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ABSTRACT

This program, included in "Effective Reading Programs...," serves 1500 children from five elementary schools. Almost 100 percent of the children are black and come from an inner-city community in which family income is low, with 50 percent of the school children from welfare families. Children selected for this program show a deficit in reading achievement equivalent to one and one-half years or more. The program began in 1971 and focuses on strengthening reading, vocabulary, and communication skills through the addition of nontraditional settings for instruction and the extension of the school year through July. Organized into six segments, each six-week segment includes four weeks of traditional classroom instruction, one week of special instruction at one of several community cultural institutions, and one week of vacation. Integrated into the regular classroom curriculum is time for the children to write about their experiences at the cultural institutions. The students are encouraged to use their new vocabulary in diary entries, and to learn to read by augmenting reading lessons with writing. In addition to planning activities, teachers schedule parent conferences and tutor students during the one-week vacation periods. (RB/AIP)

ENRICHED AND EXTENDED SCHOOL YEAR PROGRAM

EAST CLEVELAND CITY SCHOOLS

EAST CLEVELAND, OHIO

DATA ANALYSES

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Submitted on: March, 1974

Preface

The present document contains data and statistical analyses of the Enriched and Extended (E&E) School Year Program conducted by the East Cleveland City Schools, East Cleveland, Ohio. Background information concerning the purposes, theory underlying, and the actual logistics of the operation of the E&E Program has been provided in a series of preceding reports and documents. The present report is concerned exclusively with the relative effectiveness of this E&E Program on the participating students. Moreover, "effectiveness" is evaluated exclusively in terms of the E&E Program's facility to effect increase in academic achievement as measured by the Stanford Achievement Test (S.A.T.), a nationally standardized test of scholastic achievement.

This is by no means meant to imply that the full "effectiveness" of the E&E Program or any educational program can ever be fully assessed in terms of <u>just</u> improvement in students' scholastic functioning. Programs such as our E&E Program influence both the participating students and staff in a variety of very complex and intricate ways, not all of which are reflected in increase in a score on a group-administered academic test. Indeed there already exists a wealth of documentation concerning the "non-academic" type effectiveness of this program, which will not even be touched upon in the present report. Not included

is the tremendous improvement in the participating students' self concepts, self esteems, and attitudes towards school-measures of growth which have been reported and well documented. Not mentioned here is the widespread growth in "teacher professionalism" resulting from participation in the program. Such professionalism--as assessed by teacher willingness to "put in" extra time and effort for their students, teachers' attitudes toward and rapport with their students, teachers' eagerness to still further improve upon their instructional skills, etc.--has been documented in a variety of ways, none of which are discussed within the present report. Nor is the most desired and achieved change in parent and community involvement with the school even mentioned within this document.

Yet while student achievement growth is not the only measure of a program, this measure is, of course, an important index of a program's influence and, in fact, affords the most stringent test of any educational program's effectiveness. Consequently, this report will deal with this one--very important--measure of the East Cleveland City School's Enriched and Extended School Year Program in considerable detail.

For the reader's convenience, this document is divided into two parts. One part is concerned exclusively with descriptive statistical data, while the other section deals with inferential statistical analyses of these data. Since inferential statistics provide the most critical assessment of a program's effectiveness

of a program's effectiveness and replicability, Part One will deal with inferential analyses. In essence, Part One asks: are seeming differences in achievement between E&E Program participants and non-participants "real", statistically significant differences in achievement? The procedures and statistical methods employed to provide answers to this one pervasive question are discussed in the following section. Part Two provides purely descriptive data concerning the E&E Program. Part Two provides a series of Tables presenting academic "growth gauge indices" for students in the East Cleveland School System. "Growth gauge indices" reflect gain scores in achievement for students across twelve months of schooling. Growth gauge indices are the standard method of scholastic growth employed in Project Yardstick. The methods used here for calculating growth gauges are precisely those employed by Project Yardstick.

Part Two presents mean gain scores per each subtest of the Stanford Achievement Test for each grade level 2 through 5. Gain scores are measured for twelve months (September to September) for students in the East Cleveland School System over a number of academic years. Growth gauge indices are provided for total elementary school population as well as individually for each of the six elementary schools. E&E Program as well as non-program schools per each year are designated in the series of Tables presented in Part Two. Please note that while E&E Program schools

are designated as such, within an E&E school, program participants are not differentiated from non E&E Program participants. The data presented in Part Two is purely descriptive and is provided to acquaint the reader more fully with the East Cleveland School System. It is suggested that Part Two of this report be used primarily as an Appendix to supplement and clarify the information contained in Part One.

month interval because an underlying purpose of the E&E Program was to try to arrest the actual regression in academic achievement found among students during the summer months by extending the process of learning throughout the year. During the 1971-72 year, the E&E Program was in effect for only some of the students at one of our six elementary schools (number, approximately 200). By 1972-73, the E&E Program had been extended to two additional elementary schools, such that approximately 450 students who constituted again only part of the student bodies at three elementary schools were now participants. It must be noted that since gain scores are the basis of analysis here, first grade is not included for there was no "pre" S.A.T. administration by which to measure gain. Similarly, sixth grade is not included, for there was no "post" administration of the S.A.T. to use in assessing gains.

To assess the effectiveness of the E&E Program, gain scores of E&E participants were compared with those of two different types of control groups. The E&E and control groups are essentially the same in terms of I.Q.s and socio-economic backgrounds. Both types of control groups offer stringent comparisons, but for different reasons. Consequently, the logic and method of forming each control group will be discussed in detail.

First, the gain socres of the E&E participants were compared with the gain scores of all non-participating students in the total East Cleveland elementary population in all six elementary schools.

This control group constitutes what is hereafter called the System Control Group. This System Control Group poses a stringent comparison for both statistical and practical reasons. Statistically, when comparing two groups such that the number of individuals in one group (the System Control Group) is a great deal larger than the number of individuals in the other group (the E&E Participants), the probability of finding statistically significant differences is much reduced. Practically, in this System Control procedure, the E&E Program was put to a stringent test in that in essence E&E students were not, strictly speaking, compared exclusively with their peers. While the East Cleveland School System is predominately a black, lower socio-economic level school district, one of our six elementary schools could not be so described. This one school (designated as Non Project School 6; see Part Two) consists of less minority children as well as less children of lower socio-economic family background. This school has a higher mean I.Q. level among its student body, has far less turn-over among members of the teaching staff, has less turn-over and transiency within its student body, and produces notably higher levels of academic achievement in its students than has been true of all other East Cleveland Schools. This not-strictly-comparable elementary school is included in the average gain scores for the System Control Group.

The E&E Program was further assessed against what is hereafter called a Within School Control Group. For every year of its existence, the E&E Program has been in effect for only some of the students within a school. The Within School Control Group, therefore, consists of all the other students within the same school who were not E&E participants. This second control group comparison again offers a stringent test of the program's effectiveness, in that this comparison attempts in part to control for a "Hawthorne" or "halo" effect. That is, any new program might spuriously produce higher levels of achievement just because of its "newness". Since any new program effects a school as a whole, merely in terms of heightened spirits, heightened anticipation, increased attention, etc., it was felt that the achievement gains of E&E participants must be assessed relative to other non-participating students at the same school.

In the following statistical analyses, E&E participant's mean gain scores are compared with those of both the System Control Group and the Within Schools Control Group. These comparisons are made separately for each subtest of the S.A.T., for each grade level 2 through 5, for the two separate years, 1971-72 and 1972-73. Comparisons for 1971-72, the first year of the program's operation, are presented first as Tables 1 through 4. Each table represents one grade, 2 through 5. Tables subscripted with "a" provide a comparison of the E&E students with the System Control Group;

Tables subscripted with "b" provide a comparison of E&E with the Within School Control Group. Thus, Table 1a compares E&E second graders with System Control second graders; Table 3b compares E&E fourth graders with Within School fourth graders. Comparisons for 1972-73, when three schools had involvement in the E&E Program, are found in Tables 5 through 8. Again the subscript system designates which control group is being examined.

Since the means used throughout represent mean gain scores, any student--in either the E&E or the control groups--who was not present for both pre and post S.A.T. testing was automatically dropped. While the procedure may in part help to control for the high percent of transiency within the total school system, it by no means completely controls for program attrition and is, moreover, confounded by many other factors, and consequently will be discussed under the following section, Stipulations On Data Analyses.

The statistical test employed throughout in making all comparisons is the t test. One-tailed paired t tests for differences between mean gain scores were conducted using a separate variance estimate procedure. Confidence levels were pre-established at the .10 level or better. The .10 confidence level was chosen so as to provide a most stringent test of the program's effectiveness. A .10 confidence level implies that such an obtained difference is a "real" statistically meaningful difference 90 percent of the time.

Only 10 percent of the time would a difference of this magnitude have occurred merely due to chance. All confidence levels better than .10 (.05, .02, .001) are merely "icing on the cake". Thus, for each S.A.T. subtest, for each grade level, for each year, E&E students are compared with each of the two control group students via a series of t tests. It must be noted that in all comparisons, the first group is always the control group; therefore, negative to values are what should be expected.

Stipulations On Data Analyses

While the following series of analyses speak very nicely for themselves, there are several practical considerations which must be discussed before examining the present method of statistical analysis and its results.

First, the present method of analysis does not control for student attrition, which is approximately 30 percent across the elementary school population. While the method of viewing results in terms of gain scores does ensure that the student is present for at least one full year in the East Cleveland Schools, the present analysis does not reveal which students are E&E participants for both of the two years under investigation. There is no way to know about the achievement gains earned by students who participated in E&E for one year and then transferred out of our school system. Was there subsequent achievement in school improved

by their participation in E&E? Similarly, there is no way included in this analysis by which the cumulative improvement of those students who are two-year E&E participants is assessed, for these E&E veterans are not separately designated. Related, an across years analysis of the relative effectiveness of the E&E Program was not conducted. Again, a crucial question would appear to be what has been the cumulative increment in achievement yielded by E&E from 1971 through 1973. Moreover, as mentioned earlier, the System Control Group affords a somewhat unfair comparison, since this control group's achievement levels are spuriously raised by the inclusion of one, not precisely comparable, East Cleveland elementary school.

In addition, the East Cleveland School System provide a variety of programs, in addition to the E&E Program, for the benefit of its students. Participation in any of these other programs is essentially controlled for, in that participation in other programs is equally distributed across the E&E group and the two control groups. If anything, the E&E students receive less of the other programs, primarily because of problems in scheduling the very busy E&E students into the other existing programs. For example, East Cleveland provides a Title I Remedial Reading Program, and because of their busy schedules, very few of the E&E students

participate in this program while of course control group students do. Consequently, since other program participation is distributed about equally across the E&E group and the control groups, the present analysis attempts to assess the differential effectiveness of E&E Program participation.

Results: 1971-1972

Table 1 through 4 present the results of the t tests conducted for 1971-72 year.

As Tables 1a and 1b indicate, at grade 2 the E&E Program proved to be a great success. The second graders who participated in the program scored statistically significantly higher than all other second graders in the school system on the S.A.T. measure of Word Meaning ($p < .05$), Paragraph Meaning ($p < .02$) and Word Study Skills ($p < .01$). In addition, the E&E second graders exceeded non E&E second graders within the same school on highly significant, positive effect on the language and reading achievement of the participating second grade students.

Inspection of Tables 2a and 2b reveal that while the E&E Program had an effect on the participating third graders, at third grade its effects are far more modest. Table 2b indicates the mean academic growth of the participating third graders was significantly superior to that of non-participating third graders

with the same school on measures of both Word Study Skills ($p < .08$) and Arithmetic Concepts ($p < .02$).

Tables 3a and 3b reveal a most startling, unsurpassed positive effect of the E&E Program on the participating fourth graders. On virtually all subtests of the S.A.T., the E&E fourth grade students differed at a statistically significant level from both control groups. Relative to all other fourth graders in the East Cleveland School System, the achievement gains of the E&E fourth graders were significantly greater on measures of Word Meaning ($p < .03$), Paragraph Meaning ($p < .08$), Word Study Skills ($p < .02$), Language ($p < .02$), Arithmetic Computations ($p < .05$), Arithmetic Concepts ($p < .001$), Arithmetic Applications ($p < .001$), Social Studies ($p < .01$), and Science ($p < .02$). Moreover, the achievement gains of the E&E fourth graders were significantly higher than achievement gains obtained by the control group of fourth graders within the same school on S.A.T. measures of Word Meaning ($p < .10$), Paragraph Meaning ($p < .05$), Word Study Skills ($p < .025$), Language ($p < .08$), Arithmetic Concepts ($p < .025$), Arithmetic Applications ($p < .06$), Social Studies ($p < .07$), and Science ($p < .02$). That is, almost exactly the same pattern of statistically significant differences are obtained whether one compares the E&E fourth graders with control fourth graders within the total school system or within the program school itself. Thus, there is extremely

Table 1a

t Tests of Mean Gain Scores:

Second Grade E&E Versus System Control Group, 1971-1972

S.A.T. Subtest	Control		E + E		t value	Probability
	$\bar{X}$	S.D.	$\bar{X}$	S.D.		
Word Meaning	.8366	.686	1.057	.529	- 2.09	.02**
Paragraph Meaning	.7425	.693	1.0250	.493	- 2.85	.004***
Spelling	.9692	.755	.5964	.885	2.18	.02
Word Study	.6655	1.056	1.1429	1.323	- 1.87	.04**

Note: Control Group consists of 426; E&E Group consists of 28

Table 1b

t Tests of Mean Gain Scores:

Second Grade E&E versus Within School Control Group, 1971-1972

S.A.T. Subtest	Control		E + E		t value	Probability
	X	S.D.	X	S.D.		
Word Meaning	.9433	.764	1.0571	.529	- .81	.21
Paragraph Meaning	.8350	.765	1.0250	.493	-1.40	.08*
Spelling	1.1100	.884	.5964	.885	2.54	.01
Word Study	.8800	1.099	1.1429	1.323	- .91	.18

Note: Control Group consists of 60; E&E Group consists of 28

Table 2a

t Tests of Mean Gain Scores:

Third Grade E&E Versus System Control Group, 1971-1972

Subtest	Control		E + E		t value	Probability
	X	S.D.	X	S.D.		
Word Meaning	.8962	.912	.8125	.860	.59	.28
Paragraph Meaning	.7944	.898	.6675	.696	1.08	.14
Spelling	1.1395	1.041	1.0825	.946	.36	.36
Word Study	.6791	1.163	.7450	.863	- .45	.33
Language	.3204	.942	.3275	.791	- .05	.48
Arithmetic Computation	.7939	1.005	.5750	1.040	1.28	.10
Arithmetic Concepts	.5667	.958	.6825	.810	- .85	.20

Note: Control Group consists of 445; E&E Group consists of 40

Table 2b

t Tests of Mean Gain Scores:

Third Grade E&E Versus within School Control Group, 1971-1972

S.A.T. Subtest	Control		E + E		t value	Probability
	X	S.D.	X	S.D.		
Word Meaning	.7518	1.083	.8263	- .36	- .36	.36
Paragraph Meaning	.6371	.930	.6342	.658	.02	.49
Spelling	.9565	1.140	1.0684	.954	- .53	.30
Word Study	.4458	1.063	.7132	.865	-1.37	.09*
Language	.2758	.919	.3184	.770	- .25	.40
Arithmetic Computation	.9645	1.109	.7263	.785	1.25	.11
Arithmetic Concepts	.3145	.930	.6921	.791	-2.17	.02**

Note: Control Group consists of 62; E&E Group consists of 38

Table 3a

t Tests of Mean Gain Scores:

Fourth Grade E&E Versus System Control Group, 1971-1972

S.A.T. Subtest	Control		E + E		t value	Probability
	X	S.D.	X	S.D.		
Word Meaning	.9971	1.227	1.2763	.854	-1.86	.03**
Paragraph Meaning	.7840	1.200	1.0658	1.090	-1.52	.07*
Spelling	.7709	1.111	.7895	.718	- .15	.44
Word Study	.7826	1.281	1.2658	1.300	-2.20	.02**
Language	.6445	1.156	1.0395	.917	-2.49	.01***
Arithmetic Computations	.7939	1.229	1.0447	.830	-1.71	.05**
Arithmetic Concepts	.7973	1.420	1.4211	1.075	-3.34	.02**
Arithmetic Applications	.5454	1.179	1.0895	.911	-3.44	.005***
Social Studies	.4016	1.100	.8553	1.098	-2.44	.01***
Science	.6181	1.078	.9553	.860	-2.27	.01***

Note: Control Group consists of 443; E&E Group consists of 38

Table 3b

t Tests of Mean Gain Scores:

Fourth Grade E&E Versus Within School Control Group, 1971-1972

S.A.T. Subtest	Control		E + E		t value	Probability
	X	S.D.	X	S.D.		
Word Meaning	.9653	1.019	1.2784	.865	-1.68	.05**
Paragraph Meaning	.6986	.917	1.0378	1.091	-1.62	.05**
Spelling	.7708	.927	.7649	.711	.04	.48
Word Study	.8139	1.059	1.2730	1.317	-1.84	.03**
Language	.8028	.833	1.0541	.925	-1.39	.08*
Arithmetic Computations	.8653	1.092	1.0676	.829	-1.08	.14
Arithmetic Concepts	.9375	1.411	1.4595	1.063	-2.16	.02**
Arithmetic Applications	.8083	.993	1.1135	.911	-1.61	.06*
Social Studies	.5389	.947	.8514	1.113	-1.46	.07*
Science	.5569	1.025	.9784	.859	-2.27	.01***

Note: Control Group consists of 72; E&E Group consists of 37

strong support that the Enriched and Extended School Year Program not only greatly enhanced the participating fourth graders' language and reading skills per se but also increased their ability to apply these reading skills in other academic subject areas, like social studies, science, and word or reading problems in arithmetic.

Table 4a and 4b reveal almost an identical pattern of improved academic gain in the participating E&E fifth graders as has already been reported for the E&E fourth graders. The E&E fifth graders achieved at significantly higher levels than did all other fifth graders within the school system in terms of the reading relevant skills of Paragraph Meaning ($p < .09$), Spelling ($p < .002$), Word Study Skills ($p < .05$), and Language ($p < .08$) as well as in terms of the reading applied academic areas of Arithmetic Concepts ($p < .07$) and Social Studies ($p < .02$). In addition E&E fifth graders gained significantly more academically than did fifth graders within the same school on measures of Paragraph Meaning ($p < .10$), Spelling ($p < .01$), Word Study Skills ($p < .01$), and also Social Studies ($p < .05$). Again at the fifth grade level, there is good "hard" statistical support to the fact that these E&E fifth graders gained not only in reading skills but also in their ability to apply these skills to other academic subject areas.

Table 4a

t Tests on Mean Gain Scores:

Fifth Grade E&E Versus System Control Group, 1971-1972

S.A.T. Subtest*	Control		E + E		t value	Probability
	X	S.D.	X	S.D.		
Word Meaning	.5222	1.168	.6571	1.474	- .58	.28
Paragraph Meaning	.9044	1.299	1.1976	1.576	-1.47	.10*
Spelling	.8739	1.394	1.5286	1.360	-2.97	.002****
Word Study	.6102	1.609	1.0429	1.375	-1.92	.03**
Language	.9533	1.483	1.1929	.982	-1.43	.08*
Arithmetic Computations	1.1115	1.444	1.1262	.726	- .11	.46
Arithmetic Concepts	.5062	1.361	.7548	.961	-1.53	.06*
Arithmetic Applications	.6406	1.289	.4714	.960	1.05	.15
Social Studies	.3681	1.308	.6762	.818	-2.18	.02**

Note: Control Group consists of 433; E&E Group consists of 42

Table 4b

t Tests of Mean Gain Scores:

Fifth Grade E&E Versus Within System Control Group, 1971-1972

S.A.T. Subtest	Control		E + E		t value	Probability
	X	S.D.	X	S.D.		
Word Meaning	.4793	.897	.6537	1.492	- .67	.25
Paragraph Meaning	.8741	1.013	1.2366	1.575	-1.30	.10*
Spelling	.8672	1.074	1.5268	1.377	-2.57	.01***
Word Study	.5293	1.105	1.0927	1.354	-2.20	.01***
Language	1.3414	1.111	1.1902	.994	.71	.24
Arithmetic Computations	.9276	1.473	1.1537	.712	-1.01	.16
Arithmetic Concepts	.5862	1.626	.7463	.917	- .61	.27
Arithmetic Applications	.6862	1.187	.4951	.959	.88	.19
Social Studies	.4155	.888	.7122	.794	-1.74	.04**

Note: Control Group consists of 58; E&E Group consists of 41

Results: 1972-1973

Tables 5 through 8 present the results of the t test comparisons for the 1972-73 year.

As Tables 5a and 5b reveal, none of the comparisons between the E&E second graders and either of the two control groups (total system or within the same school second graders) were statistically significant. That is, while of course the E&E second graders gained in achievement level, the differences between achievement growth between them and the control group second graders at the .10 level or better was not achieved.

Tables 6a and 6b reveal several areas of statistically significant academic growth among the E&E third graders. It should be noted that the extend of positive achievement growth found at third grade during the 1972-73 year is greater than the growth obtained for third graders during the preceding 1971-72 year. The E&E third graders during the 1972-73 year demonstrate significantly higher achievement gains than did all other third graders in the school system on S.A.T. measures of Language ($p < .01$) and, surprisingly, on Arithmetic Computations ($p < .10$). Similarly, the E&E third graders gained significantly more in Language ($p < .02$) than did the control non-program third graders during this year within three, not one, E&E Program schools.

Table 5a

t Tests of Mean Gain Scores:

Second Grade E&E Versus System Control Group, 1972-1973

S.A.T. Subtest	Control		E + E		t value	Probability
	X	S.D.	X	S.D.		
Word Meaning	.8631	.721	.7964	.528	1.03	.15
Paragraph Meaning	.8388	.694	.7730	.527	1.04	.15
Spelling	1.0445	.705	1.0306	.654	.19	.42
Word Study	.7164	1.134	.7721	.892	- .53	.30

Note: Control Group consists of 317; E&E Group consists of 111.

Table 5b

t Tests of Mean Gain Scores:

Second Grade E&E Versus Within School Control Group, 1972-1973

S.A.T. Subtest	Control		E + E		t value	Probability
	X	S.D.	X	S.D.		
Word Meaning	.8712	.753	.7964	.528	.94	.17
Paragraph Meaning	.8164	.734	.7730	.527	.55	.29
Spelling	1.0849	.758	1.0306	.654	.62	.27
Word Study	.6973	1.259	.7721	.892	- .56	.29

Note: Control Group consists of 146; E&E Group consists of 111

Table 6a

t Tests of Mean Gain Scores:

Third Grade E&E Versus System Control Group, 1972-1973

S.A.T. Subtest	Control		E + E		t value	Probability
	X	S.D.	X	S.D.		
Word Meaning	.8202	.903	.7432	.768	.89	.19
Paragraph Meaning	.7358	.868	.6910	.682	.57	.28
Spelling	.8754	1.197	.9072	.956	- .29	.38
Word Study	.5619	1.453	.6045	1.036	- .35	.36
Language	.3578	1.143	.5982	.773	-2.57	.005***
Arithmetic Computations	.8922	1.172	.7793	.706	1.26	.10
Arithmetic Concepts	.9073	1.247	.8288	.874	.75	.23

Note: Control Group consists of 386; E&E Group consists of 111

Table 6b

t Tests of Mean Gain Scores:

Third Grade E&E Versus Within School Control Group, 1972-1973

S.A.T. Subtest	Control		E + E		t value	Probability
	X	S.D.	X	S.D.		
Word Meaning	.7930	.984	.7432	.768	.49	.31
Paragraph Meaning	.7572	.872	.6910	.682	.74	.23
Spelling	.9632	.978	.9072	.956	.49	.31
Word Study	.6373	1.199	.6045	1.036	.25	.40
Language	.3955	.930	.5982	.773	-2.06	.02**
Arithmetic Computations	.8980	1.319	.7793	.706	1.04	.15
Arithmetic Concepts	1.0388	1.427	.8288	.874	1.61	.05

Note: Control Group consists of 201; E&E Group consists of 111

Tables 7a and 7b report several statistically significant academic growth among the E&E participants in fourth grade. The E&E fourth graders gained significantly more than did all other fourth graders in the school system in Paragraph Meaning ($p < .10$) and gained significantly more than did all other fourth graders in the school system and than did control fourth graders within E&E project schools in terms of Language skill accomplishments ($p < .03$ and $p < .11$, respectively).

Tables 8a and 8b indicate that during the 1972-73 year, the E&E participants in fifth grade gained significantly in more academic areas than did E&E participants at any other one grade level. The E&E fifth graders evidenced significantly more academic growth than did all other fifth graders in the school system in the reading relevant areas of Paragraph Meaning ($p < .025$), Spelling ($p < .03$), and Language ($p < .05$) as well as in the reading applied area of Social Studies ($p < .01$). In addition, when compared with non E&E fifth graders within the three E&E participanting schools, the E&E fifth graders gained significantly more in Word Meaning ($p < .09$), Spelling ($p < .04$), and Social Studies ($p < .01$). Once again, the pattern of academic gains achieved by participating fifth graders during the 1972-73 year parallels the pattern of gains reported for fifth graders during the preceding 1971-72 year, in that significant gains were obtained in both subtests specific to reading

Table 7a

t Tests of Mean Gain Scores:

Fourth Grade E&E Versus System Control Group, 1972-1973

S.A.T. Subtest	Control		E + E		t value	Probability
	X	S.D.	X	S.D.		
Word Meaning	1.1013	1.787	.9286	.920	1.36	.09
Paragraph Meaning	.7287	1.008	.8545	.901	-1.26	.10*
Spelling	.7787	1.031	.5946	.835	1.93	.03
Word Study	.8441	1.281	.7268	1.149	.92	.18
Language	.7481	1.144	.9821	1.214	-1.81	.03**
Arithmetic Computations	.6790	1.133	.7277	.843	- .49	.31
Arithmetic Concepts	.9263	1.283	.8705	1.111	.45	.33
Arithmetic Applications	.6173	1.088	.6705	.881	- .53	.30
Social Studies	.6497	1.331	.4920	1.079	1.28	.10
Science	.6495	1.305	.5107	1.085	1.13	.13

Note: Control Group consists of 376; E&E Group consists of 112

Table 7b

t Tests of Mean Gain Scores:

Fourth Grade E&E Versus Within School Control Group, 1972-1973

S.A.T. Subtest	Control		E + E		t value	Probability
	X	S.D.	X	S.D.		
Word Meaning	1.0850	2.352	.9286	.920	.81	.21
Paragraph Meaning	.7909	1.075	.8545	.901	- .55	.29
Spelling	.8840	1.044	.5946	.835	2.63	.004
Word Study	.8198	1.338	.7268	1.149	.64	.26
Language	.8043	1.267	.9821	1.214	-1.31	.10*
Arithmetic Computations	.6615	1.253	.7277	.843	- .55	.29
Arithmetic Concepts	.8203	1.363	.8705	1.111	- .35	.36
Arithmetic Applications	.5385	1.141	.6705	.881	-1.12	.13
Social Studies	.5150	1.260	.4920	1.079	.17	.43
Science	1.6820	.205	.5107	1.085	-1.25	.10*

Note: Control Group consists of 187; E&E Group consists of 112

Table 8a

t Tests of Mean Gain Scores:

Fifth Grade E&E Versus System Control Group, 1972-1973

S.A.T. Subtest	Control		E + E		t value	Probability
	X	S.D.	X	S.D.		
Word Meaning	.5506	1.159	.6145	.843	- .63	.26
Paragraph Meaning	.8339	1.213	1.0545	.971	-1.96	.03**
Spelling	.9565	1.335	1.1727	.959	-1.87	.03**
Word Study	.5667	1.396	.3518	1.182	1.59	.06
Language	.9853	4.373	1.3818	1.009	-1.58	.06*
Arithmetic Computations	1.2791	1.316	1.0191	.947	2.28	.01
Arithmetic Concepts	.7641	1.291	.7073	1.015	.48	.32
Arithmetic Applications	.7890	1.249	.9218	1.181	-1.02	.15
Social Studies	.4345	1.332	.7427	1.145	-2.37	.01***

Note: Control Group consists of 354; E&E Group consists of 110

Table 8b

t Tests of Mean Gain Scores:

Fifth Grade E&E Versus Within School Control Group, 1972-1973

S.A.T. Subtest	Control		E + E		t value	Probability
	X	S.D.	X	S.D.		
Word Meaning	.4580	1.070	.6145	.843	-1.36	.09*
Paragraph Meaning	.9710	1.203	1.0545	.971	- .64	.26
Spelling	.9166	1.434	1.1727	.959	-1.79	.04**
Word Study	.6047	1.254	.3518	1.182	1.70	.04
Language	1.3817	1.128	1.3818	1.009	- .00	.50
Arithmetic Computations	1.1728	1.152	1.0191	.947	1.22	.11
Arithmetic Concepts	.8012	1.226	.7073	1.015	.07	.24
Arithmetic Applications	.8793	1.307	.9218	1.181	- .28	.39
Social Studies	.3811	1.437	.7427	1.145	-2.33	.01***

Note: Control Group consists of 169; E&E Group consists of 110

skills and level of functioning as well as subtests which assess the student's ability to apply his reading skills to other academic subject areas.

Results: Summary 1971-1972 and 1972-1973

The preceding statistical analyses and discussion has revealed that the East Cleveland City Schools' Enriched and Extended School Year Program has indeed had a positive influence on the participating students. Not only do the students and teachers report affective, attitudinal improvements as a result of participation in the program, but the preceding analyses reveal that the students do demonstrate statistically significant gains in achievement, as measured by a nationally standardized test of achievement.

This is not to say that all participants gain significantly in all academic areas. One would not expect any educational program to effect such sweeping accomplishments in just two short years of operation and in a population of "inner city" like students, wherein learning and school had previously been rather aversive. Yet the accomplishments to date of the E&E Program have been evaluated relative to two types of stringent control groups. At each grade level for each subtest of the Stanford Achievement Test, E&E students were compared with all other students in the East Cleveland elementary school. In both type of comparisons, the academic gains of the E&E

participants significantly exceeded those of non-program participants, varying with the specific grade levels and the specific S.A.T. subtests.

In viewing the results of statistically significant gain scores across the two years, 1971-72 and 1972-73, several patterns become apparent. First, the E&E Program appears to have its greatest effects in the upper elementary grades (grades 4 and 5). These results may be even more pronounced had gain scores for the participating sixth graders been available. At the upper elementary grades of 5 and 6 across both years, E&E participants achieved statistically significant academic gains in basic reading skills like word meaning or vocabulary, understanding and comprehension of textual paragraph reading, and general language skills. Moreover, these E&E students showed significantly higher growth scores in their levels of functioning in reading related academic areas like Social Studies, Science, and Arithmetic Applications. Thus, it would appear that at the upper elementary grades, the E&E Program significantly improved not only students' basic reading skills, but also their ability to apply these reading skills in other academic subjects.

This extremely positive effect of the program at the upper elementary grades is rather unexpected and is, frankly, quite exciting. Most educational programs yield their largest results at the lower elementary, primary grades when students are still

relatively "turned on" towards school, when students have not yet "missed out" on much academic learning such that the cumulative academic deficit has not yet reached its highest toll, and when students have not yet experienced repeated failure such that school actually becomes an aversive place. Yet, the E&E Program maximally does effect the upper elementary youngsters, many of whom have previously experienced failure and frustration towards school. The obvious implications of this finding in terms of dropout prevention, reducing behavioral and disciplinary problems in the secondary junior and senior high schools, etc. are extremely wide-reaching and profound.

At the elementary grades 2 and 3, the E&E Program too had large positive effects, though relative to the upper elementary grades, the effects at the elementary levels are more modest. It is interesting to note that effects at the elementary grades are more "scattered" than at the upper grades. This finding could be attributable to many factors, chief of which is the noted developmental "spurting" quite common among children in this age group. That is, younger children's growth curves in all areas of development (motor, language, cognitive, as well as academic) is notably less stable -- subject to a child slowly "plodding along" his peers. It should also be noted that when significant growth changes do occur in elementary grades, these changes are always in the areas of reading. Particularly in the area of word study skills, how a child

employs phonic knowledge to attack and figure out a new word, is the most consistent gain achieved across years at the elmentary grades.

Moreover, while extremely large gains occurred across virtually all grade levels during the first year of the program (1971-1972), statistically significant gains (fewer in number, but just as high in statistical meaningfulness) persisted into the second year of the program. That is, the positive gains achieved by E&E Program survived the test of "newness" and were found over two years of the program. While these statistically significant gain scores speak very nicely for themselves, the differences in gain between the E&E and the control students might have been even greater, were it not for some logistical, operational problems existing during the second year of the Program. During the 1972-1973 year, there was rather considerable E&E teacher dissatisfaction over buses to transport the students to the participating institutions arriving late, over the particular type of scheduling provided for E&E students at the institutions, etc. These logistical difficulties have been "ironed out" during the current 1973-74 school year, so that it is quite likely that when statistical tests of gain scores are computed for E&E students for the 1973-74 year, the same widespread achievement gains evidenced during 1971-1972 will again result.

Finally, the above data and discussion must be viewed in light of several statistical considerations. An inspection of all the preceding Tables reveals that generally not only did E&E students demonstrate higher gain scores, but the standard deviations of these gain scores for the E&E group were less than were the standard deviations of the control groups. Although no statistical tests for differences between variances were conducted, these smaller standard deviations suggest that not only did the E&E students grow more, but also that this growth was more consistent, that the gains of these students were less spread out and more closely clustered around their group mean than was true for the control groups. Secondly, the reader should keep in mind that statistically significant differences are defined as differences at the .10 level or better. Thus, a difference at the .10 level indicates only 10 times in 100 is this difference due to chance; therefore, 90 percent of the time this difference is a real, statistically relevant one. Most of the statistically significant results discussed are considerably better than the pre-established .10 level. Indeed, some might argue that in order to detect any conceivable difference in a new educational program of this type, the probability or confidence level should be more liberal than the conventional .10 level. Yet, the E&E Program has met the rigorous test of significance at the conventional .10 level and has yielded

positive academic gains for its participants in terms of reading skills and reading related subject areas.

Part Two: Descriptive Statistics

Part Two contains a series of Tables providing academic gain scores for East Cleveland elementary students. Tables are presented for each elementary school as well as for the school system as a whole for twelve month intervals for three years, 1970-1971, 1971-1972, and 1972-1973. Gains are reported for each subtest of the Stanford Achievement Test for each grade level 2 through 5.

These Tables designate E&E project schools from non-project schools for the three years, but do not differentiate out E&E participants from non-participants within a project school. These Tables consist of purely descriptive statistics and are designed primarily to serve as an Appendix for the preceding results and discussion of Part One.

Table 9

Mean Academic Gain Scores: Total Elementary School Population 1970 - 1971

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.6	.7	.8	-
Paragraph Meaning	.7	.7	.6	.8
Spelling	.	.8	0	.7
Word Study Skills	.6	.5	.6	-
Language	-	.5	.6	.8
Arithmetic Computation	-	.7	.8	.5
Arithmetic Concepts	-	.4	.9	1.0
Arithmetic Applications	-	-	.4	.6
Social Studies	-	-	.4	.4
Science	-	-	.3	-
Vocabulary	-	-	-	-

Table 10

Mean Academic Gain Scores: Non-Project School No. 1

Population 1970 - 1971

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.6	.7	.7	-
Paragraph Meaning	.5	.7	.9	.9
Spelling	.7	.9	-	.9
Word Study Skills	.6	.3	.8	-
Language	-	.3	.7	.9
Arithmetic Computation	-	.8	1.3	.5
Arithmetic Concepts	-	.4	.9	1.0
Arithmetic Applications	-	-	.7	.7
Social Studies	-	-	.8	.6
Science	-	-	.3	-
Vocabulary	-	-	-	-

Table 11

Mean Academic Gain Scores: Non-Project School No. 2

Population 1970 - 1971

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.5	.4	1.1	-
Paragraph Meaning	.5	.3	1.1	1.0
Spelling	.5	.1	.6	.5
Word Study Skills	.5	.3	.7	.4
Language	-	.1	.6	-
Arithmetic Computation	-	.3	.6	.4
Arithmetic Concepts	-	.1	.7	1.2
Arithmetic Applications	-	-	.4	.3
Social Studies	-	-	.2	.6
Science	-	-	.2	-
Vocabulary	-	-	-	-

Table 12

Mean Academic Gain Scores: Non-Project School No. 3

Population 1970 -71

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.7	.7	.8	-
Paragraph Meaning	.7	.6	.1	.9
Spelling	1.0	.8	.4	.7
Word Study Skills	.5	.7	.3	-
Language	-	.1	.6	.7
Arithmetic Computation	-	.5	.5	.5
Arithmetic Concepts	-	.6	.7	1.0
Arithmetic Applications	-	-	.2	.5
Social Studies	-	-	.3	.6
Science	-	-	.3	-
Vocabulary	-	-	-	-

Table 13

Mean Academic Gain Scores: Non-Project School No. 4

Population 1970-1971

S.A.T.	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.8	.8	1.0	-
Paragraph Meaning	.8	.9	.6	.6
Spelling	1.0	.8	.7	.5
Word Study Skills	.9	.6	.8	-
Language	-	.5	.6	.8
Arithmetic Computation	-	.8	.7	.3
Arithmetic Concepts	-	.6	1.1	1.0
Arithmetic Applications	-	-	.2	.4
Social Studies	-	-	.3	.3
Science	-	-	.2	-
Vocabulary	-	-	-	-

Table 14

Mean Academic Gain Scores: Non-Project School No. 5

Population 1970 - 1971

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.7	.7	.7	-
Paragraph Meaning	.7	.7	.6	.7
Spelling	.7	.7	.5	.7
Word Study Skills	.7	.4	.6	-
Language	-	.6	.7	.4
Arithmetic Computation	-	.8	.7	.2
Arithmetic Concepts	-	.4	.8	.7
Arithmetic Applications	-	-	.5	.6
Social Studies	-	-	.2	.1
Science	-	-	.2	-
Vocabulary	-	-	-	-

Table 15

Mean Academic Gain Scores : Non-Project School No. 6

Population 1970 - 1971

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.8	1.1	.6	-
Paragraph Meaning	.9	1.1	.9	.5
Spelling	.7	1.3	.6	1.3
Word Study Skills	1.1	.6	.4	-
Language	-	.9	.7	1.3
Arithmetic Computation	-	.8	.5	.6
Arithmetic Concepts	-	.5	.7	.9
Arithmetic Applications	-	-	.4	1.1
Social Studies	-	-	.5	
Science	-	-	.5	.4
Vocabulary	-	-	-	-

Table 16

Mean Academic Gain Scores: Total Elementary School Population 1971 - 1972

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.7	.7	.8	.1
Paragraph Meaning	.6	.6	.7	.1
Spelling	.7	.8	.6	.1
Word Study Skills	.6	.4	.3	0
Language	-	.3	.4	.2
Arithmetic Computation	-	.7	.7	.1
Arithmetic Concepts	-	.4	.8	0
Arithmetic Applications	-	-	.4	0
Social Studies	-	-	.4	.1
Science	-	-	.5	.1
Vocabulary	-	-	-	-

Table 17

Mean Academic Gain Scores: Project School No. 1

Population 1971 - 1972

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.8	.6	.8	.6
Paragraph Meaning	.6	.5	.7	.4
Spelling	.8	.7	.5	.5
Word Study Skills	.7	.4	.7	.1
Language	-	.2	.7	.6
Arithmetic Computation	-	.6	.7	.2
Arithmetic Concepts	-	.4	.9	.4
Arithmetic Applications	-	-	.7	.3
Social Studies	-	-	.4	.3
Science	-	-	.6	.3
Vocabulary	-	-	-	-

Table 18

Mean Academic Gain Scores: Non-Project No. 2

Population 1971 - 1972

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.7	.6	1.1	0
Paragraph Meaning	.5	.5	.7	.2
Spelling	.7	.8	.8	-.1
Word Study Skills	.5	.3	.6	.2
Language	-	.2	.6	0
Arithmetic Computation	-	.5	.9	.2
Arithmetic Concepts	-	.5	.8	.4
Arithmetic Applications	-	-	.6	0
Social Studies	-	-	.4	.2
Science	-	-	.4	.0
Vocabulary	-	-	-	-

Table 19

Mean Academic Gain Scores: Non-Project School No. 3

Population 1971 - 1972

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.8	.8	.7	.3
Paragraph Meaning	.6	.7	.8	.2
Spelling	.9	1.0	.6	.2
Word Study Skills	.7	1.8	.6	.2
Language	-	0	.3	0
Arithmetic Computation	-	.8	.8	.3
Arithmetic Concepts	-	.5	.7	.7
Arithmetic Applications	-	-	.2	.5
Social Studies	-	-	.4	.2
Science	-	-	.5	.2
Vocabulary	-	-	-	-

Table 20

Mean Academic Gain Scores: Non-Project School No. 4

Population 1971 - 1972

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.7	.6	1.0	-.4
Paragraph Meaning	.7	.7	.5	-.1
Spelling	.9	.8	.5	-.2
Word Study Skills	.3	.4	.5	-.6
Language	-	.5	.6	0
Arithmetic Computation	-	.7	.7	.4
Arithmetic Concepts	-	.6	.6	-.5
Arithmetic Applications	-	-	.5	-.2
Social Studies	-	-	.3	-.3
Science	-	-	.5	0
Vocabulary	-	-	-	-

Table 21

Mean Academic Gain Scores: Non-Project School No. 5

Population 1971 - 1972

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.6	.8	.7	-.1
Paragraph Meaning	.5	.7	.7	.2
Spelling	.4	.8	.8	-.4
Word Study Skills	.2	.4	1.0	.2
Language	-	.3	-.3	.2
Arithmetic Computation	-	.6	.5	-.1
Arithmetic Concepts	-	.5	.9	-.3
Arithmetic Applications	-	-	.3	-.2
Social Studies	-	-	.2	0
Science	-	-	.4	.2
Vocabulary	-	-	-	-

Table 22

Mean Academic Gain Scores: Non-Project School No. 6

Population 1971 - 1972

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.8	.5	.6	-.3
Par[illegible]h Meaning	.9	.4	.6	-.2
Spelling	.7	.8	.4	-.5
Word Study Skills	1.1	-.2	.5	-.4
Language	-	.4	.6	.1
Arithmetic Computation	-	.6	.6	-.2
Arithmetic Concepts	-	.1	.6	0
Arithmetic Applications	-	-	.5	-.2
Social Studies	-	-	.6	-.1
Science	-	-	.8	-.3
Vocabulary	-	-	-	-

Table 23

Mean Academic Gain Scores: Total Elementary Schools

Population 1972 - 1973

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.6	.7	.8	-.1
Paragraph Meaning	.6	.7	.6	.1
Spelling	.8	.8	.5	.2
Word Study Skills	.6	.5	.7	.2
Language	-	.5	.7	.1
Arithmetic Computation	-	.7	.6	.1
Arithmetic Concepts	-	.4	.8	.4
Arithmetic Applications	-	-	.5	.0
Social Studies	-	-	.4	.2
Science	-	-	-	0
Vocabulary	-	-	-	-

Table 24

Mean Academic Gain Scores: Project School No. 1

Population 1972 - 1973

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.8	.7	1.1	.1
Paragraph Meaning	.8	.7	.5	.2
Spelling	1.1	.9	1.3	.2
Word Study Skills	.7	.3	1.0	.1
Language	-	.2	-.1	0
Arithmetic Computation	-	.8	1.0	.2
Arithmetic Concepts	-	.4	.3	.3
Arithmetic Applications	-	-	-	.1
Social Studies	-	-	-	.3
Science	-	-	-	-.1
Vocabulary	-	-	-	-

Table 25

Mean Academic Gain Scores: Project School No. 2

Population 1972 - 1973

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.6	.4	.7	-.4
Paragraph Meaning	.4	.3	.8	-.4
Spelling	.7	.1	1.2	-.1
Word Study Skills	.6	.3	.9	-.1
Language	-	.2	.3	-.3
Arithmetic Computation	-	3	1.3	-.2
Arithmetic Concepts	-	.1	.6	.2
Arithmetic Applications	-	-	-	0
Social Studies	-	-	-	-.1
Science	-	-	-	-.4
Vocabulary	-	-	-	-

Table 26

Mean Academic Gain Scores: Project School No. 3

Population 1972 - 1973

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.5	.7	.5	0
Paragraph Meaning	.5	.6	.3	.3
Spelling	.7	.8	.8	.6
Word Study Skills	.2	.7	.9	.5
Language	-	.1	0	.7
Arithmetic Computation	-	.5	.7	.4
Arithmetic Concepts		.6	.2	1.0
Arithmetic Applications	-	-	-	-.3
Social Studies	-	-	-	.3
Science	-	-	-	.4
Vocabulary	-	-	-	-

Table 27

Mean Academic Gain Scores: Non-Project School No. 4

Population 1972 - 1973

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.6	.8	1.0	.7
Paragraph Meaning	.7	.9	.5	.4
Spelling	.9	.8	.4	.7
Word Study Skills	.6	.6	.6	.6
Language	-	.5	.5	.6
Arithmetic Computation	-	.8	.6	.3
Arithmetic Concepts	-	.6	.8	.6
Arithmetic Applications	-	-	.5	.4
Social Studies	-	-	.3	.3
Science	-	-	.1	.5
Vocabulary	-	-	-	-

Table 28

Mean Academic Gain Scores: Non-Project School No. 5

Population 1972 - 1973

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.6	.7	.8	0
Paragraph Meaning	.6	.7	.6	.1
Spelling	.7	.7	.7	.3
Word Study Skills	.5	.4	.7	0
Language	-	.6	.7	-.1
Arithmetic Computation	-	.8	.5	-.3
Arithmetic Concepts	-	.4	.7	-.3
Arithmetic Applications	-	-	.5	-.3
Social Studies	-	-	.4	0
Science	-	-	.3	-.2
Vocabulary	-	-	-	-

Table 29

Mean Academic Gain Scores: Non-Project School No. 6

Population 1972 - 1973

S.A.T. Subtests	Grade Levels 2-3	3-4	4-5	5-6
Word Meaning	.6	.6	.8	-.6
Paragraph Meaning	.6	.3	.5	-.6
Spelling	.6	.5	.4	0
Word Study Skills	.5	.9	.5	-1.0
Language	-	.1	.3	-.6
Arithmetic Computation	-	.8	.4	-.2
Arithmetic Concepts	-	.6	.4	-.7
Arithmetic Applications	-	-	.4	-.7
Social Studies	-	-	.4	-.6
Science	-	-	.3	-.8
Vocabulary	-	-	-	-