher training as opposed to none will enhance lower achieving students' gain scores in reading achievement.

TABLE 11

ANALYSIS OF VARIANCE
Mean gain scores (standard deviations), and N for various values of TEACHER TRAINING and probability of mean differences

Group	Grade	none	Specific Training during Program	General Training during Program	Specific before Program	Specific before and during		
		mean(SD)	mean(SD)	mean(SD)	mean(SD)	mean(SD)	F	P
9 (N = 189)	2	1.47 (1.3) N = 15	3.29 (1.6) N = 79	-----	3.58 (1.5) N = 63	3.74 (2.1) N = 32	7.65	.001
16 (N = 136)	3	3.47 (1.2) N = 20	1.59 (.9) N = 94	-----	1.46 (.3) N = 6	1.39 (1.1) N = 16	22.07	.001
20 (N = 252)	3	-----	3.57 (1.9) N = 107	2.86 (1.1) N = 16	3.49 (1.5) N = 48	2.86 (1.6) N = 81	3.35	.05
27 (N = 430)	4	2.01 (1.4) N = 24	2.60 (1.9) N = 165	4.51 (1.6) N = 22	3.52 (1.7) N = 57	3.01 (2.0) N = 162	8.12	.001
32 (N = 306)	5	1.92 (1.2) N = 66	1.14 (.82) N = 103	2.73 (1.9) N = 8	1.74 (.93) N = 27	1.25 (1.1) N = 102	9.89	.001
37 (N = 250)	6	1.84 (1.2) N = 34	1.45 (1.0) N = 117	2.08 (1.2) N = 6	1.55 (1.1) N = 18	1.53 (1.5) N = 75	.99	----

PARENT GROUPS. There were some high partial correlations on the PARENT GROUP variable (Table 7). The responses to our questionnaire were coded so that five descriptions of parent groups were possible on this variable: none (where there was no parent involvement), general meetings (where there was no advisory council but meetings were held with the parents), advisory council and general meetings (both), and some other combination (involvement that might or might not include advisory councils, general meetings, and some other component). The anova data (Table 12) indicated that in no case was "none" associated with highest gain scores. For only one group were there higher gain scores where advisory councils were not included and for four groups the advisory-council-only category had students with significantly superior gain scores. Such groups are mandatory for Title I projects and the fact that they are associated with greater gain scores for these low groups reinforces that aspect of Title I.

We hypothesize that: parent involvement is a positive aspect of reading programs for low achieving students and parent advisory councils are an effective means for such involvement.

TABLE 12

ANALYSIS OF VARIANCE
Mean gain scores (standard deviations), and N for various values of PARENT GROUPS and probability of mean differences

Group	Grade	none	Advisory Council	General Meetings	Advisory Council and General Meetings	Other Combinations	F	P
		mean (SD)	mean (SD)	mean (SD)	mean (SD)	mean (SD)		
9 (N = 189)	2	3.06 (1.5) N = 103	4.89 (1.2) N = 18	-----	2.91 (1.6) N = 36	3.74 (2.1) N = 32	7.98	.001
16 (N = 136)	3	1.14 (.6) N = 29	-----	3.47 (1.2) N = 20	2.07 (.9) N = 30	1.49 (1.0) N = 57	29.29	.001
20 (N = 252)	3	3.00 (1.4) N = 79	5.43 (1.5) N = 22	-----	3.42 (1.7) N = 70	2.86 (1.6) N = 81	16.78	.001
27 (N = 430)	4	2.73 (1.5) N = 152	5.17 (2.7) N = 23	2.61 (1.5) N = 15	3.49 (1.8) N = 56	2.69 (2.0) N = 184	11.09	.001
32 (N = 306)	5	1.52 (.88) N = 69	2.13 (1.09) N = 34	1.16 (.77) N = 23	2.24 (1.4) N = 31	1.12 (1.0) N = 149	12.44	.001
37 (N = 250)	6	1.77 (1.1) N = 62	2.30 (1.0) N = 21	.76 (.7) N = 7	1.77 (1.5) N = 12	1.37 (1.2) N = 148	4.46	.01

STUDY SKILLS AND LANGUAGE ARTS. We questioned the emphasis placed on DECODING (phonics and word analysis skills) STUDY SKILLS (strategies which enable the reader to organize and thus aid in recall and analysis of material read, such as outlining, summarizing, setting goals, etc.) COMPREHENSION, SPEED (increasing the pace of reading) WRITING (not penmanship), and LANGUAGE ARTS (the integration of reading, language and writing instruction). Of these, emphasis on STUDY SKILLS and LANGUAGE ARTS appeared to be most related to reading gains and so they were included in the regression and partial correlations computed.

The correlations (Table 4) and the partial correlations (Table 7) indicated that both are important variables.[1] Our data indicated that teaching study skills (in either a minor way or emphasized) is associated with greater gains than when they are not taught, (Table 13), and although the evidence is not strong, we would hypothesize that there is a beneficial effect when attention is given to study skills beginning in grade 2.

[1]Unfortunately the analysis of variance on LANGUAGE ARTS was not computed and we are unable to make any hypotheses for it.

TABLE 13

ANALYSIS OF VARIANCE

Mean gain scores (standard deviations), and N for various values of STUDY SKILLS and probability of mean differences

Group	Grade	none	Minor	Emphasized	F	P
		mean (SD)	mean (SD)	mean (SD)		
9 (N = 189)	2	1.61 (1.2) N = 24	3.57 (1.8) N = 89	3.56 (1.5) N = 76	15.80	.001
16 (N = 136)	3	1.28 (.67) N = 41	1.79 (.98) N = 59	2.54 (1.5) N = 36	12.96	.001
20 (N = 252)	3	1.90 (.92) N = 31	3.65 (1.8) N = 144	3.15 (1.5) N = 77	15.16	.001
27 (N = 430)	4	1.47 (1.2) N = 72	3.22 (2.0) N = 222	3.26 (1.8) N = 136	28.23	.001
32 (N = 306)	5	.749 (.85) N = 46	1.41 (1.0) N = 137	1.73 (1.2) N = 123	14.08	.001
37 (N = 250)	6	-----	1.81 (1.3) N = 91	1.40 (1.1) N = 159	6.75	.01

CONSULTANTS. We has questioned whether (1) there was a consultant and (2) did that person function as an administrator, (3) do in-service training, (4) work with teachers in the classrooms, (5) work with students in the classrooms, (6) have other functions, or (7) some combination of these.

For the low groups studied, "other function" yielded the highest gain scores in all but one case (Table 14). Again, the original program descriptions for these groups with high gains, established that "other" included evaluation and/or program design. We would therefore hypothesize that the use of consultants to aid in program design and/or for program evaluation will enhance achievement gains for the low achieving children.

SOCIAL/GUIDANCE WORKERS FOR STUDENTS. This is a dichotomous variable with either a "yes" or "no" response and it combined the responses to several questions on pupil personnel. A "yes" response indicated that such personnel were available to children as part of the program under study and did not include cases where the services were no more than they would be in the usual school situation.

The higher correlations (Table 4) tended to be for grades 3 and 4 and they were maintained when SES and ETHNICITY were partialed out (Table 7). In general, it was not as strong a variable as many of the others studied but it may warrant further investigation, particularly at the middle grades where the reading task is changing. On the basis of our data we hypothesize that providing special personnel, social or guidance workers, for low achieving students will enhance their reading achievement gains.

TABLE 14

ANALYSIS OF VARIANCE
Mean gain scores (standard deviations), and N for various values of CONSULTANTS and probability of mean differences

Group	Grade	none	In-service Training	Evaluation and/or Program Design	Combination	F	P
		mean (SD)	mean (SD)	mean (SD)	mean (SD)		
9 (N = 189)	2	3.17 (1.6) N = 82	2.92 (1.5) N = 70	4.89 (1.2) N = 18	3.90 (2.3) N = 19	8.03	.001
16 (N = 136)	3	3.0 (1.4) N = 26	1.82 (1.0) N = 53	1.39 (1.1) N = 16	1.28 (.7) N = 41	16.38	.001
20 (N = 252)	3	3.38 (1.4) N = 68	2.92 (1.6) N = 110	5.43 (1.5) N = 22	3.00 (1.7) N = 52	16.21	.001
27 (N = 430)	4	3.24 (1.8) N = 139	2.35 (1.6) N = 120	5.17 (2.7) N = 23	2.79 (1.9) N = 148	17.15	.001
32 (N = 306)	5	1.95 (1.2) N = 71	1.12 (.92) N = 83	2.13 (1.1) N = 34	1.15 (.98) N = 118	16.60	.001
37 (N = 250)	6	1.45 (1.1) N = 55	1.79 (1.4) N = 48	2.30 (.97) N = 21	1.37 (1.1) N = 126	4.61	.01

Summary of the Study of Relationships of Reading Achievement Gain Scores with Program Characteristics for Low Achieving Students.

This section summarizes our tentative hypotheses about the effect of background and program variables on the gain scores of students who scored one standard deviation below the mean on reading achievement pre-tests--the low-groups.

Partly because of the nature of our groups, SES was not a powerful predictor of gain scores for the low groups. Likewise the contrasts between ethnic groups present within our groups varied considerably and greater gain scores could not be predicted for any one ethnic group. Our data suggested the hypothesis that students from various SES and ethnic backgrounds can be expected to achieve greater or lesser achievement gain scores depending on factors other than SES and ethnicity.

There were program characteristics which accounted for an additional proportion of the variance in reading achievement scores beyond that associated with SES and ETHNICITY. While our data did not generate one encompassing explanation for the relationship between program variables and achievement gains for all groups, the data did suggest some hypotheses concerning certain powerful predictors that may be found to be generalizeable to many school situations. The relationship of program variables to gain scores for the low-groups were not dramatically different between grade levels.[1] The students in the low-groups in

[1] Multiple regression and analysis of variance techniques on the data from the mid- and high-groups might reveal more differences in the associated variables and these data are available from our study.

the fifth and sixth grades are actually still responding to reading in much the same way as third and early fourth graders (see Volume II) and therefore the differences by grade level are not great. Most of our hypotheses concerning effective program components are tenable for grades 2 through 6. Actual hypothesis testing in schools would determine if there are causal effects in any of our correlational results.

The following hypotheses are restated here to emphasize that these program characteristics, of all those we measured, are most consistently associated with gain scores of the lowest achieving children.

1. Individual and small group instruction will yield higher gain scores on reading achievement tests for low achieving students.

2. Programs for low achieving children offered by reading specialists will yield greater gain scores on reading achievement tests than other programs.

3. Relevant teacher training will enhance lower achieving students' gain scores in reading achievement.

4. Parent involvement is a positive aspect of reading programs for low achieving students and Parent Advisory Councils are an effective means for involvement.

In addition to these hypotheses concerning the four program variables, certain other program characteristics are also powerful predictors at certain grade levels. The most effective location for instruction was a "reading laboratory or resource room" for the earlier grades while the fifth grade students in "classrooms" had the highest gains. Two program components, language arts and study skills also accounted for significant amounts of variance without a clear pattern of the relationship. Consultants for program design and/or evaluation

and feedback appear to be associated with higher gain scores for the low groups.

The above variables need to be researched further to determine if they contributed to the higher scores, what other circumstances were highly inter-related, and in what contexts they are most advantageous.

Our review of the 14 programs which yielded the highest gain scores for the low achievers led us to believe that effects might be produced by management of the instructional process so that pupils have individually prescribed instruction based either on diagnosis[1] or continuous assessment (e.g., criterion referenced tests). Direct observations at the 14 sites would be fruitful and would further the process of "pinning down just what joint action of situational variables produces a particular effect (Cronbach, 1974, p.19)." Classroom observations would offer more options to the researcher than our post hoc investigation where variables were necessarily limited. Successful programs were unique to their locale, unique to particular interactions between the personnel as well as the program features associated with each project and the resources available.

We are convinced that there should be no expectation that what is a model program in one community should be the best model in other communities. Our data somewhat shatters the mystique of model programs which include variables that will be effective in all cases. Nevertheless, the several powerful predictors which kept reappearing do have relevance to policy decisions which we discuss in Section V.

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[1]Rider (1972) found this to be characteristic of the nine Title I programs he identified as most effective.

V. CONCLUSIONS, IMPLICATIONS, AND FURTHER STUDY

Reports of recently implemented reading programs were located and data solicited from project directors and/or school personnel which included school and program descriptors as well as individual student achievement data from 36 communities. The data were analyzed to examine the relationship between achievement gain scores and program characteristics and also to identify characteristics of the schools serving the poorer readers. Volume II constitutes analyses of reading achievement tests and speculations about the differences in achievement for students at different grade levels, 1-6.

Characteristics of Schools Serving a Large Number of Poorer Readers

In our data, students making the smallest gain scores came from larger schools in lower socio-economic urban areas with fewer white students. Some differences with regard to their education include the fact that in these schools there was less teacher training, less teacher curriculum development, fewer consultants, fewer dollars per pupil spent and more social workers for students, as might be expected by their greater problems.

Other differences seem to vary with grade level. Those students making smaller gain scores in grades 2, 3 and 4 generally went to schools where there were more tutors, where there were more reading specialists, fewer remedial programs, more enrichment activities, and more psychologists and social workers for their parents. To date national attention has targeted more dollars to these lower grades and it was interesting

to find that in grades 5 and 6 there were fewer reading specialists, enrichment activities and social workers/psychologists for the parents, but more remedial programs. Our findings emphasize the danger in making "causality" statements about co-occuring events. In many cases the differences reflected the implementation of special help for low achieving students and its presence could hardly be said to "cause" low achievement.

It was not difficult to locate problem areas. We now need further research to determine if some or any of the special services offered mostly to the primary grades should be incorporated at the upper grade levels.

Program Characteristics Related to Gain Scores for Low Achieving Groups

One of the most encouraging outcomes from our research is the evidence that program characteristics do contribute to differences found on the reading achievement test gain scores for the low achieving students even after SES and ethnicity have been accounted for.[1]

The following particular program characteristics appeared frequently enough in conjunction with higher gain scores to warrant attention and further study: individual or small group instruction, reading specialists, teacher training, and Parent Advisory Councils.

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[1]Stallings (1975) has found this to be true of Follow-Through groups and Bloom (1976) found evidence for it in his most recent study. McDonald (1976) also substantiates it at the second and fifth grade levels.

The exact nature of the contribution of program components to gain scores varies across grade levels and even within grade levels for different programs. A strong implication from our data for funding agencies is that they should not try to mandate all the specific aspects of programs. Rather than specifying what components should be included, communities might be encouraged to work out their specific problems. However, they should also strongly be advised of the mounting body of evidence which supports small group and individualized instruction, reading specialists, teacher training and parent involvement. Other of our variables (see summary in Section IV) and some variables not included in our study also need to be researched and our suggestion would be to concentrate research on direct observation of program components as our evidence suggests that these do make a difference beyond background variables.

Differences in Achievement for the Low Group Grade Levels 1-6.

Program efforts at all grade levels can and do produce achievement gains. Nevertheless, there is a cumulative effect for every year of not gaining a full year in achievement and the fifth and sixth graders are further "behind" than the students in the primary grades. Volume II addresses this issue and the cross sectional data we collected indicated that across the various programs the yearly growth, or pre- to post-test gain scores, on standardized reading achievement tests was only slightly better at the lower (grades 2-4) levels. However, the drop in test scores between spring testing at the end of one academic

year and the beginning of the school year the following fall was startling. While our data were not from the same group across the grade levels (it was not longitudinal), the data seemed strong enough to indicate that the "loss" over the summer was a major contributor to steadily decreasing scores in terms of grade equivalents. For a low group to make a gain of .8 and even 1.0 grades in an academic year is a major accomplishment. However, when that group loses anywhere from .5 to 1.0 grade levels over the summer, the scores relative to actual grade level decrease annually. Such losses over the summer are most evident for the low group and we suspect that longitudinal studies will probably substantiate losses over the summer as a major problem, one which must be faced. Research on summer programs which encourage reading as well as teach reading might help to reduce those losses and to provide low-achieving students with more exposure to a "literate" vocabulary so necessary to advanced reading skills.

Further Research

Numerous suggestions for further research are made throughout the report and those which seem most pertinent to gaining new insights into the teaching and learning of "reading" which can then be translated into practice are mentioned briefly below along with further study which could be undertaken on the data we now have from the 36 communities.

We need research to determine if certain program characteristics which were highly correlated with greater gain scores for the low achieving children in this study and other studies, will actually effect greater achievement. Revisions in program planning and teaching

strategies might be implemented slowly and cautiously at the local levels with continued careful evaluation of the special efforts to test their effects for any given site. Study in natural field settings is necessary to test hypotheses such as those suggested by our data and to generate new hypotheses as other relevant variables become apparent. And we would suggest that data from these studies be analyzed to determine if any effect found is making a difference specifically for the low-achievers.

Another major effort should be made to determine the effectiveness of summer programs planned to include a substantial exposure to good books.

The most fundamental goal of the various research projects suggested would be to improve our understanding of those things which positively affect reading achievement, particularly for the low achieving children. While we continue to pursue other ways to increase the general learning of such students, we also must improve our techniques in teaching reading and maximize the use of the time spent with them in that area. As a result of our research which led to several very strong hypotheses, we are convinced that discussions and interactions between experienced professionals in the field and a research team who can observe ongoing programs will result in beneficial outcomes. We are also convinced that there is no panacea for improving reading on a nation-wide scale, but that with further research, certain factors may emerge as suggested components for effective reading programs which are tailored to the unique situation found in every school.

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APPENDIX A

The following is a list of sites from which we gathered data.

Sylacauga, Alabama

Glendale, Arizona

Tuscon, Arizona

Sierra Vista, Arizona

Flagstaff, Arizona

Hanford, California

Newport Beach, California

San Jose, California

Westminster, Colorado

Hartford, Connecticut (parochial)

Fort Lauderdale, Florida

Lewiston, Idaho

Wichita, Kansas

Chicago, Illinois

East St. Louis, Illinois

Van Buren, Maine

Fall River, Massachusetts

Leominster, Massachusetts

Andover, Massachusetts

Clarkston, Michigan

Minneapolis, Minnesota

Lincoln, Nebraska

Omaha, Nebraska

East Brunswick, New Jersey

New York City, New York (PS 140)

Uniondale, New York

Pinder County, North Carolina

Cleveland, Ohio

Aurora, Oregon

Pittsburgh, Pennsylvania

Newport, Rhode Island

Portsmouth, Rhode Island

Oglala, South Dakota

Seattle, Washington

Vancouver, Washington

Stevens Point, Wisconsin

[1]We would like to express our appreciation for the cooperation particularly from these communities, but also to other communities who responded to our questionnaire and indicated a willingness to participate.

ERIC #_____ NIE #_____

School_____ Address:_____

Tel._____

Administrator_____

Study or Project_____

_____

Author_____ Date_____

SCHOOL BACKGROUND QUESTIONNAIRE

Please check answers that describe your school(s) during the year when this study was undertaken. (197)

CHILDREN

1. Grade levels served by your school(s):

   K Gr.1 Gr.2 Gr.3 Gr.4 Gr.5 Gr.6 Gr.6+

   If school was nongraded, what age levels were included?

   5yrs. 6yrs. 7yrs. 8yrs. 9yrs. 10yrs. 11yrs. 12yrs. 12+yrs.

2. Please indicate the number of pupils in your school(s) (i.e. the schools where this study was undertaken)_____

3. English was the first language of:

   90% or more of the students____ 50% or more____ less than 50%____

4. The socioeconomic status of most of the pupils was:

   primarily low SES____ low-middle____ middle____

   middle-high____ primarily high____

5. The area served by your school(s) is:

   primarily rural____ primarily urban____ primarily suburban____

6. Which ethnic groups constituted 10% or more of your enrollment?

   Black____ Chicano____ Puerto Rican____ White/Anglo____

   Other (note)_____

INSTRUCTORS

7. Were any types of special training, such as in-service workshops or seminars, available to the teachers (other than those given in conjunction with the study)?

   yes____ no____

8. Were teachers actively instrumental in curriculum development?

   yes____ no____

9. Did your school then have teacher aides? yes____ no____

10. Did your school program include tutors? yes____ no____

11. Was there a reading specialist (as defined by certification requirements in your state) assigned to your school(s)? yes____ no____

12. Were consultants from outside your school system or from the "central office" used throughout that year? yes____ no____

13. The assignment of students to classrooms that year was:

    heterogeneous____ heterogeneous for most classes____ homogeneous for most classes____ homogeneous____

14. Select the phrase which best characterized classroom structure for the whole school.

    Children usually select materials and activities_____
    Children and teachers together agree on materials and activities_____
    Teacher usually selects materials and directs activities_____

    Descriptive sentence_____

    _____

15. Organization of your school:

    all classes graded (i.e., K,1.2)_____ most classes were single grades_____ most classes were non-graded_____ all classes were non-graded_____

16. What was the average class size in your school that year?_____

17. Please indicate the number of hours per week spent by each child in reading instruction in the normal school program:

    less than 1_____ 3 to 4.9_____ 10+_____

    1 to 1.9_____ 5 to 6.9_____

    2 to 2.9_____ 7.0 to 9.9_____

18. Which of the following were available to the children in your school?

    developmental reading program?____ learning disabilities program?____

    program of enrichment activities (films, tours, guest speakers, etc.)?____

    remedial reading program?____

SUPPORT SERVICES

19. Support was given to the parents via:

general meetings for all parents (including PTA, PTO, etc.____

home visits____ organized, ongoing committees or support groups____

parent-teacher conferences____ psychological services for parents____

social worker____

20. Which of the following were available to your pupils?

vision and hearing screening____

other medical (note)_____

guidance or adjustment counselor____ social worker____

psychologist for severely disturbed children____

FINANCING

21. What was the per-pupil expenditure for your attendance area or district during 19__? _____

22. Was the source of your school funds: public?____ private?____

EVALUATION

23. Did you have an achievement testing program for the entire school? yes____ no____

What tests were used?	When? (fall and/or spring)	For? (grades)
_____	_____	_____
_____	_____	_____
_____	_____	_____

24. Did you keep records of children's performance on tests of intelligence or aptitude? yes____ no____

25. Would the project director (_____) be the person from whom to collect similar information on the children in his/her study or project study done in your school in 19___? If yes, do you have his/her current address?

_____

Appendix C

Study:_____ Eric #_____ NIE_____

Author:_____ Address:_____

_____

Date:_____ Tel:_____ _____

Questionnaire for Treatment and Control Groups

Please check answers which best describe the situation for your project. There is a separate questionnaire for each group and your answer on each questionnaire should pertain to one group only. Remember, your answers whould apply to the treatment situation, not the usual classroom.

Group_____

1. Major source of treatment:

   Classroom teacher____ Specialist____ Other tutor____
   Machine____ Other (note)_____

CHILDREN

2. Grade levels participating:

   K____ gr 1____ gr 2____ gr 3____ gr 4____ gr 5____ gr 6____ gr 6+____

   If classes were nongraded for this study, what age levels were included?

   5 yr____ 6 yr____ 7 yr____ 8 yr____ 9 yr____ 10 yr____ 11 yr____

   12 yr____ 12+ yr____

3. How many students were in the treatment group described in this questionnaire?_____

4. Were children participating in this group identified as exceptional?
   No____ Yes____

   Were they identified as: gifted____ emotionally disturbed____
   learning disabled____ mentally retarded____ other exceptional (note)____

5. English was the first language of:

   90% or more of the students____ 50% or more____ less than 50%____

6. The socioeconomic status of most of the pupils in this group was (Check one)

   primarily low SES____ low-middle____ middle____ middle-high____
   primarily high____

7. Which ethnic groups constituted 10% or more of the children in this group?

   Black____ Chicano____ Puerto Rican____ White/Anglo____
   Other (note)_____

INSTRUCTORS

8. Under this project were any types of special training, such as in-service workshops or seminars, made available to the teachers of this group of pupils? No____ Yes____ (If "Yes", check as many as apply)

   Were they: voluntary____ compulsory____ specific to the program____
   general____ completed before the program was underway____
   ongoing during program____

9. Did teachers actively participate in developing curriculum for this group of pupils?
   No____ Yes____ Did they: set objectives for program____
   create learning materials____

10. Were aides participating with this group? No____ Yes____
    Were they: volunteers____ paraprofessional____ secondary students____
    college students____ student teachers____ parents____ other adults____

11. Were the aides given any training for this program? No____ Yes____
    Was it: on a volunteer basis____ completed before program got underway____
    ongoing during the duration of the program____ specific to program____
    general____
    (check as many as apply)

12. Were there special tutors for your program for this group of pupils?
    No____ Yes____
    Were they: volunteers____ paraprofessionals____ reading specialists____
    elementary students (peer tutoring)____ secondary students____
    college students____ parents____ other adults____

13. Were the tutors given any training under this program? No____ Yes____
    Was the training: on a volunteer basis____
    completed before program got underway____
    ongoing during the duration of the program____
    specific to program____ general____

14. Was there a certified reading specialist participating in the project?
    No____ Yes____
    Did she: work with individuals____ groups of 2-6____ groups larger than 6____ function as a consultant____ perform diagnoses____

15. Were there any consultant services (other than the project director) brought in specifically for this project? No____ Yes____
    Was their function to help with: management____ in-service training____
    teachers in the classrooms____ students in the classroom____
    other (note) _____

INSTRUCTION

16. How were the children selected to participate in the program?
    no selection, everyone participated____ low achievement____ SES____
    random____ high achievement____ other (note)_____

17. Was the assignment of students to groups: (select one phrase)
    heterogeneous____ heterogeneous for most groups____
    homogeneous for most groups____ homogeneous____ individualized____

89

18. Select the one phrase which best characterized classroom structure for this group:
children usually select materials and activities____
children and teachers together agree on materials and activities____
teacher usually selects materials and directs activities____

Please elaborate:_____

_____

19. What was the organization of the groups? (Select one phrase)
every group contained pupils from one grade level only____
most groups contained pupils from one grade level only____
most groups contained pupils from several grade levels____
every group contained pupils from several grade levels____

20. Instruction of this group was carried on:
in a school____ in a hospital____ in a church____ at home____
in a community center____ child care center____
reading center (not in the school)____ other place (note)____

21. Please indicate the number of hours per week spent by each child in the reading instruction which was considered "treatment" under this program.
____ hours per week
Were these hours in addition to children's regular instruction? No___ Yes___
Were they a substitute for his regular instruction? No____ Yes____

22. Please indicate the number of hours per week each child participated in a special "treatment," other than reading, under this project.
____hours per week
Were these hours in addition to children's regular instruction? No___ Yes___
Were they a substitute for his regular instruction? No____ Yes____

23. What size groups were formed for reading (or other treatment)?
individuals____ 2-5 pupils____ 6-10 pupils____ 10-20____
more than 20____ mix or other group sizes (note)_____

24. How would you describe the nature of "treatment" given to this group?
major focus was: developmental reading____ remedial reading____
an enrichment program (films, tours, speakers, etc.)____
other (note)_____

25. Indicate with check marks in the appropriate columns whether the materials used for reading and/or language instruction for this group included major, minor, or no emphasis on the following:

	Major	Minor	None
decoding	_____	_____	_____
comprehension	_____	_____	_____
study skills	_____	_____	_____
speed reading	_____	_____	_____
writing	_____	_____	_____
language arts	_____	_____	_____

26. How long were the children in the treatment group?_____

27. Did parents participate in the program? No____ Yes____
They helped: as library aides____ in the design and development of curriculum____ in planning and implementing the program____

SUPPORT SERVICES

28. Was additional support provided to the parents under this project?
No____ Yes____
Were there: general meetings for all parents____ home visits____
parent-teacher conferences____
organized, ongoing committees or support groups____ social worker____
psychological services for parents____
training programs for parents on working with own children____
other (note)_____

29. Were any of the following extra services provided for the child under this program? No____ Yes____ Services provided were:
medical (note)_____guidance or adjustment counselling_____
social worker_____ psychologist for severely disturbed children_____
other (note)_____

FINANCING

30. What was the per-pupil expenditure for this program?_____

If not known, what was the total cost of the program?_____

31. What was the source of funding?_____

EVALUATION

32. Which tests were used in pre- and post-testing students in this group? When?

_____

_____

_____

33. Did you keep other data?
observational records____ affective measures____ language development____
neurophysiological development____ aptitude or intelligence data____

34. How was pupil progress reported?
teacher-child conference____ teacher-parent conference
teacher-child-parent conference____ written reports____

APPENDIX D
NIE Coding Sheet - School Variables

Column #

1 Study ID
2
3

---

4 number of sets of cards for study (at least 2)

school ID: 0 = treatment card 1 = ? 2 = (refer back to study for coding used)

6 treatment ID: 0 = school card 1 = ? 2 = (refer back to study for coding used)

7
8

Children in school

9 grade K 0 = NA 1 = ? 2 = N 3 = Y
10 1 0 = NA 1 = ? 2 = N 3 = Y
11 2 0 = NA 1 = ? 2 = N 3 = Y (estimate for non graded)
12 3 0 = NA 1 = ? 2 = N 3 = Y
13 4 0 = NA 1 = ? 2 = N 3 = Y
14 5 0 = NA 1 = ? 2 = N 3 = Y
15 6 0 = NA 1 = ? 2 = N 3 = Y
16 6+ 0 = NA 1 = ? 2 = N 3 = Y

17 number of students. 1 = ? 2 = 1-49 3 = 50-99 4 = 100-199 5 = 200-299 6 = 300-499 7 = 500-999 8 = 1000-4999 9 = 5000+

18 exceptional characteristics. 1 = ? 2 = N 3 = exceptional (LD, MR, etc.) 4 = gifted 5 = mix

19 English as first language. 1 = ? 2 = N 3 = Y 4 = mix

Socio-economic status and environment

20 low: 1 = ? 2 = N 3 = Y

21 middle. 1 = ? 2 = N 3 = low-middle 4 = Y 5 = high-middle

22 high: 1 = ? 2 = N 3 = Y

23 school district: 1 = ? 3 = urban 4 = rural 5 = suburban 6 = town 7 = mix

24 ethnicity. 1 = ? 2 = American Indian 3 = Black 4 = White 5 = Spanish speaking or surname 6 = Black and White 7 = Spanish and White 8 = other 9 = other mix (90% is considered all one group)

Instructor variables

25 teacher training. 1 = ? 2 = N 3 = present

26 teacher curriculum development. 1 = ? 2 = N 3 = present

27 teacher aides: 1 = ? 2 = N 3 = present

Column #

Instructor variables (cont)

30 tutors: 1 = ? 2 = N 3 = present

34 reading specialist: 1 = ? 2 = N 3 = present

35 ex-project consultant: 1 = ? 2 = N 3 = present

Instruction

37 grouping. 1 = ? 3 = heterogeneous 4 = homogeneous 5 = individualized 6 = mix

38 structure. 1 = ? 3 = child determined 4 = teacher determined 5 = child plus teacher 6 = combination 7 = other

40 graded: 1 = ? 3 = graded 4 = ungraded (or multi-graded) 5 = mix

41 class size: 1 = ? 3 = 1 4 = 2-6 5 = 7-15 6 = 16-30 7 = 30+

Time

42 hours spent in reading instruction: 1 = ? 2 = N 3 = less than 1 hr./wk. 4 = 1-1.9 hr./wk. 5 = 2-2.9 hr. 6 = 3-4.9 7 = 5-6.9 8 = 7-9.9 9 = 10 hrs.+

Program Characteristics

Nature

46 developmental reading: 1 = ? 2 = N 3 = Y
47 remedial reading: 1 = ? 2 = N 3 = Y
48 enrichment. 1 = ? 2 = N 3 = Y
49 other treatments: 1 = ? 2 = N 3 = Y

Parent support

59 parent groups: 1 = ? 2 = N 3 = Y

60 psychological services: 1 = ? 2 = N 3 = Y

61 social worker. 1 = ? 2 = N 3 = Y

62

Support services to child

63 medical: 1 = ? 2 = N 3 = assumed 4 = Y 5 = beyond normal

64 guidance counselor: 1 = ? 2 = N 3 = assumed 4 = Y 5 = beyond normal

65 social worker; 1 = ? 2 = N 3 = assumed 4 = Y 5 = beyond normal

66 psychologist: 1 = ? 2 = N 3 = assumed 4 = Y 5 = beyond normal

67 learning disabilities specialist. 1 = ? 2 = N 3 = assumed 4 = Y 5 = beyond normal

Column #

Finances

68 and 69 per pupil expenditure: 01 = ? 02 = N 03 = 1-99 04 = 100-199 05 = 200-299 06 = 300-399 07 = 400-499 08 = 500-599 09 = 600-699 10 = 700-799 11 = 800-899 12 = 900-999 13 = 1000+

70 source of funding: 0 = NA 1 = ? 2 = public 3 = private 4 = public and private 5 = other

Evaluation of students

71 Anchor Tests, pre- and post-: 1 = ? 2 = California Achievement Test (1970)
3 = Comprehensive Test of basic Skills (1968)
4 = Cates-MacGinitie Reading Tests (1964)
5 = Iowa Tests of Basic Skills (1971)
6 = Metropolitan Achievement Tests (1970)
7 = Sequential Tests of Educational Progress II (1969)
8 = SRA Achievement (1971)
9 = Stanford Achievement (1964)
0 = Non-Anchor

72 and 73 Standardized tests, pre- and post-: (special codes 01 - 99)
01 = ?
02 = Test of Basic Experiences
03 = Metropolitan Reading Readiness
04 = California Cooperative
05 = Gray Oral
06 = Gilmore
07 = Slosson
08 = Other

74

75 Aptitude and/or intelligence data. 1 = ? 2 = N 3 = Y

76 Other measures: 1 = ? 2 = N 3 = Y

77 Progress reporting. 1 = ? 2 = N 3 = teacher child conferences 4 = teacher-parent conferences 5 = teacher-child-parent conferences 6 = written 7 = combination

78

79

80 Card number 1

APPENDIX E

NIE Coding Sheet for Treatment Variables

Column #

1 Study ID #
2 " " "
3 " " "

4 number of sets of cards for study (at least 2)
5 school ID: 0 = treatment card 1 = ? 2 = (code refers back to specific school)
6 treatment ID: 0 = school card 1 = ? 2 = (code refers back to specific treatment number)

7 6 3 major source of treatment. 0 = NA 1 = ? 2 = N 3 = classroom teacher
4 = specialist 5 = tutor 6 = machine 7 = teacher specialist
8 = regular teacher + specialist 9 = teacher + tutor 10 = teacher + machine
11 = specialist + tutor 12 = specialist + machine 13 = tutor + machine

Children in study

9	Grade K.	0 = NA	1 = ?	2 = N	3 = Y	
10	1.	0 = NA	1 = ?	2 = N	3 = Y	
11	2.	0 = NA	1 = ?	2 = N	3 = Y	
12	3.	0 = NA	1 = ?	2 = N	3 = Y	
13	4.	0 = NA	1 = ?	2 = N	3 = Y	(estimate for ungraded)
14	5.	0 = NA	1 = ?	2 = N	3 = Y	
15	6.	0 = NA	1 = ?	2 = N	3 = Y	
16	6+	0 = NA	1 = ?	2 = N	3 = Y	

17 Number of students. 1 = ? 2 = 1-49 3 = 50-99 4 = 100-199 5 = 200-299
6 = 300-499 7 = 500-999 8 = 1000-4999 9 = 5000+

18 Exceptional characteristics. 1 = ? 2 = N 3 = exceptional (ED, MR, etc.)
4 = gifted 5 = mix
19 English first language. 1 = ? 2 = N 3 = Y 4 = Mix

SES
20 Low: 1 = ? 2 = N 3 = Y
21 Middle: 1 = ? 2 = N 3 = low-middle 4 = y 5 = high-middle
22 High: 1 = ? 2 = N 3 = Y

23 School district: 1 = ? 3 = urban 4 = rural 5 = suburban 6 = town 7 = mix

24 Ethnicity: 1 = ? 2 = American Indian 3 = Black 4 = White 5 = Spanish speaking or surname (Puerto Rican & Chicano) 5 = Black & White 7 = Spanish & White 8 = Other (Portuguese, Polish, French) 9 = Other mix (90% shall be considered all one group)

Instructor Variables

25 Teacher training: 1 = ? 2 = N 3 = during program (specific) 4 = during program (general) 5 = completed training (specific) 6 = completed training (general) 7 = pre-program and during (specific) 8 = pre-program and during (general)

26 Teacher curriculum development: 1 = ? 2 = N 3 = present 4 = objectives only 5 = learning activities only 6 = combination

27 Teacher Aides: 1 = ? 2 = N 3 = present and unknown 4 = volunteer 5 = paraprofessional 6 = mix

Column #

28 Teacher Aides. 1 = ? 2 = N 3 = elementary 4 = secondary 5 = college 6 = student teacher 7 = parents 8 = other adults 9 = mix

29 Aides' training for program: 0 = NA 1 = ? 2 = N 3 = present and unknown 4 = during program (specific) 5 = during program (general) 6 = pre-program (specific) 7 = pre-program (general) 8 = pre and during, specific 9 = pre and during, general

30 Tutors. 1 = ? 2 = N 3 = present 4 = volunteer 5 = paraprofessionals 6 = reading specialist 7 = machine 8 = Learning Disability tutor 9 = mix

31 Tutors. 1 = ? 2 = N 3 = elementary 4 = secondary 5 = college 6 = parents 7 = other adults 8 = professional 9 = mix

32 Tutors' training for program: 0 = NA 1 = ? 2 = N 3 = present 4 = during program, specific 5 = during program (general) 6 = pre-program (specific) 7 = pre-program (general) 8 = pre and during, specific 9 = pre and during, general

33 Reading Specialist: 1 = ? 2 = N 3 = works with individuals only 4 = works with individuals and small (2-6) groups 5 = works with individuals and small groups and large groups 6 = works with individuals and large groups 7 = works with small groups and large groups 8 = works with small groups only 9 = works with large groups only

34 Reading Specialist as Diagnostician: 1 = ? 2 = N 4 = diagnosis only 5 = consultant only 6 = diagnosis and consultant

35 Project Director services: 1 = ? 2 = N 4 = management 5 = in-service training 6 = work with teachers in classrooms 7 = work with students in classrooms 8 = other 9 = mix

36 Project consultant services: 1 = ? 2 = N 4 = management 5 = in-service training 6 = work with teachers in classrooms. 7 = work with students in classrooms 8 = other 9 = mix

Instruction

37 Selecti of Ss for program: 0 = NA 1 = ? 2 = n selection or everybody 3 low achievement 4 = SES 5 = random 6 = high achi ent 7 = other

38 Grouping: 0 = NA 1 = ? 3 = heterogeneous 4 = homogeneous [grouping by skill deficit, not age] 5 = individualized 6 = 3 + 5 7 = 4 + 5 8 = 3 + 4

39 Structure: 1 = ? 2 = child determined 3 = teacher determined (includes child's choice after teacher's determination) 4 = child plus teacher 5 = combination other (includes teacher directed with free choice element) 6 = other

40 Graded: 0 = NA 1 = ? 3 = graded 4 = ungraded (or multi-grade) 5 = mix

41 Treatment grp. size: 1 = ? 3 = 1 4 = 2-6 5 = 7-15 6 = 16-30 7 = 30+

Location

42 1 = ? 2 = in school classroom 3 = inschool-lab or resource room 4 = church/community center 5 = hospital 6 = child care center 7 = reading center 8 = home 9 = other

Time

43 Hours spent in reading instruction: 1 = ? 2 = N 3 = less than 1 hr. per wk. 4 = 1-1.9 hrs. per wk. 5 = 2-2.9 hrs. per wk. 6 = 3-4.9 7 = 5-6.9 8 = 7-9.9 9 = 10 hrs. per week or more

44 Hours spent in "treatment" other than reading: 1 = ? 2 = N 3 = less than 1 hr. per wk. 4 = 1-1.9 hrs./2k. 5 = 2-2.9 hrs./2k. 6 = 3-4.9 7 = 5-6.9 8 = 7-9.9 9 = 10+

45 Treatment hours: 1 = ? 2 = N 3 = substitute for regular program 4 = base plus increment

46 Grouping for reading and/or other treatment: 1 = ? 2 = N 3 = 1:1 4 = 1:2-1:5 5 = 1:6-1:10 6 = 1:10+ 7 = 3 + 4 8 = 3 + any other 9 = other mix

Characteristics of program

Nature:

47 Developmental reading: 1 = ? 2 = none 3 = available 4 = minor 5 = major

48 Remedial reading: 1 = ? 2 = none 3 = available 4 = minor 5 = major

49 Enrichment: 1 = ? 2 = none 3 = available 4 = minor 5 = major

50 Other treatments: 1 = ? 2 = none 3 = available 4 = minor 5 = major

Materials emphasis:

51 Decoding: 1 = ? 2 = N 3 = minor 4 = emphasized 5 = assumed 6 = phonics

52 Comprehension: 1 = ? 2 = N 3 = minor 4 = emphasized 5 = assumed 6 = vocab. 7 = 4 + 6

53 Study skills: 1 = ? 2 = N 3 = minor 4 = emphasized 5 = assumed

54 Speed: 1 = ? 2 = N 3 = minor 4 = emphasized 5 = assumed

55 Writing. 1 = ? 2 = N 3 = minor 4 = emphasized 5 = assumed

56 Language Arts. 1 = ? 2 = N 3 = minor 4 = emphasized 5 = assumed

Parent Participation

57 Active in program: 1 = ? 2 = N 3 = Y (Code under #59 for non-participating Parent Advisory Committee.)

58

Support Services

59 Parent groups: 1 = ? 2 = N 3 = Parent Advisory Council 4 = general meetings 5 = 3 + 4 6 = organized support groups 7 = home visits 8 = combinations other than #5

60

61 Psychological services: 1 = ? 2 = N 3 = Y

62 Social worker: 1 = ? 2 = N 3 = Y

Support services to child

63 Medical: 1 = ? 2 = N 3 = yes, beyond school's regular services

64 Guidance Counselor: 1 = ? 2 = N 3 = Y, beyond school's regular services

65 Social worker. 1 = ? 2 = N 3 = Y, beyond school's regular services

66 Psychologist: 1 = ? 2 = N 3 = Y, beyond school's regular services

67

68

69

Column #

70 Source of funding: 0 = NA 1 = ? 2 = Title I 3 = Title III 4 = public 5 = private 6 = public and private 7 = Follow Through 8 = other or mix

Evaluation of students

71 Anchor Tests, pre- and post-: 1 = ? 2 = California Achievement Test (1970)
3 = Comprehensive Test of Basic Skills (1968)
4 = Gates-MacGinitie Reading Tests (1964)
5 = Iowa Tests of Basic Skills (1971)
6 = Metropolitan Achievement Tests (1970)
7 = Sequential Tests of Educational Progress II (1969)
8 = SRA Achievement (1971)
9 = Stanford Achievement (1964)
0 = Non-Anchor

72 & 73 Standardized tests, pre- and post-: (special codes 01 - 99)
01 = ?
02 = Tests of Basic Experiences
03 = Metropolitan Reading Readiness
04 = California Cooperative
05 = Gray Oral
06 = Gilmore
07 = Slosson
08 = Other

74 Observational data: 1 = ? 2 = N 3 = Y
75 Aptitude and/or intelligence data. 1 = ? 2 = N 3 = Y
76 Other measures: 1 = ? 2 = N 3 = Y
77 Progress reporting. 1 = ? 2 = N 3 = teacher-child conferences 4 = teacher-parent conferences 5 = teacher-child-parent conferences 6 = written 7 = combination

General Information

78 Research design:
0 = NA 1 = ?
2 = one group, pre- and post-test
3 = comparison group and treatment group, pre- and post-test
4 = random assignment of treatment to intact groups, pre- and post-test
5 = time series (longitudinal study)
6 = random assignment of subjects to treatment & control groups, pre- and post-test

79 Bibliographic source: 1 = ? 3 = journal article 4 = project report 5 = doctoral dissertation 6 = masters thesis 7 = paper

80 Card number 2

[If possible, note somewhere why Project Director feels the program was a success (or not)]

TABLE F - 1

Scores Designating Low-, Mid-, High Groups[1]

Cut-off Points used to Form Clusters of Low-, Mid-, and High Groups at Each Grade Level

Grade	Test	Level and Form	Fall Cut-Off Scores for		Previous Spring Cut-Off Scores for	
			Low Group	High Group	Low Group	High Group
1	Gates McGinitie	Primary A Comprehension	7	20		
	Metropolitan*	Primary I Comprehension	3	12		
		Primer (converted to Primary I)			3	12
2	California Achievement	IA Total Score	59	104		
	Gates McGinitie	Primary B Comprehension	7	24		
		Primary A (converted to B) Total Score			9	24
	Metropolitan	Primary II, Total Score	21	69		
		Primary I (converted to II)			15	44
	Stanford	Primary II, Total Score	17	46		
		Primary I (converted to II)			13	37
3	California	2A, Total Score	33	78		
	Gates McGinitie	Primary C, Comprehension	12	37		
		Primary B (converted to C)			15	36
		Primary C, Total Score	30	76		
		Primary B (converted to C)			32	75
	Metropolitan	Elementary, Total Score	26	66		
		Primary II (converted to Elementary)			21	52
		Primary I (converted to Elementary) (children pretested at beginning of grade 2) Total Score	13	41		
	Stanford	Primary II, Comprehension	24	47	20	43
		Total Score	38	76	32	70
4	Metropolitan	Elementary F, Comprehension	15	37	13	34
		Total Score	34	82	29	76
5	Metropolitan	Intermediate F, Comprehension	11	34		
		Elementary (converted to Intermediate)			11	32
		Intermediate F, Total Score	26	71		
		Elementary (converted to Intermediate)			24	67
6	Metropolitan	Intermediate F, Comprehension	14	39	14	36
		Total Score	33	81	32	77

[1] These scores represent a cut-off score for the low group at the 16th percentile; for the mid group, from the 17th to the 84th percentile; and for the high group, above the 84th percentile.

*End of Kindergarten norms used; no percentile ranks given for beginning of grade 1 in MAT Primary I or Primer. The Kindergarten percentiles on Primer were converted to Primary I.

**The Gates provides no total score, and therefore no percentiles for total scores. We arbitrarily devised cut-off points for the 16th and 84th percentiles by combining vocabulary and comprehension scores.

APPENDIX F

TABLE F - 2

CLUSTERING GROUPS BY PRE-TEST

Sample Size (N) Means ($\bar{X}$) and Standard Deviation (SD) for the Low, Medium, and High Groups in Grades 4, 5 and 6 Formed on the Basis of Pre-Test Scores

		Vocabulary			Comprehension			Total		
Grade		N	$\bar{X}$	SD	N	$\bar{X}$	SD	N	$\bar{X}$	SD
4	LOW	414	12.367	5.462	414	8.860	5.130	430	21.247	8.187
	MID	293	30.863	8.131	293	22.065	7.969	302	52.692	13.936
	HIGH	52	46.269	2.643	52	39.385	2.277	52	85.654	3.662
5	LOW	295	11.068	3.505	295	8.675	3.405	306	19.768	5.326
	MID	337	21.715	7.138	337	17.570	6.516	513	42.433	12.623
	HIGH	23	42.609	3.615	23	37.000	3.568	106	76.132	6.400
6	LOW	243	13.811	3.994	243	11.140	3.458	259	24.976	5.827
	MID	433	26.972	7.401	433	22.986	7.282	601	53.118	13.243
	HIGH	38	45.526	1.704	38	38.658	1.192	125	83.664	4.078

APPENDIX G

TRANSFORMATION OF NOMINAL VARIABLES

Our nominal variables (those for which no assumptions could be made about ordering the categories) had to be transformed in order to determine their correlations with gain scores. A set of contrasts between the response categories (or dummy variables) were created for each variable. The correlations of each of these contrasts with gain scores was then combined and a multiple correlation for the original variable with gain scores computed.

For instance, for one group (#20) the variable on Consultant Services for the reading program had responses in four categories: 2, 5, 8 and 9 as described below. We had no rationale for ordering these categories (i.e., for saying 9 was better than 8 which was better than 5 etc.), much less giving them a numerical value. So, orthogonal contrasts were set up with the assigned values given in the table to determine the correlation of the set of contrasts with gain scores. The assigned values for the orthogonal contrasts or dummy variables and the correlations with gain scores were as follows:

	2	5	8	9	simple correlation for each contrast	multiple correlation for three contrasts together or the original variable
Dummy variable or contrast-1	0	0	1	-1	.271	
Dummy variable or contrast-2	0	2	-1	-1	-.196	
Dummy variable or contrast-3	3	-1	-1	-1	.022	.406

2-no consultants
5-consultant for inservice training only
8-consultant for "other" service (evaluation or program design)
9-consultant for some combination of management, training, evaluation, work with teachers, etc.

The multiple correlation of these contrasts represents the relationship between the gain score and a combination of the dummy variables. The coefficient of .406 represents the correlation between the nominal variable, TCONSULT and gain

scores.

The particular orthogonal contrasts in the dummy variables is arbitrary, but their total contribution to the multiple correlation with gain scores is the same no matter what contrasts are chosen.

Correlations of all nominal variables were computed to yield the simple correlations of each contrast within the variable. Then, based on the strength of the correlations of the contrasts with gain scores, a subset of variables was selected and multiple correlations computed for them. Time and budget constraints prohibited us from computing multiple correlations for all nominal variables. Table 8 presents the significant multiple correlations computed; multiple because they combine the set of contrasts within each variable.

APPENDIX H

SES VALUES

Composition of SES Values 1 to 10 from Questionnaire Responses

Value Coded	Socio-economic Groups Represented
1	All children from low SES backgrounds
2	Children from low and low-middle SES
3	All children from low-middle SES.
4	Children from low and from middle SES
5	All children from middle SES
6	Children from low and high-middle SES from low, low-middle, and high SES from low, middle, and high SES from low, high-middle, and high SES from low-middle and high SES
7	Children from middle and from high SES
8	All children from high-middle SES
9	Children from high-middle and from high SES
10	All children from high SES

APPENDIX I

Tests Used at the Various Sites

California Achievement Test (CAT) Monterey, California: California Test Bureau, 1970.

Comprehensive Tests of Basic Skills (CTBS) Monterey, California: California Test Bureau, 1968.

Gates-McGinitie (GM) New York: Teachers College Press, Columbia University, 1964.

Iowa Every Pupil Tests of Basic Skills (ITBS) Boston, Mass.: Houghton Mifflin, 1971.

Metropolitan Achievement Test, (MAT) New York: Harcourt, Brace & World, 1970.

Sequential Tests of Educational Progress (STEP) Princeton, New Jersey: Educational Testing Service, 1969.

Stanford Achievement (SAT) New York: Harcourt, Brace & World, 1964.