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ABSTRACT
         The Comprehensive School Mathematics Program (CSMP)
is a program of CEMREL, Inc., one of the national educational
laboratories, and was funded by the National Institute of Education
(NIE). Its major purpose is the development of curriculum materials
for grades kindergarten through 6. A comparison of student
achievement at the end of fourth grade on the Mathematics Applied to
Novel Situations (MANS) Scales was conducted in a district where CSMP
was taught only in kindergarten through grade 3, after which the
district's regular program was used. These classes were compared to
classes with no CSMP experience. The CSMP-background classes had
significantly higher scores on nine scales: 1) two of six computation
measures; 2) three of five estimation scales; 3) two of five
evaluating number relationship; 4) one of three other number system
measures; and 5) one of two place value scales. On no scale was there
a significant difference in favor of the non-CSMP classes. It was
viewed as surprising that the data were strikingly similar to those
obtained in a previous large study in which the CSMP group had been
with this curriculum through the fourth grade. (MP)

EXTENDED PILOT TRIALS OF THE COMPREHENSIVE SCHOOL MATHEMATICS PROGRAM:

EVALUATION REPORT SERIES

Evaluation Report 7-B-5

Achievement of Former CSMP Students at Fourth Grade

Extended Pilot Trial of the
Comprehensive School Mathematics Program

Evaluation Report 7-B-5

Achievement of Former CSMP Students At Fourth Grade

Martin Herbert

December, 1980

Description of Evaluation Report Series

The Comprehensive School Mathematics Program (CSMP) is a program of CEMREL, Inc., one of the national educational laboratories, and is funded by the National Institute of Education. Its major purpose is the development of curriculum materials for grades K-6.

Beginning in September, 1973, CSMP began an extended pilot trial of its Elementary Program. The pilot trial is longitudinal in nature; students who began using CSMP materials in kindergarten or first grade in 1973-74, were able to use them in first and second grades respectively in 1974-75, and so on in subsequent years. Hence the adjective "extended".

The evaluation of the program in this extended pilot trial is intended to be reasonably comprehensive and to supply information desired by a wide variety of audiences. For that reason the reports in this series are reasonably non-technical and do not attempt to widely explore some of the related issues. The list of reports through year six is given on the next page. The following reports are planned for year 7:

Extended Pilot Trials of the
Comprehensive School Mathematics Program

Evaluation Report Series

Key to Indexing

Evaluation Reports are labelled m-X-n,

where m is the year of the pilot study, with 1973-74 as Year 1.
X is the type of data being reported where A is for overviews
and summaries, B is for student outcomes and C is for other data.
n is the number within a given year and type of data.

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Summary

A comparison of student achievement at the end of fourth grade on the MANS Scales was conducted in a district where CSMP was taught only in grades K-3, after which the district's regular program was used. These "CSMP" classes were compared with non-CSMP students who had no previous CSMP experience. Except for this difference, the study was identical to one conducted a year earlier in which the CSMP classes had, in fact, studied CSMP from K-4.

Results: CSMP Versus Non-CSMP

The CSMP classes had significantly higher scores, at the .05 level, on nine scales:

2 of the 6 Computation scales
3 of the 5 Estimation scales
2 of the 5 Number Relationship scales
'1 of the 3 Other Number System scales
1 of the 2 Place Value scales

On no scale was there a significant difference in favor of the non-CSMP classes. Overall, the mean score across the 24 scales was 136.7 for the CSMP classes versus 118.4 for the non-CSMP classes, a 15% difference which must be considered significant, educationally as well as statistically.

These Results Versus Previous Results At Other Sites

Surprisingly, (since these CSMP classes had been away from CSMP for a year), the data were strikingly similar to the data obtained in a previous large study in which the CSMP classes had studied CSMP through fourth grade. The exceptions were: a) the 5 scales dealing with number relationships and a scale on decimals, in each of which the CSMP advantage was about half what it was previously, and b) the standardized computation test, where CSMP classes did about 10% better than non-CSMP classes, a finding exactly the reverse of what happened previously.

Introduction

The Comprehensive School Mathematics Program (CSMP) is a K-6 mathematics curriculum, but its greatest usage now occurs in grades K-3, with relatively fewer schools using the program in the intermediate grades (4-6). The present study is an attempt to answer a question which follows from this fact: do students who study CSMP only through third grade retain, a year later, some of the already demonstrated benefits of the program?[1]

The present study took place in a small New England city in which CSMP has been used in grades K-3 in some of the schools, but not in subsequent grades. In the spring of 1980 a series of tests was administered to fourth graders in four schools. Two of these schools (7 classes in all) used CSMP in K-3 and the regular district program in fourth grade. The other two schools (7 classes) used the regular district program in all of grades K-4. The tests used were the same ones used previously in an evaluation study comparing CSMP fourth graders, who had studied CSMP in grades K-4, with non-CSMP fourth graders. A comparison of these two studies will be presented, providing evidence about the degree to which students, after a year away from CSMP, are still able to do various kinds of mathematical tasks better than students with no CSMP experience.

In this study "CSMP classes" will refer to those classes which studied CSMP in grades K-3.

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[1] See for example Evaluation Reports 3-B-1, 4-B-2, 6-B-1 and 7-B-2 for reports of testing done in grades 2-5, respectively.

The MANS Test and Previous Studies

The MANS Tests (Mathematics Applied to Novel Situations) are short test scales developed especially to assess what are thought to be some of the underlying thinking skills of CSMP. MANS scales of various kinds have been used in the evaluation of CSMP in second through fifth grade.

The scales are administered by trained testers who follow a standardized script including sample problems for each scale. Then the students do the test items in that scale and the process is repeated for the next scale. The scales do not contain any of the special vocabulary or techniques of the CSMP program and most of them are built around mathematical situations that are unfamiliar to both CSMP and non-CSMP students.

In the spring of 1979, a set of 24 MANS scale was administered to about 50 fourth grade classes, located in 6 school districts using CSMP materials. About half the classes had studied CSMP through fourth grade; the other classes had no CSMP experience. The scales contained an average of $8\frac{1}{2}$ items and required an average of 5 minutes each, though the tests were essentially untimed except for those dealing with estimation. Three testing period of 50-60 minutes each were required. Included in these scales were the items from the Computation and Reading Comprehension tests of the Stanford Achievement Test.

The results of this 1979 comparative study are described extensively in Evaluation Report 6-B-1 of the CSMP Evaluation Report Series. The present study is similar to this previous 1979 study, differing only in the fact that the present fourth grade "CSMP" classes studied CSMP only through third grade. Comparison of the present results with those obtained previously will be presented in a later section.

Comparison of Class Means

The following procedure was used for each MANS test scale:

1. For each class, the roster of students was examined. Individual students in "CSMP classes" who had in fact no previous CSMP instruction (transfers) were eliminated from the study. Similarly, individuals in non-CSMP classes who _had_ studied CSMP were also eliminated. This accounted for a total of 26 students in 14 classes.

2. Students who were absent during the testing session which contained the reading test were eliminated because of 3, below.

3. For each class, based on all students present for a particular MANS scale, a pair of mean scores was calculated: the mean score for the MANS test and mean score for the reading test.

4. These 14 pairs of class means formed the basic data for an Analysis of Covariance procedure, with reading score as covariate, with statistical significance determined by an F-test with 1 and 11 degress of freedom. The purpose of this procedure is to reduce the variability of mean scores by taking into account the ability level of the class, as measured by reading scores. It enables one to adjust these class mean scores according to differences in class ability levels.

7.1

Table 1 summarizes the results for all scales, with scales grouped together by categories according to the kind of problem contained in the scale. Two kinds of summary statistical data are given. First is given the adjusted mean scores across CSMP and across non-CSMP classes (adjusted for differences in reading ability). Second is given the p-value of the F-test on these differences, i.e. the probability of obtaining by chance a difference as large as the one observed had there been in fact no "true" differences between the two curriculum groups.

Table 1.
Summary of Class Means

		Adjusted Means "CSMP"	Non-CSMP	Level of Significance
Computation:	C1 Stanford Achievement Computation Test	26.6	24.6	.21
	C2 Fractions	6.6	4.7	.01
	C3 Mental Arithmetic: Addition	3.4	3.1	.32
	C4 " " Subtraction	3.0	2.7	.39
	C5 " " Multiplication	4.6	4.6	.98
	C6 " " Division	4.6	3.5	.01
	Total	48.7	43.3	.07
Estimation:	E1 2, 5 or 10	8.7	7.6	.02
	E2 Estimating Intervals: Addition	6.1	5.9	.61
	E3 " " Multiplication	4.9	4.1	.01
	E4 " " Division	3.3	2.6	.02
	E5 Word Problem Approximations	3.0	2.5	.06
	Total	25.9	22.7	.02
Geometry:	G1 Geometric Congruencies	4.6	4.7	.77
Other Number Systems:	N1 Decimal Gas	2.7	2.0	.08
	N2 Negative Hits and Misses	3.3	2.4	.09
	N3 Measuring Fractional Inches	2.4	1.5	.01
	Total	8.4	5.9	.03
Number Relations:	R1 Solving Number Machines	5.7	5.4	.35
	R2 Using Number Machines	5.3	4.9	.47
	R3 Boses, Counting By	7.4	7.1	.19
	R4 Boxes, Multiplying by	6.8	4.0	.01
	R5 Labelling Number Lines	3.4	2.1	.01
	Total	28.6	23.6	.02
Place Value:	V1 Arrowed Number Lines	4.2	3.6	.13
	V2 Constructing Numbers	7.1	6.5	.04
	Total	11.2	10.1	.04
Word Problems	W1 Extraneous Data	5.2	4.5	.06
	W2 Two Stage Word Problems	4.1	3.6	.09
	Total	9.3	8.1	.08

CSMP classes did better on almost all of the scales and this advantage was significant, at the 5% level, on 9 of the 24 scales and nearly significant (5%-10% level) on 5 other scales.

On the following pages, this information is repeated on a scale-by-scale basis. For each scale an abstract of the scale and a sample item has been provided. The data has been placed in a box immediately <u>above</u> the corresponding data obtained in the previous 1979 study.

(Note that these are separate results so that factors used in adjusting scores may differ somewhat. However, the ability level of students in the two studies was comparable; the mean reading score across the present 14 classes was 20.3 and across the 51 classes in the previous study it was also 20.3.)

Because there were fewer classes involved, the difference in mean scores required to produce significance will be larger than in the previous study.

	Adjusted Means[1]		Significance
	CSMP	Non-CSMP	(p-value)

(C1) Stanford Achievement-Test: Computation

(Students took one of two 20-item forms)

Abstract: 40 multiple choice questions of two different types:
(a) standard computation, 22 items; (b) paired comparison
of two computations, 18 items. With each type, items
involved each of the four operations and at least 90%
involved only whole numbers.

	CSMP	Non-CSMP	p
(boxed)	26.6	24.6	.21
	23.3	25.3	.03

Sample: a) 532
           × 32

f 16,924
g 2660
h 17,024
j 17,004
k NH

b) $54 \div 9 \; \bullet \; 48 \div 6$ > = <

(C2) Fractions

(Students took one of two 6 item forms.)

Abstract: 12 items, with 6 of each type, identical to those in C1
except that 8 involved fractions and 4 involved large
number multiplication and division.

	CSMP	Non-CSMP	p
(boxed)	6.6	4.7	.01
	6.3	5.1	.01

Sample:

a) $6,000 \div 78 \; \bullet \; 6,000 \div 79$ > = <   b) $\frac{3}{5} - \frac{1}{5} =$

a $\frac{2}{5}$
b $\frac{4}{5}$
c $\frac{2}{10}$
d $\frac{2}{0}$
e NH

(C3) Mental Arithmetic: Addition

(Students took either C3 + C6 or C4 + C5)

Abstract: An open number sentence involving addition must be
completed without aid of pencil and paper, 5 items.

	CSMP	Non-CSMP	p
(boxed)	3.4	3.1	.32
	3.7	3.3	.01

Sample: 53 + 8 = [   ]

(C4) Mental Arithmeitc: Subtraction

Abstract: Same as C3, but with subtraction, 5 items

	CSMP	Non-CSMP	p
(boxed)	3.0	2.7	.39
	3.0	2.7	.03

Sample: 72 − 4 = [   ]

(C5) Mental Arithmetic: Multiplication

Abstract: Same as C3, but with multiplication, 8 items

	CSMP	Non-CSMP	p
(boxed)	4.6	4.6	.98
	5.1	4.7	.07

Sample: [   ] x 4 = 400

(C6) Mental Arithmetic: Division

Abstract: Same as C3, but with division, 8 items

	CSMP	Non-CSMP	p
(boxed)	4.6	3.5	.01
	5.0	4.1	.01

Sample: 150 DIVIDED BY 25 = [   ]

Total: Computation Scales	CSMP	Non-CSMP	p
(boxed)	48.7	43.3	.07
	46.3	45.2	.38

[1] Boxed data = present study
Unboxed data = large 1979 study

SCALE CATEGORY: ESTIMATION

	Adjusted Means		Significance (p-value)
	CSMP	Non-CSMP	

(E1) 2, 5 or 10

Abstract: Quickly estimate whether a given number is about .2 or 5 or 10 times as large as another given number, 13 items.

8.7	7.6	.02
8.3	7.9	.02

Sample   CO   s about ___ times as large as 19

E2. Estimating Intervals: Addition

Abstract: Quickly estimate which of 5 intervals contains the answer to a series of computation problems, 8 items.

6.1	5.9	.61
6.1	5.8	.03

Sample: 479 + 86   0   10   50   100   500   1000

E3 Estimating Intervals: Multiplication

Abstract: Same as E2, except multiplication, 8 items.

4.9	4.1	.01
4.8	4.3	.01

Sample: 40 x 10   0   10   50   100   500   1000

E4 Estimating Intervals: Division

Abstract: Same as E2, except division, and only 4 intervals, 8 items.

Sample: 101 DIVIDED BY 9   0   1   10   20   100

3.3	2.6	.02
3.6	3.2	.01

E5 Word Problem Approximations

Abstract: Quickly choose one of 4 round-number answers as closest to the exact answer to a word problem with relatively easy calculations, 5 items

3.0	2.5	.06
2.8	2.6	.03

Sample. Susan has $131.
Chairs cost $32.
About how many chairs can Susan buy?

2 chairs   4 chairs   6 chairs   10 chairs

Total: Estimation Scales	25.9	22.7	
	25.6	23.7	.01

11

	Adjusted Means		Signifi-
	CSMP	Non-CSMP	cance (p-value)

(N1) Decimal Gas

	2.7	2.0	.08

Abstract: With word problems about gasoline, one step solutions are required in which the numbers involve decimals, 7 items.

	3.2	2.1	.01

Sample: Tom has 6.5 gallons.

He buys 3.5 more gallons.

How much gas will he have then? _____

	3.3	2.4	.09

(N2) Negative Hits and Misses

	3.0	2.5	.01

Abstract: Given two rules [(a) each hit means a gain of 5 points, (b) each miss means a loss of 1 point] and given a vertical number line running from 12 below zero to 15 above, players turns are described in part with the required task being to to complete the description, 6 items.
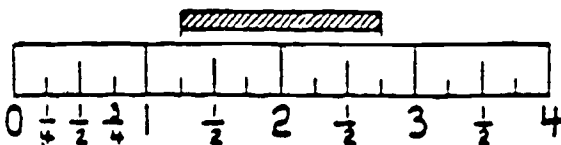
Sample:

Peter	Started with a score of	Number of Hits	Number of Misses	Ended with a score of
	10 below zero	1		12 below zero

	2.4	1.5	.01

(N3) Measuring Fractional Inches

	2.3	2.0	.06

Abstract: Calculate the length of a given bar laid along a ruler marked in 1/2, 1/4 or 1/10 inches, 6 items.

Sample:

$0 \quad \frac{1}{4} \quad \frac{1}{2} \quad \frac{3}{4} \quad 1 \quad \frac{1}{2} \quad 2 \quad \frac{1}{2} \quad 3 \quad \frac{1}{2} \quad 4$

_____

Total: Other Number Systems Scales

	8.4	5.9	.03
	8.5	6.6	.01

	Adjusted Means		Signifi-
	CSMP	Non-CSMP	cance (p-value)

(R1) Solving Number Machines

Abstract: From 3 pairs of numbers, determine what the machine is doing to produce the second number from the first and use this knowledge to find the missing number from the 4th pair, 8 items.

	CSMP	Non-CSMP	p
	5.7	5.4	.35
	6.2	5.3	.01

Sample:

WHAT NEXT OUT

IN	OUT
2	6
5	9
10	14
	12
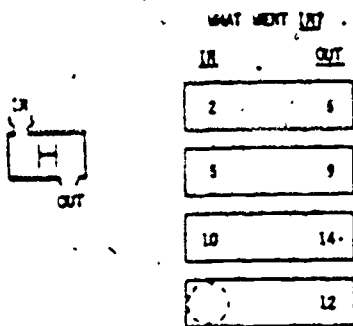
(R2) Using Number Machines (only done by students previously doing R1)

Abstract: Given a number of labelled machines in sequence, find the initial or the terminating number, given the other, 10 items.

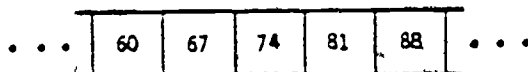|	5.3	4.9	.47
	6.7	4.6	.01

Sample:

-3
+4
2

(R3) Boxes: Counting by

Abstract: Presented with an infinite series of boxes each of which contains a member of an additive series of numbers, questions are asked about the series' membership of other numbers, 4 different series, 12 questions (3 on each óne series).

	7.4	7.1	.19
	7.6	7.2	.01

Sample:

Counting by 7's   Will 46 be in any of the boxes? _____

. . . | 60 | 67 | 74 | 81 | 88 | . . .

(R4) Boxes: Multiplying By

Abstract: Same idea and format as in R3 except that the series is multiplicative and specific empty boxes are to be filled in, 5 series, 13 items (empty boxes).
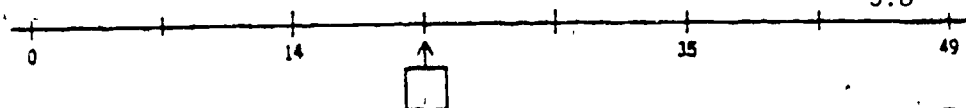
	6.8	4.0	.01
	7.9	4.1	.01

Samples

. . . | | 1 | | | 1,000 | 10,000 | 100,000 | . . .

(R5) Labelling Number Lines

Abstract: Same basic idea as R4 only with an additive series in number line context, 6 number lines, 6 items.

	3.4	2.1	.01
	3.8	2.4	.01

Sample:

0   14   ↑   15   49

Total: Number Relations Scales	28.6	23.6	.02
	32.2	23.7	.01

13   1

	SCALE CATEGORY: GEOMETRY	Adjusted Means		Signifi-
		CSMP	Non-CSMP	cance (p-value)

(G1) Geometric Congruencies

Abstract: After examining 3 correct and 3 incorrect solutions to a sample problem, given a regular geometric shape and a number of parts, the shape must be divided into that many congruent parts, 8 items. The word "congruent" was not used.

CSMP	Non-CSMP	p-value
4.6	4.7	.77
4.7	4.5	.13

Sample:

SCALE CATEGORY: PLACE VALUE

CSMP	Non-CSMP	p-value
4.2	3.6	.13
4.2	4.2	.79

(V1) Arrowed Number Lines

Abstract: Given a segment of a number line with four little arrows pointing to four different points, circle the arrow pointing closest to a given number, 12 items.

Sample:

CSMP	Non-CSMP	p-value
7.1	6.5	.04
6.8	6.6	.38

(V2) Constructing Numbers

Abstract: Given four different digits, and examples of legal and illegal 2, 3 and 4 digit numbers, construct a two, three or four digit number. The constructed number is either the largest, the smallest or the closest to a given number, 10 items.

Sample: Which three-digit number is closest to 600? ___ ___ ___

Total: Place Value Scales	CSMP	Non-CSMP	p-value
	11.2	10.1	.04
	10.9	10.9	.77

1₀

14

SCALE CATEGORY: WORD PROBLEMS (also see E5 and N1)

	Adjusted Means		Signifi-
	CSMP	Non-CSMP	cance (p-value).

(W1) __Extraneous Data__ (Students took either W1 or W2) .

| | 5.2 | 4.5 | .06 |

Abstract: Student must read a 4 or 5 sentence word problem,   5.3   4.9   .08
disregard one or two pieces of extraneous
information and then complete the one step
solution involving small whole numbers, 7 items.

Sample: Yesterday Ann bought 3 books.

Books cost 20¢ each.

Ann has 30¢ left.

She wants to buy a game that costs 45¢.

How much more money does she need to buy the game? _____

(W2) __Two-Stage__

| | 4.1 | 3.6 | .09 |

Abstract: Student must read a 2 to 4 sentence word problem
and complete a solution involving two different   3.9   3.4   .01
operations, 7 items.

Sample: Pam gets 50¢ each week.

She always spends 30¢ and saves the rest.

How much will she save in 4 weeks? _____

Total: Word Problem Scales

| | 9.3 | 8.1 | .08 |
| | 9.2 | 8.4 | .01 |

The similarity of results from the two studies is striking, whether one looks at means, differences in means, or p-values. There are some important differences, which will be described in the next section, but the data certainly support the hypothesis that students who studied CSMP in grades K-3 retain superiority over non-CSMP students in many areas after a year away from CSMP.

Figure 1, below, shows the graph of class means. For each class, the mean score on the total of all the MANS scores was plotted against the mean reading score. The common regression line for the two groups of classes is also shown.
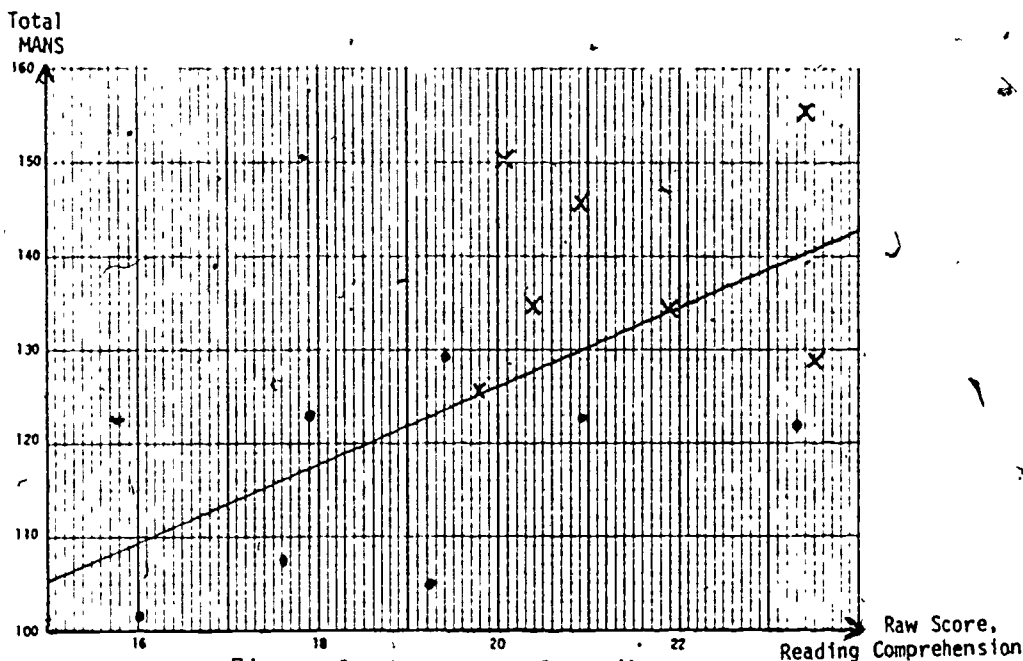

Figure 1, Graph of Class Means

X = CSMP class, ● = non-CSMP class

Although the overall CSMP superiority is clear from the graph, one rather troubling feature is revealed. The CSMP classes are better in reading, and although scores have been adjusted to take into account for this difference, it is still true that at most only 4 of the 7 non-CSMP classes are in the same ability range as the CSMP classes (reading scores of, say 19 to 24). The graphs of district means, next section relieve this problem somewhat. It is also true that reading scores do not predict MANS scores particularly well and that higher reading scores do not necessarily result in higher MANS scores. There is probably a lot of variation in the way individual fourth grade teachers do or do not "follow-up" on their students' CSMP background.

Comparisons with District Means from Previous Study

In the previous study, graphs were developed to show the mean scores for various participating school districts (6 in all). These graphs will be presented again here except that the present data has been superimposed.

Description of Graphs and Tables in Previous Study

For each scale category, (i.e. tne total score from the scales within the category), a similar analysis of covariance procedure was used to compare school district means. At each district, the class mean scores were averaged separately across CSMP and non-CSMP classes.

The district means are plotted on the following pages as follows:

MANS Scale
Category Score
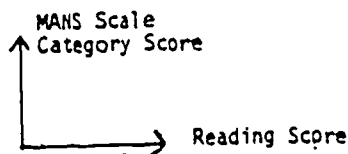
Reading Score

The entries on the graph are numerals corresponding to districts. A <u>circled</u> numeral is for the average of the CSMP class means in that district, a <u>plain</u> numeral is the best linear predictor of category score for a given reading score. Also given are the adjusted CSMP and non-CSMP means, and the level of significance, using the ANCOVA procedure (1 and 8 degrees of freedom). A total of 6 categories are graphed in this way.

Addition of Present Data to Graphs

For each graph the mean score across the 7 CSMP classes in the present study has been plotted and is indicated by a <u>circled</u> "P" (Ⓟ) and the mean score across the 7 non-CSMP classes is indicated by an uncircled "P" (P). Thus the reader can determine how well these two groups of classes did; not only according to what the regression line would have predicted based on their reading scores, but also whether their scores fit the respective patterns of CSMP and non-CSMP classes from districts involved in the previous study.
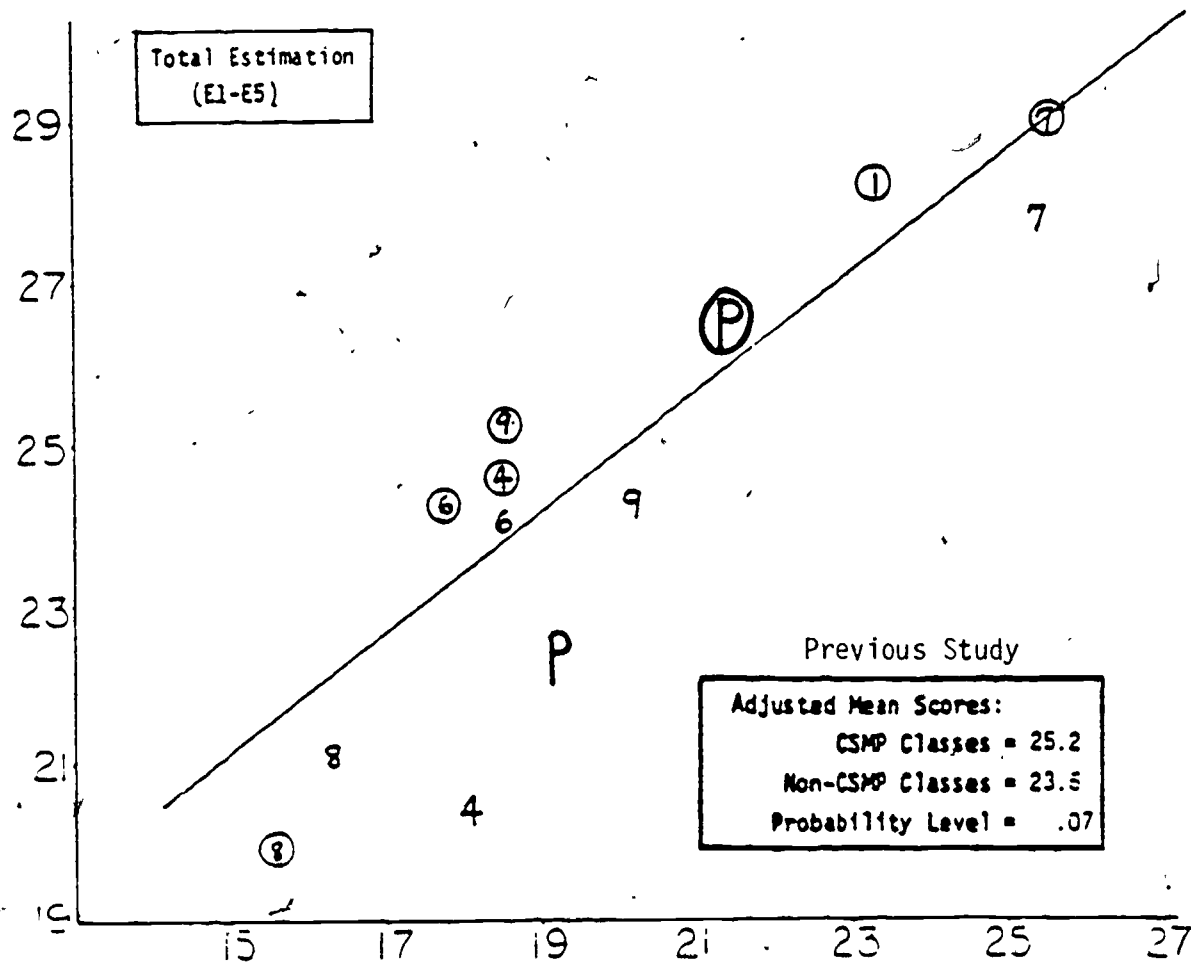
Total Computation
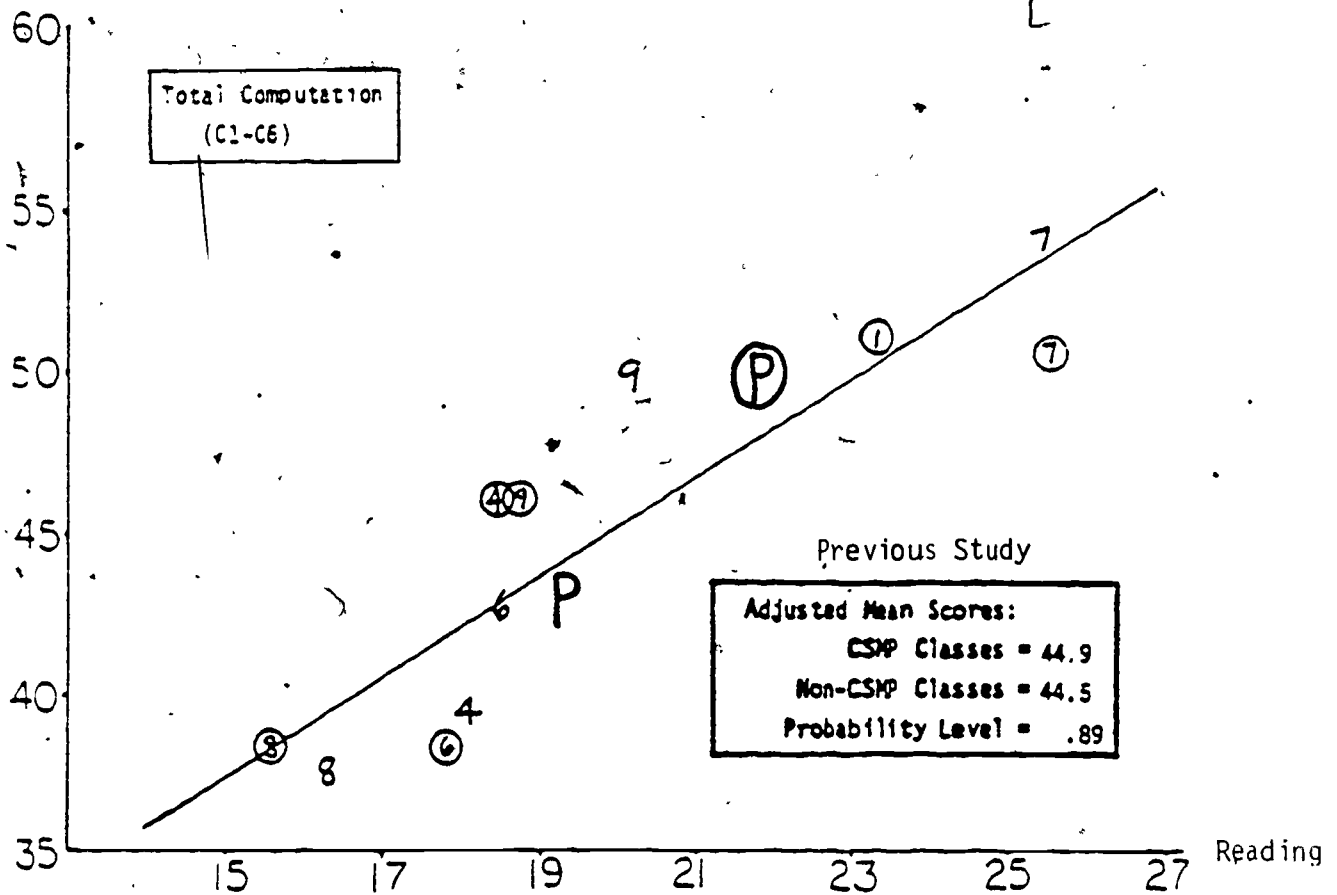
In neither the original study, nor the present study, was the difference between CSMP and non-CSMP classes significant. But this obscures an important result, which can be found on page 8. There were significant differences on some of the individual scales of the Computation category, but the scales where this occurred were different in the two studies.

In the original study, non-CSMP classes did better on the Stanford Achievement Test by about 2 points while in the present study CSMP classes did better by about 2 points.
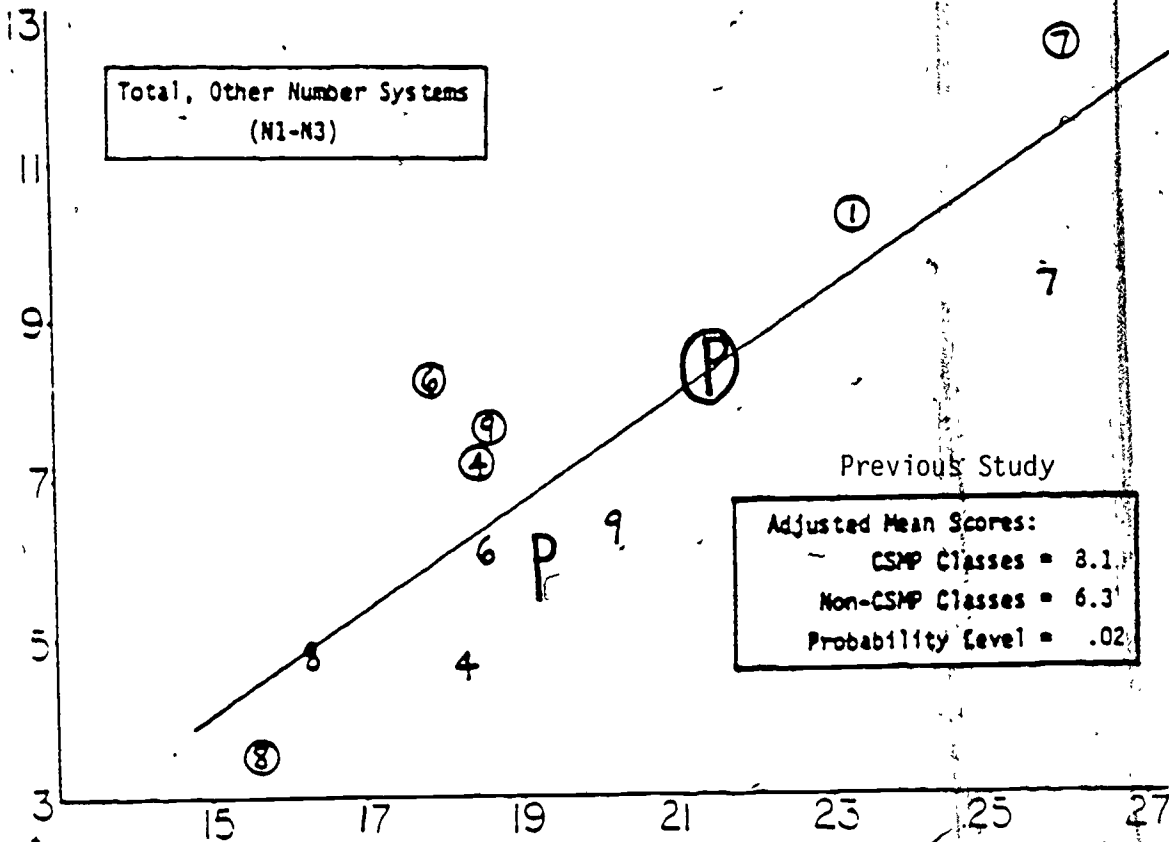
For the other scales in the Computation category, Fractions and the 4 Mental Arithmetic scales, CSMP classes did better by about the same amount in each study except Mental Arithmetic-Multiplication. For this scale there was no difference in the present study compared to an almost significant difference previously. This topic is given considerable attention in the CSMP fourth grade curriculum; thus the result is not surprising. On the other hand, the same is true of Mental Arithmetic-Division, on which there was a significant difference in both studies.

Total Estimation
(E1-E5)

Previous Study

Adjusted Mean Scores:
CSMP Classes = 25.2
Non-CSMP Classes = 23.5
Probability Level = .07

The present results are very similar to those obtained in the previous study. This is true whether one looks at the numerical data on page 9 or at the graph above, where the present CSMP classes appear to be in line with the previous CSMP classes, and similarly for non-CSMP classes.
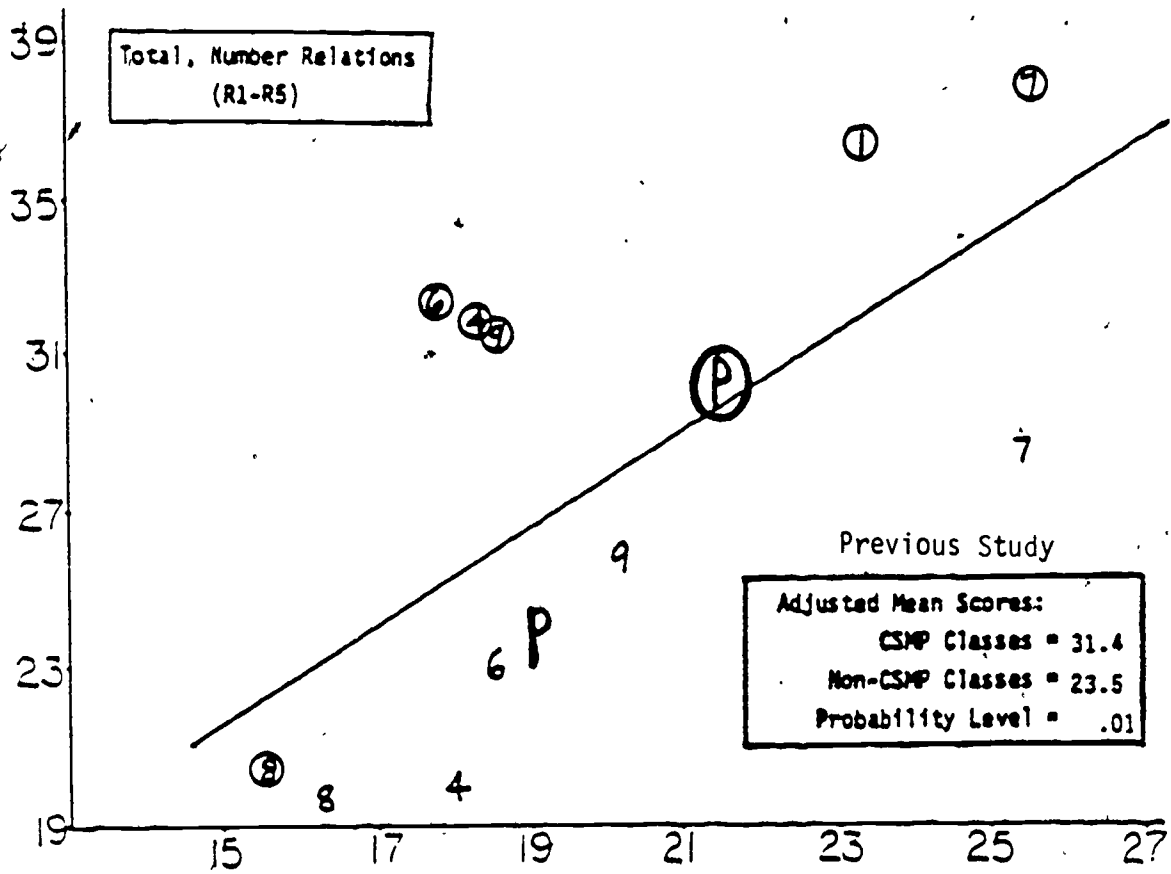
23

Total, Other Number Systems
(N1-N3)

Previous Study

Adjusted Mean Scores:
- CSMP Classes = 8.1
- Non-CSMP Classes = 6.3
- Probability Level = .02

In the present study, the CSMP mean lies right on the regression line, i.e. better than the various non-CSMP scores but not as high as most other CSMP scores. The scale on which the present CSMP classes did relatively least well dealt with decimals, which receive very little emphasis before fourth grade in the CSMP curriculum.
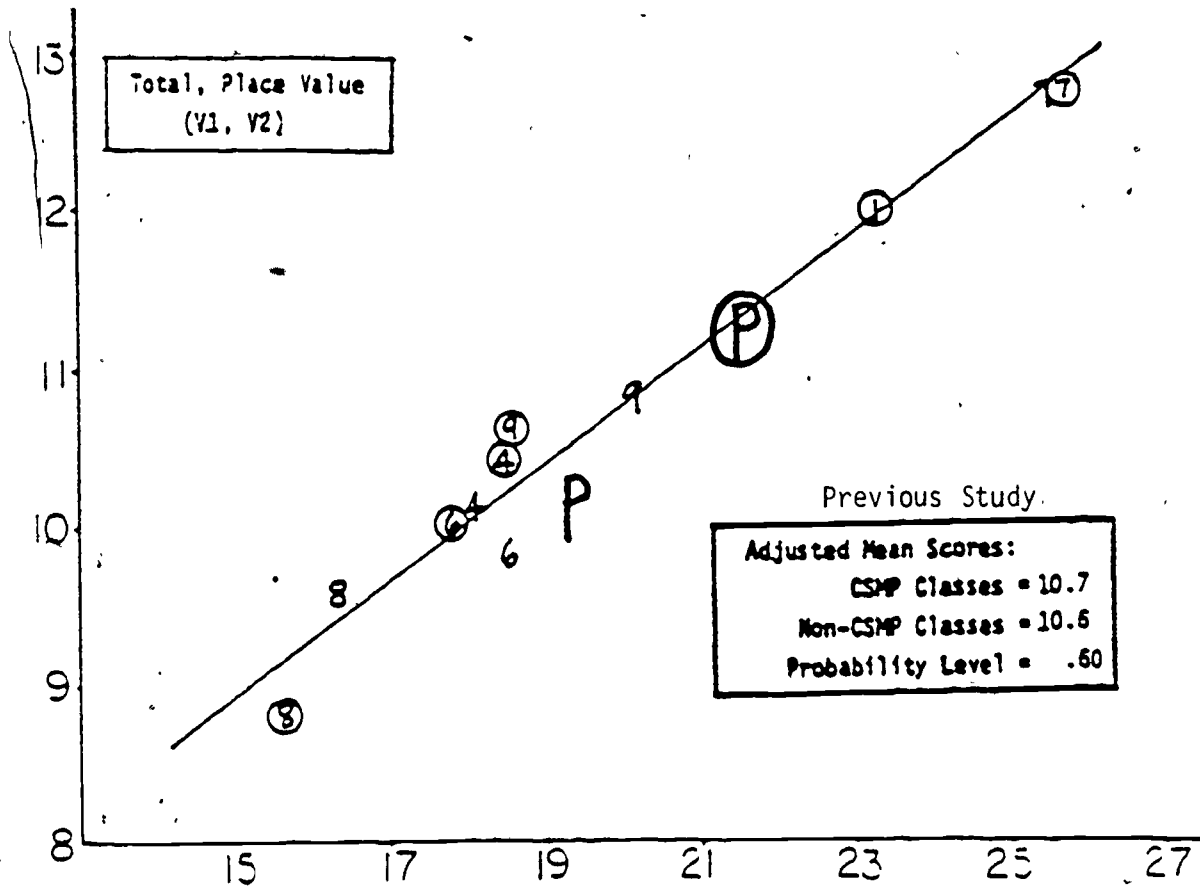
Total, Number Relations (R1-R5)

Previous Study

Adjusted Mean Scores:
CSMP Classes = 31.4
Non-CSMP Classes = 23.5
Probability Level = .01

This graph shows the present CSMP classes scoring better, vis-a-vis the regression line, than non-CSMP classes in all districts, but not doing as well as most other CSMP classes. It can be seen on page 11 that for each of the 5 scales in this category, the present CSMP classes did better than their non-CSMP counterparts, but the difference was always smaller than that obtained in the original study. Thus, the year away from CSMP has reduced (by about half) their advantage in relational thinking.

Place Value

Total, Place Value
(V1, V2)

Previous Study.

Adjusted Mean Scores:
    CSMP Classes = 10.7
    Non-CSMP Classes = 10.6
    Probability Level = .60

In the present study there was a significant difference in favor of CSMP classes on one of these scales and not in the other. In the previous study, there was virtually no difference on either. The graph shows that both groups fit the pattern from previous sites quite well. (Note also how well reading score predicts the score in this category; all entries on the graph lie close to the regression line.)

Word Problems

Total, Word Problems
(W1,W2)

Previous Study

Adjusted Mean Scores:
CSMP Classes = 9.3
Non-CSMP Classes = 8.3
Probability Level = .13
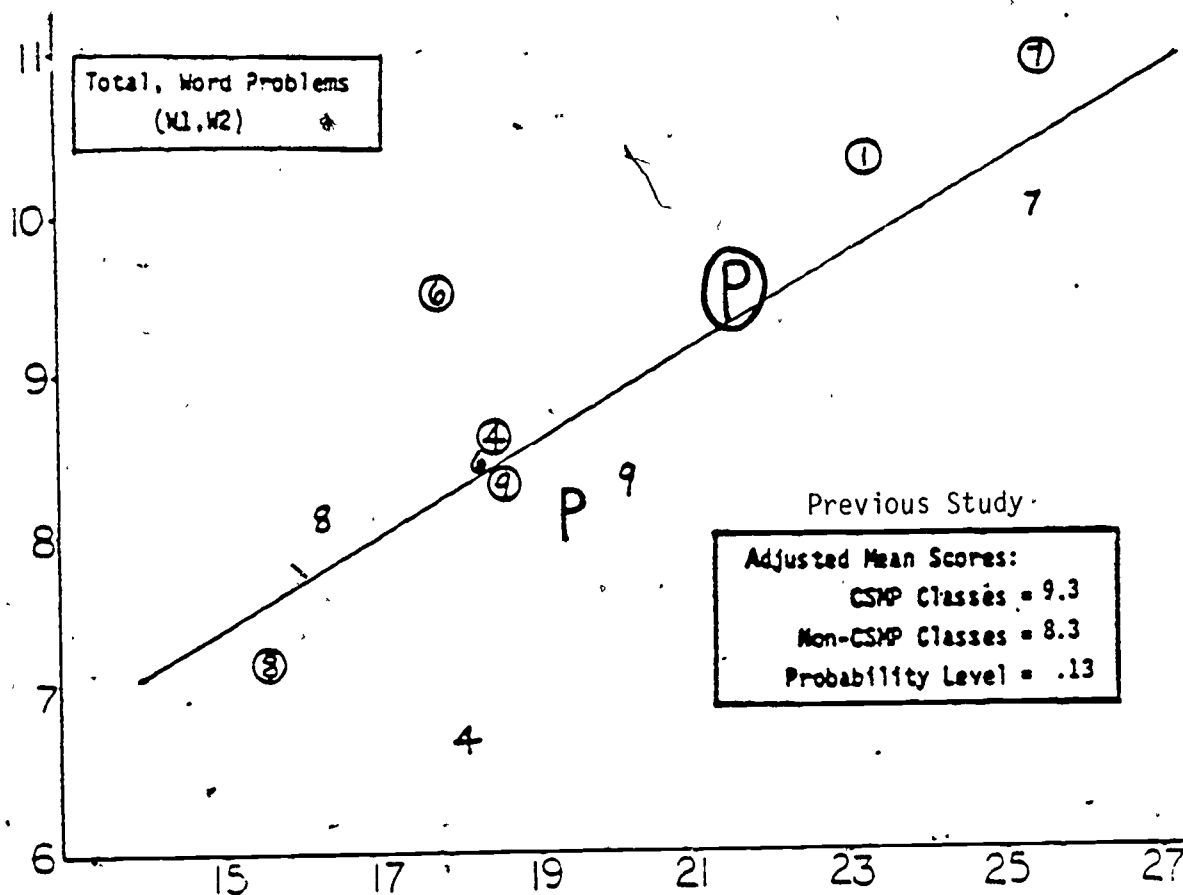
CSMP superiority of about half a point was recorded in both studies for each
of the two scales in this category. The data from the present study is consistent
with previous data, although the overall pattern is not as clear cut for this
category as for others.

In summary, compared to the previous CSMP classes in other districts (who had studied CSMP through fourth grade), the present group of fourth grade "CSMP" classes:

- did better on: computation, especially the standarized portion place value, but only marginally

- did about the same on: estimation word problems

- did less well on: number relations other number systems, especially decimals (However, in both cases, they still do better than non-CSMP classes.)

2.

Appendix

Class Means by MANS Category
Fourth Grade "CSMP" and non-CSMP Classes
(Raw Scores)

	Class ID	Reading Comprehension	Computation (C1-C6)	Estimation (E1-E5)	Number Relations (R1-R5)	Other Number Systems (N1-N3)	Word Problems (W1,W2)	Place Value (V1,V2)
CSMP Classes	1	20.2	51.8	27.2	33.6	11.2	9.7	12.2
	2	20.4	50.3	24.9	29.2	7.8	7.8	10.6
	3	23.5	48.5	24.9	25.5	6.0	8.8	10.4
	11	19.8	42.8	24.6	25.4	7.5	9.3	10.8
	12	21.9	47.3	25.4	27.9	8.5	9.2	11.2
	13	20.9	50.9	28.1	30.9	9.0	9.9	11.6
	14	23.4	55.4	29.2	31.9	9.0	11.8	13.1
non-CSMP Classes	51	17.9	48.0	22.5	24.1	6.3	7.8	10.3
	52	19.2	38.3	20.0	20.3	4.5	7.4	9.6
	53	23.3	43.0	23.1	25.7	5.7	8.4	10.8
	54	20.9	44.4	23.9	24.7	6.9	7.6	10.2
	61	19.4	48.1	24.0	25.4	7.9	8.9	10.1
	62	16.0	37.5	19.6	19.1	3.8	7.1	9.6
	63	17.6	37.0	22.7	21.5	6.0	8.5	9.1