Findings from the Michigan School Readiness Program 6 to 8 Follow Up Study

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Submitted to

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The Office of Early Childhood Education and Family Services

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I. Introduction

Growing evidence points to the fact that high-quality preschool experiences have an effect on children's short-term and long-term development (Barnett, 1995; Belsky et al., 2007; Gorey, 2001; Henry et al., 2003; Peisner-Feinberg et al., 2001; Schweinhart & Weikart, 1997). A number of evaluations have been conducted specifically evaluating state-funded preschool programs (Early et al., 2006; Gormley et al., 2005; Henry et al., 2003). Most find at least modest, positive program effects on children's performance, attendance, and reduced rates of grade retention. Much of the work in evaluating state-funded preschool programs has focused on relatively short-term impacts. Specifically, evaluations have focused on whether or not preschool graduates are ready for kindergarten or how preschool attendees versus non attendees fair in kindergarten and first grade (Hustedt et al., 2007; Lamy et al., 2005). There are a few studies that look beyond preschool effects on children's kindergarten and first grade performance (Henry et al., 2003; Peisner-Feinberg et al., 2001).

In addition to contributing to a growing literature on state-funded preschool, this report is the latest installment of an ongoing evaluation of the Michigan School Readiness Program (MSRP), a state-funded preschool program in the state of Michigan, which began more than a decade ago. This study uses the data from the MSRP to investigate the relationship between state-funded preschool attendance and longer-term child outcomes. Specifically, data are analyzed from a sample of preschool attendees and non-attendees that spans their preschool through their middle school years.

In 1996, the High/Scope Educational Research Foundation, with Michigan Department of Education funding, began to evaluate MSRP. High/Scope followed two cohorts of children – from kindergarten to 4th grade for Cohort 1 and from kindergarten through 2nd grade for Cohort 2– evaluating the implementation, level of quality, and efficacy of the MSRP. Early Returns (Florian, 1997), the semiannual Progress Report (Schweinhart, 1999), Points of Light (Xiang et al., 2000), and Effects Five Years Later (Xiang & Schweinhart, 2002) all outline major findings from that line of work. Those reports indicated that MSRP children were better prepared when they entered school and continued to do better 5 years later, with elementary school teachers rating MSRP graduates significantly more ready to learn than their counterparts who did not attend the MSRP. Overtime, significantly fewer MSRP graduates were held back a grade from Grade 2 through Grade 4, and significantly more program graduates passed the Michigan Educational Assessment Program (MEAP) tests in Grade 4 (Xiang & Schweinhart, 2002). As a result, compared to their classmates of similar age and socioeconomic background who did not attend the program, 24% more MSRP participants passed the MEAP literacy test in 4th grade and 16% more passed the mathematics test. In addition, 35% fewer participants needed to repeat a grade. Based on these findings, MSRP annually prevents an estimated 1,700 Michigan children from having to repeat a grade, saving the state an estimated $11 million each year by this effect alone.

The work presented here extends the investigation of outcomes for children in Cohort 1 beyond the fourth grade into middle school (Grades 6 – 8). Specifically, the same 596 study participants who participated in the K-4 Longitudinal Follow-up Study were tracked into middle school from

Grade 6 through Grade 8, using data provided by the Center for Educational Performance and Information (CEPI) within the Office of the State Budget as well as the MEAP data provided to High/Scope by the Michigan Department of Education. Analyses and findings presented in this report are based on nine waves of data (fall, spring, and end of year) for each of the three grades (i.e., 6, 7, and 8) for five dependent variables of interest -- MEAP achievement data in 7th grade (Reading, Writing, and English Language Arts), grade retention, school attendance, course enrollment for math and science courses, and different types of special services received (special education, Title I, and at-risk services).

The report findings are organized in four chapters. Chapter two provides information on the methods employed to conduct the research. Chapter three presents major findings on the relationship between attending MSRP and middle school outcomes. Chapter four summarizes these findings and offers recommendations and implications for policy. Appendix A provides detailed information on the variables utilized in this report as well as procedures used to minimize missing data. Appendix B lists detailed statistical information on the types of hierarchical models used for each of the middle school outcomes of interest. In addition, each of the findings is supported by detailed output tables with coefficient estimates, standard errors, t-tests and their significance, and odds ratios (where applicable).

II. Methods

What is the relationship between MSRP participation and middle school outcomes in Grades 6-8? To answer this question hierarchical linear modeling was used to investigate differences in the two groups (MSRP and No-Program) controlling for student and school characteristics. We examined how students who attended MSRP compared to students who did not attend MSRP on five outcomes of interest: (1) 7th grade MEAP achievement scores, (2) grade retention measured at the end of Grades 6-8, (3) school attendance measured at the end of Grades 6-8, (4) course enrollment for math and science courses (for Grades 7 and 8), and (5) special education services received measured at the end of Grades 6-8. These analyses controlled for student-level (i.e., ethnicity, free/reduced lunch eligibility, age, gender, and mobility) and school-level (i.e., percentage of students on free/reduced lunch, total number of students, pupil-teacher ratio, locality, and Education Yes! Preliminary score) characteristics. Appendices A and B provide extensive details on the variables and statistical models used to produce this report.

Sample

The Cohort 1 evaluation started with 338 children, who attended MSRP programs in 1995-1996 in one of the six selected sites across the state of Michigan, and 258 children who did not attend MSRP programs, but were like their counterparts in age and socioeconomic status (called No-Program group throughout this report). The No-Program children were identified based on three criteria:

- They entered kindergarten in 1996, the same year as the MSRP children,
- They did not have a preschool program experience, and
- They came from families whose parents' self-reported income was low enough to have qualified them for the MSRP.

Overall, High/Scope's earlier reports indicated that no significant differences were detected between the MSRP and the No-Program groups in age, gender, percentage of fathers at home, mother's level of education, number of people at home, and household income (see Xiang & Schweinhart, 2002 for a full description of the characteristics of the participants).

To track information about Cohort 1 children for this work, student data were obtained from the Single Record Student Database where participants were identified by their name and birthday with the help of the original school district's code. Table 1 presents the number of matched participants by group across each of the 9 waves of data[1]. As long as a Cohort 1 study child had at least one wave of data, the child was considered matched. Overall, the total matched sample across 9 waves of data was 556 children out of the total of 596 who had participated in the

[1] Originally, the study participants were sampled from 6 sites throughout the state of Michigan (Xiang & Schweinhart, 2002).

original evaluation. As shown in Table 2, the mean retention ranged from 91% to 96% across the original 6 study sites.

Table 1. The Number of Matched Participants by Group and Data Wave

Group	2002-03			2003-04			2004-05			Original Sample
	Fall	Spring	EOY	Fall	Spring	EOY	Fall	Spring	EOY	
Program	298	298	301	303	307	305	303	300	303	338
No-Program	234	234	230	232	229	228	228	229	229	258
Total	532	532	531	535	536	533	531	529	532	596

Table 2. Participant Retention Rates by Original Study Site

Site	Identified Participants	Original Sample	Mean Retention
COOR Intermediate School District	84	89	94%
Detroit Public School	101	105	96%
Economic Opportunity Committee	100	109	92%
Kalamazoo Public Schools	83	91	91%
Muskegon Public Schools	106	112	95%
Wyoming/Godwin/Godfrey/Kelloggsville Public Schools	82	90	91%

Out of the total 556 children who participated in this study, 270 of the children were boys and 286 of the children were girls. Children ranged in age from 10.83 to 12.42 years (M=11.30; SD=.31). Children's ethnicity by group is presented in Table 3. Overall, no significant differences between the two groups (MSRP and No-Program) were found on age, gender, and ethnicity in this sample (similar to previous Cohort 1 findings, Xiang & Schweinhart, 2002).

Table 3. Student Demographic Characteristics by Study Group

Variable	Group	*n*	Average/Percentage	Statistical Significance
Age at Grade 6	MSRP	317	M=11.30 yrs	—
	No-Program	239	M=11.29 yrs	
Gender (Female)	MSRP	164	51.7	—
	No-Program	122	51.0	
Caucasian	MSRP	180	57.0	
	No-Program	139	58.2	—
African-American	MSRP	87	27.5	—
	No-Program	63	26.4	
Hispanic	MSRP	33	10.4	—
	No-Program	24	10.0	
Native American	MSRP	4	1.3	—
	No-Program	2	.8	
Biracial	MSRP	7	2.2	—
	No-Program	7	2.9	
Other	MSRP	5	1.6	—
	No-Program	4	1.7	

Note. "–" = not significant.

Table 4 contains the percentages of students who changed schools by each grade. Out of all the children, 51.9% (n = 288) changed schools at some point during Grades 6 to 8; 76 of those children (10 students total in 6th grade, 37 in 7th grade and 29 in 8th grade) changed schools within a given school year (from September to June). Given that some children changed schools, we used this factor as a covariate in our analyses (see the section on Variables below for a full list of covariates used in this study).

Table 4. The Number of Students Who Changed Schools by Original Study Site

Site	During Grade 6	Grade 6 to 7	During Grade 7	Grade 7 to 8	During Grade 8
COOR Intermediate School District		22(26.2)	5(6.0)	11(13.1)	2(2.4)
Detroit Public School		47(46.5)	11(10.9)	31(30.7)	9(8.9)
Economic Opportunity Committee		24(24.0)	8(8.0)	13(13.0)	13(13.0)
Kalamazoo Public Schools		59(71.1)		20(24.1)	3(3.6)
Muskegon Public Schools		49(46.7)	7(6.7)	18(17.1)	6(5.7)
Wyoming/Godwin/Godfrey/ Kelloggsville Public Schools		27(32.9)		16(19.5)	5(6.1)

Note. The number of students who changed school at each study site is followed in parenthesis by the percentage of the total number of students who changed schools at that site. The number of students less than 5 is not reported for confidentiality reasons.

Across three years, children in the sample attended a total of 362 schools in 163 school districts. During each school year, study children attended anywhere from 196 to 221 schools depending on the grade. Two hundred eight schools (57.5%) were located in urban areas, 85 (23.5%) in suburban, and 69 (19.1%) in rural areas. As shown in Table 5, students in 6 – 8 sample were proportionally spread across the original study sites with the highest number of schools from the Detroit Public School District.

Table 5. The Number of Schools and the Percentage of Study Participants Attending by Original Study Site

Original Study Site	Grade 6	Grade 7	Grade 8
COOR Intermediate School District	21(14.73)	26(15.09)	28(15.09)
Detroit Public School District	59(17.82)	59(17.64)	59(17.45)
Economic Opportunity Committee	30(17.64)	25(17.82)	26(17.82)
Kalamazoo Public Schools	36(14.73)	25(14.36)	22(13.64)
Muskegon Public Schools	36(18.91)	25(18.73)	22(13.64)
Wyoming/Godwin/Godfrey/Kelloggsville Public Schools	39(14.36)	38(14.55)	39(14.73)

Note. The number of schools in each study site is followed in parenthesis by the percentage of the total number of students in the sample attending schools at that site.

Variables

In this part of the report, we identify and define all of the independent and dependent variables of interest used in analyses. We first describe all of the middle school outcome (dependent) variables, followed by the predictor (independent) variables[2].

MEAP

MEAP is a criterion-referenced test that is based on Model Core Curriculum Outcomes and the Content Standards approved by the Michigan State Board of Education. It is the only assessment that is given annually to all students in the state of Michigan. Children are asked to answer multiple choice questions in 5 content areas: reading, math, writing, science, and social studies. For the writing assessment, for example, children are asked to write about a topic based on their knowledge and experience, respond in writing to a grade-level writing sample, and answer multiple-choice questions. The content areas assessed in grade 7 are Reading, Writing and English Language Arts (i.e., a combination of Reading and Writing). These 3 MEAP content areas were, therefore, used in this report.

MEAP scores in 8th grade could not be analyzed in this study. Children who were in 8th grade took MEAP in Winter 2004. Some of the students in the sample who were retained in grade were supposed to take MEAP in winter of 2005. In 2005, however, Michigan Department of Education updated MEAP testing for both content and time of assessment. Given that the Fall 2005 MEAP assessments were based on the new content for both English Language Arts and

[2] Table 17 in Appendix A provides operational definitions for each of the middle school outcome variables of interest.

Mathematics and on the updated performance standards for science and social studies, Fall 2005 scores could no longer be compared to previous year scores for the same grade and content area.

Grade Retention

Grade retention is an important indicator of the long-term influence of early childhood education. We were interested in the grade level students were at each year as well as their grade retention history. That is, whether or not a child was held back in a specific year, and if the child was ever retained in any grade from kindergarten forward.

School Attendance

School attendance was measured in percentage of days attended based upon the total number of days a child could have attended.

Course Enrollment

Since the Single Record Student Database only collects course enrollment information for math and science, the two corresponding variables were used in these analyses - the level of math course enrollment and the number of science courses in which a student enrolled in for Grades 7 and 8.

Special Services Received

Based on the SRSD information relating to special services, three variables were analyzed as indicators for the special services that participants received. The variables were grouped as

- Special education services received. The variable indicated whether the participants received special education program services and/or special education support services such as teacher consultant services for different disabilities.
- Title 1 service received. Some children in targeted assistance school programs (excluding school-wide programs) received Title I instructional services (e.g., instructions in reading, ESL, math, or science), and/or Title I support services (e.g., counseling, social work, or health services) in whole or in part with Title I funds.
- At-Risk services received. Generated from two SRSD variables, the variable indicated whether participants received instructional services (instruction in various subjects, extended, or summer programs) and/or support services (e.g., breakfast, behavior training, mental health, home/school liaison) for at-risk students who received State School Aid Act section 388.1631a funds.

Student-Level Variables

In addition to a variable indicating whether or not a student had attended MSRP or not, the following characteristics were consistently used throughout all of the analyses:

- ethnicity
- free/reduced lunch eligibility
- age
- gender, and
- mobility

Ethnicity and free lunch eligibility provided socioeconomic information. Both are regularly used in studying school achievement (Nye et al., 1999). Age in months and gender were included as covariates because they have been found to be related significantly to the outcome measures in

the study, such as grade retention (e.g., Reynolds, 1992). Mobility indicated the number of times a child moved from one school to the next within a period of three years (from 6th to 8th grade)[3]. Given that all of the variables except for group (MSRP vs. No-Program) are used in analyses as covariates, they will be called "covariates" throughout the report.

School-Level Variables

The following school characteristics were included as predictor variables in the analyses:

- percentage of free/reduced lunch eligible students at each school
- total number of students reported for a school
- pupil-teacher ratio at each of the schools the participants attended
- locale (city, urban, or suburban), and
- Education Yes! Preliminary score for each of the schools that the participants attended. In the state of Michigan, this score is used to determine how well a school is performing based on MEAP results (i.e., MEAP achievement and MEAP improvement) and 11 other performance indicators.

The school-level data (e.g., percentage of students eligible for free/reduced lunch, pupil-teacher ratio) were obtained from the National Center for Education Statistics, Common Core of Data Public School Universe for each of the years from 2002 to 2005. When such information was missing, schools were contacted directly to obtain necessary information[4].

The variables at the school level were chosen because prior research suggests that some of the differences between an instructional group and a comparison group can be attributed not only to differences in children but also to differences in the schools they attend. Accounting for such school-level differences provides more realistic estimates of the true magnitude of differences between the two groups of students – those who attended MSRP and those who did not

Tables 6 and 7 describe the types of schools that children in the study attended.

Table 6. Demographic School-Level Information by Grade

	Grade 6	Grade 7	Grade 8	Range
Total Number of Students	551	551	551	19-2257
Pupil-teacher Ratio	18.42	18.42	18.42	1-40
Percentage of Free/Reduced Lunch Eligible Students	.48	.48	.48	0-1
Education Yes! Preliminary Score[5]	82	82	82	54-96

[3] Table 18 (see appendix A) provides operational definition for each of the covariates used in the analyses.

[4] Table 19 (see Appendix A) provides an operational definition for each of the school-level variables used in these analyses.

[5] The Michigan YES! School report card system is used by the state of Michigan to comply with the No Child Left Behind reporting requirements. The report card provides an assessment of several measures of the school's performance for each school. In all of our analyses at the school level, we used Education Yes! Preliminary Scores that report cards provide.

Table 7. Demographic School-Level Information by Group

School-Level Variables	Statistical significance	MSRP		No-Program	
		M	*SD*	*M*	*SD*
Number of schools -Urban	--	52		51	
Number of Schools -Suburban	--	17		24	
Number of Schools -Rural	--	26		17	
Total Number of Children	--	586.04	268.40	627.93	293.22
Pupil-Teacher Ratio	--	19	5.20	18	4.58
Percentage of Free/Reduced Lunch Eligible Students	--	.45	.26	.47	.25
Education Yes! Preliminary Score	--	82.72	6.81	81.78	6.78

Note. "–" = not significant.

Analyses

Two types of analyses were utilized in this report. Across all of the analyses, we first describe the data in the sample. These analyses look at observed patterns and rates and provide descriptive statistics about middle school outcomes and their relationship to participating in MSRP. When such results are presented, we talk about "observed percentages" and "observed rates."

In addition, we also test a series of hierarchical two-level models that examine the relationship between MSRP participation and middle school outcomes controlling for variables both at the student and school levels that might contribute to the differences between MSRP and No-Program groups (see Appendix B for a fuller description of the hierarchical models that were utilized). When such results are presented, we talk about 'adjusted models" and "estimates adjusted for covariates" indicating that the reported estimated differences between the two groups have taken into account both student- and school-level characteristics that may also have (in addition to MSRP attendance) an influence on the outcomes of interest.

It is also important to emphasize that these analyses do not imply a causal relationship between participation in MSRP during preschool years and middle school outcomes because they are based on a quasi-experimental (treatment and comparison group) design instead of a random assignment design. Other potentially important variables (e.g., the quality of preschool experiences, home environment, or school resources) may be related to outcome variables. While we employed statistical models that controlled for basic student and school characteristics, it is possible that the difference between groups can be attributed to factors that were not measured and, therefore, were not represented in these analyses.

III. Major Findings

Do students who attend MSRP continue to perform better later in school? The results for middle school outcomes are presented in this chapter in the following order:

- 7th grade MEAP scores,
- grade retention measured at the end of Grades 6-8,
- school attendance measured at the end of Grades 6-8,
- course enrollment for math and science courses (Grades 7 and 8), and
- special education services received measured at the end of Grades 6-8.

Appendix B provides detailed information on the statistical models that yielded the results reported here[6].

MEAP, Grade 7

We examined whether participation in MSRP was associated with higher MEAP scores in Grade 7 Reading, Writing, and a composite score on English Language Arts (ELA). The description of the students who took MEAP in Grade 7 is presented in Table 8.

Table 8. Demographic Information for the Students Who Took 7th Grade MEAP

		MSRP		No-Program	
		M	*SD*	*M*	*SD*
Student-level Variables					
MEAP, Reading, Grade 7		533.65	48.46	533.66	49.83
MEAP, Writing, Grade 7		521.37	15.54	521.75	16.82
MEAP, English Language Arts, Grade 7		528.00	28.95	527.42	28.87
Age		12.30	.29	12.29	.32
Gender (count)	Male	134		100	
	Female	153		111	
Ethnicity (count)	White	170		127	
	Non-white	117		84	
Percentage of Time on Free/Reduced Lunch		.50	.41	.55	.41
Time of assessment (count)	Winter 2004	84.7%		77.7%	
	Winter 2005	15.3%		22.3%	
Mobility	0-1 moves	84.8%		86.7%	
	2-5 moves	15.2%		13.3%	

Note: N ranged from 494 – 496 students depending on the scale.

[6] See Appendix B, Tables 25-47.

It is important to note that 56 students (10.1% of the total sample) had no MEAP data available for analyses. Additionally, based on statistical analyses of outliers in the overall pool of scores, Reading scores for two students, Writing scores for two students, and English Language Arts scores for two students were excluded from the sample.

We examined whether children who did not take MEAP in 7th grade or took MEAP but their scores were not documented were significantly different from those children who took MEAP and whose scores were not missing. The children who had missing 7th grade MEAP scores:

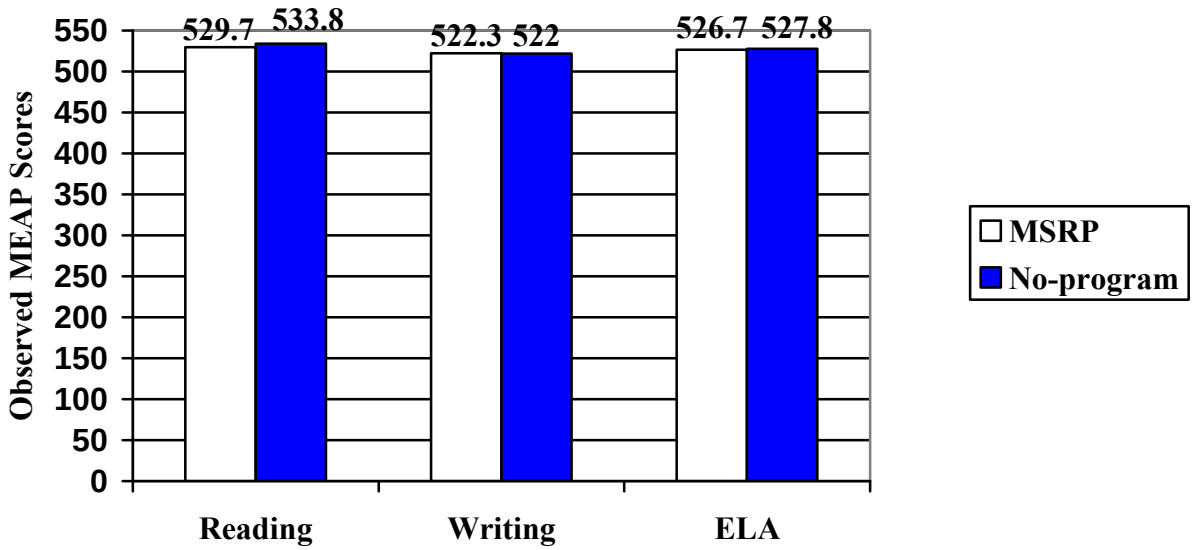
- had a significantly higher percentage of time they were eligible for free/reduced lunch (66% of time eligible for free/reduced lunch for those who had missing data vs. 52% of time eligible for free/reduced lunch for those who had 7th grade MEAP data),
- were coming from more diverse ethnic backgrounds (22 Caucasian vs. 36 non-Caucasian children had missing data), and
- were attending school less than students who had no missing data on MEAP (*M*=92.6% attendance vs. *M*=94.7%).

For these reasons, readers should be aware that 7th grade MEAP scores might not be missing at random and, as a result, MEAP findings should be interpreted with caution.

Descriptive and correlational statistics as well as hierarchical linear modeling (HLM) analyses that controlled for student- and school-level covariates all concur that there were no statistically significant differences between the MSRP and No-Program groups in their performance on 7th grade MEAP Reading, Writing, and ELA tests[7]. Figure 1 shows that the observed MEAP scores for both groups were nearly identical.

[7] See Tables 23 – 28 in Appendix B for details.

Figure 1. Observed MEAP Scores by Group, Grade 7



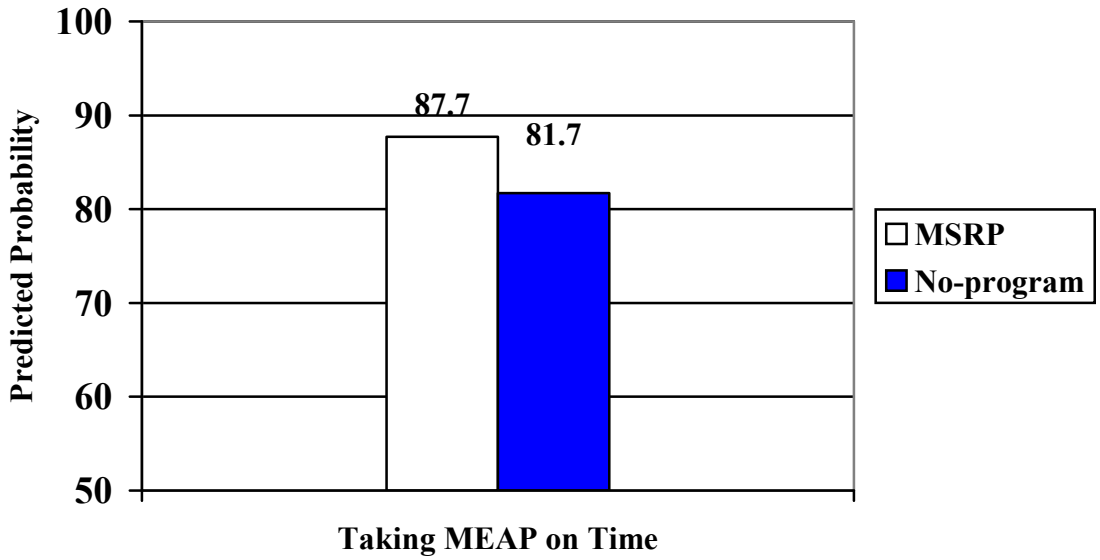
While there were no differences between MSRP and No-Program children's MEAP performance, there was a statistically significant difference in whether or not students took the MEAP test on time. Table 9 provides descriptive data on the number of students that took the test on time. 84.7% of children took the MEAP, Grade 7 test on time as opposed to 77.7% of those children who did not attend MSRP.

Table 9. Observed Rates of Taking MEAP on Time by Group

Group	On Time	One Year Later	Total
No-Program	164 (77.7%)	47 (22.3%)	211
MSRP	243 (84.7%)	44 (15.3%)	287
Total	407 (81.7%)	91 (18.3%)	498

Figure 2 shows that a significantly higher number of children who attended MSRP were predicted to take MEAP at their grade level (87.7%) than children in the No-Program group (81.7%) when adjusted for all covariates.

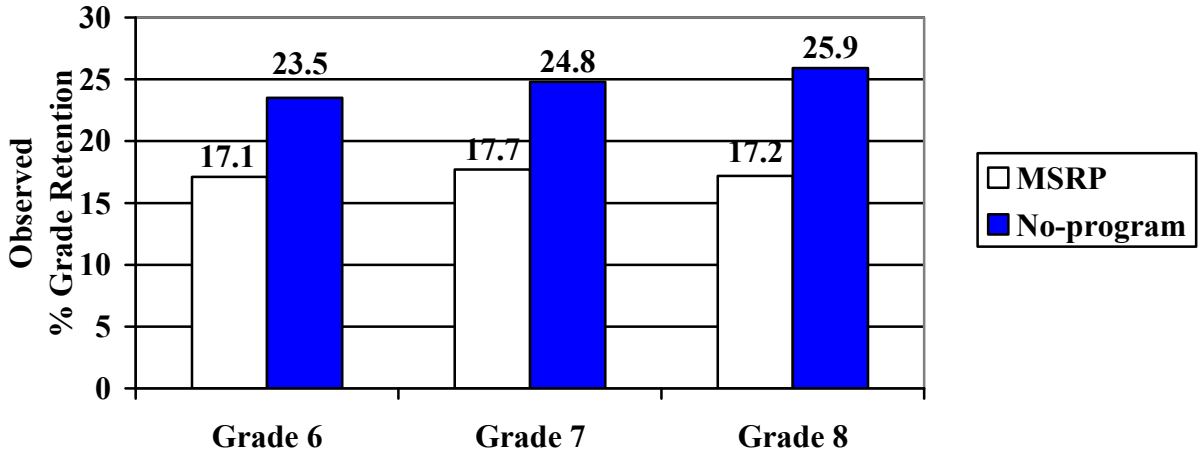
Figure 2. Predicted Probability of Taking MEAP, English Language Arts, at Grade Level by Group



Grade Retention

As shown in Figure 3, over time the percentage of students retained for the MSRP group remained relatively constant (17.1% at Grade 6, 17.7% at Grade 7, and 17.2% at Grade 8) while the percentage retained for the No-Program group slightly grew. Additionally, the percentage of students retained in each grade was consistently higher among the No-Program group than that of the MSRP group (by 6.4%, 7.1%, and 8.7% respectively).

Figure 3. Observed Grade Retention Rates by Group and Grade



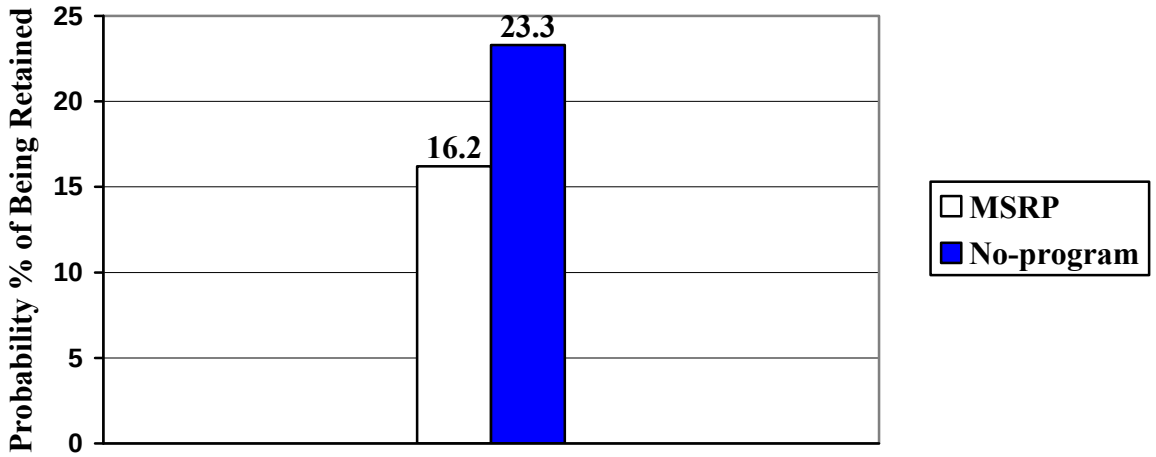
These descriptive differences observed in rates of retention between the two groups do not indicate that attending MSRP "caused" more children to stay at grade level; rather a variety of factors could contribute to such differences. To estimate the influence of various factors, we ran a series of statistical models to predict retention rates controlling for student-level (i.e., age, gender, ethnicity, receiving free/reduced lunch, mobility) and school-level characteristics (i.e., Education Yes! Preliminary Score, percentage of students on free/reduced lunch, pupil-teacher ratio, locality, and total number of students). Below we discuss the estimates of such differences for each grade separately[8].

Grade Retention, Grade 6

Children who went to MSRP as preschoolers tend to have statistically significantly lower rates of retention in 6th grade than children who did not have an MSRP experience. Figure 4 depicts estimated probabilities of being retained in 6th Grade when adjusted for student and school characteristics. On average, MSRP children were predicted to have a retention rate of 16.2% when adjusted for covariates. However, the estimated adjusted retention rate for No-Program children was much higher, 23.3%. On average, the difference in predicted probabilities of being retained is 7.1% higher for No-Program children.

[8] Tables 29 – 31 in Appendix B provide detailed information on the results presented in the text.

Figure 4. Estimated Probability of Being Retained by Group, Grade 6

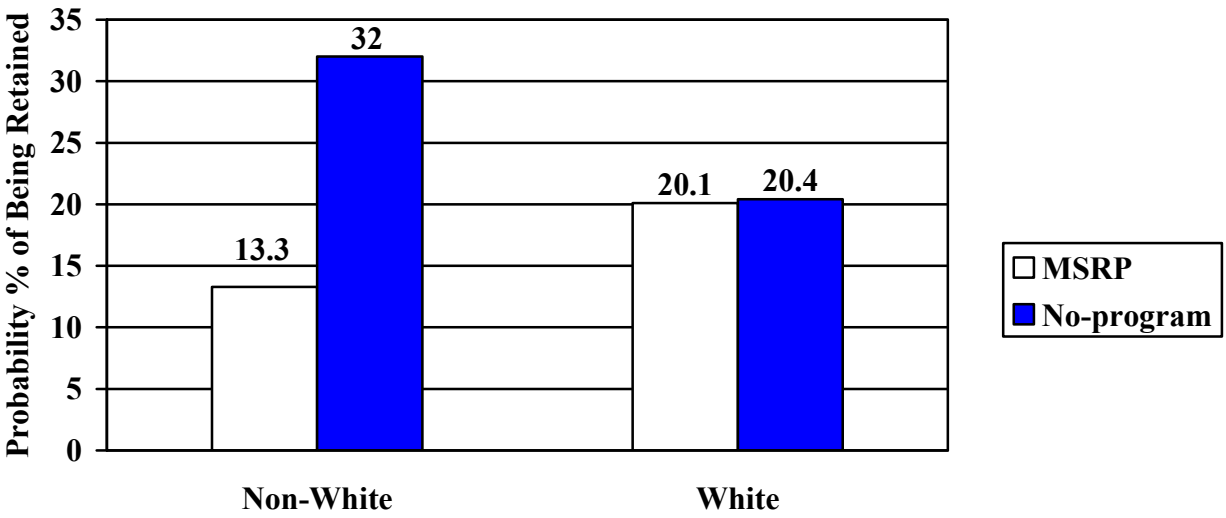


The odds of MSRP children being retained in Grade 6 were .639 – that is, 36.1% less than the odds of retention of otherwise-similar students who did not attend MSRP even after controlling for student and school characteristics (see Table 29, Appendix B).

Grade Retention, Grade 7

Grade retention rates in Grade 7 are similar to those trends found in Grade 6. Specifically, MSRP children had lower retention rates than their No-Program peers. As is evident from Figure 5 below, grade retention rates were different depending on ethnicity: attending MSRP significantly reduced the likelihood of being retained for children of color while having no similar effect among white MSRP graduates. That is, children who were non-white and who attended MSRP had much lower predicted grade retention rates (13.3%) than children who were non-white and who did not attend MSRP (32%). Differences in the predicted retention rates of white children who attended MSRP (20.1%) and those from the No-Program group (20.4%) adjusted for covariates were not pronounced. For children of color, attending MSRP reduced the likelihood that they would be retained while MSRP did not produce this benefit for white children.

Figure 5. Estimated Probability of Being Retained by Group and Ethnicity, Grade 7

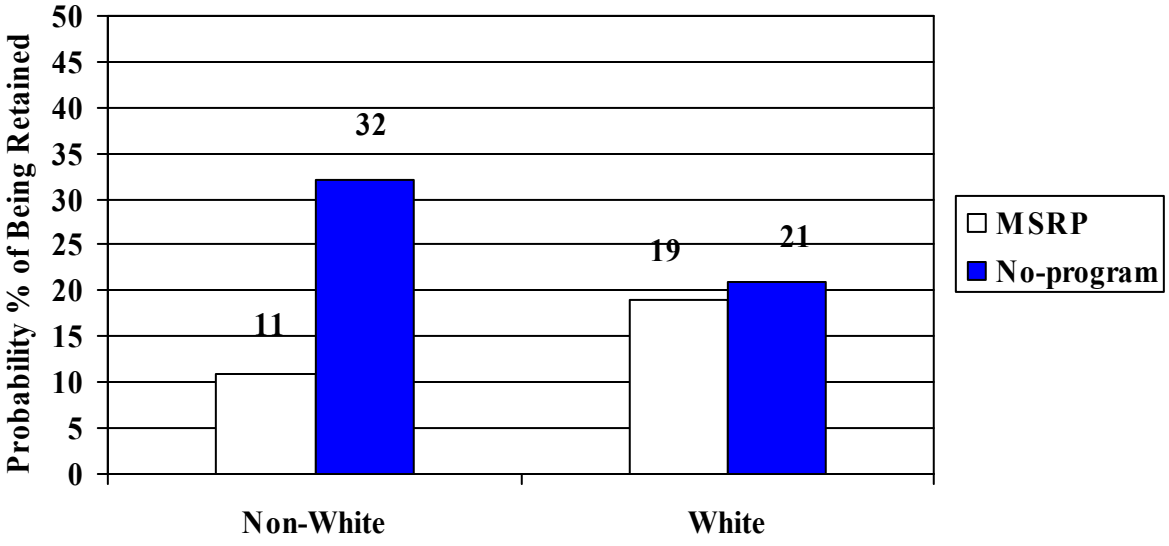


Grade Retention, Grade 8

In Grade 8, retention rates appear to be influenced by an interaction between MSRP attendance and ethnicity as well as an interaction between MSRP attendance and gender. Figures 6 and 7 graphically explain these findings.

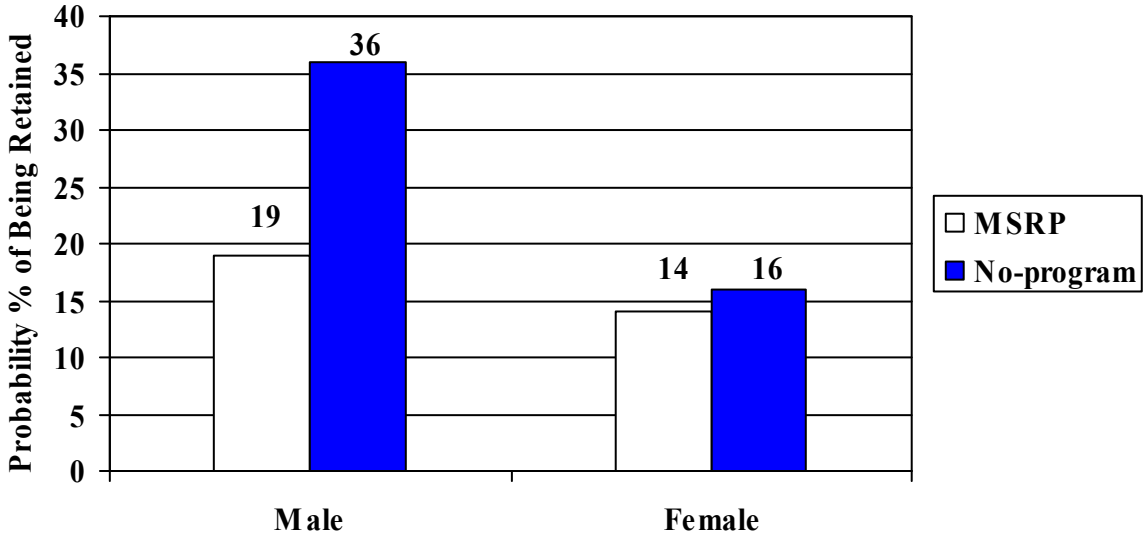
On average, students who were non-white who attended MSRP were predicted to have 11% retention rate when adjusted for covariates. However, the estimated adjusted probability of being retained for non-white students who did not attend MSRP was much higher, 32%. Similar to the 7th grade findings, children who are non-white and who attended MSRP had much lower retention rates than children who were non-white and who did not attend MSRP. There was no difference in the retention rates of white children who attended MSRP and those who did not.

Figure 6. Estimated Probability of Being Retained by Group and Ethnicity, Grade 8



On average, boys who attended MSRP were predicted to have 19% retention rate when adjusted for covariates. However, the estimated adjusted retention rate for boys who did not attend MSRP was much higher, 36%. Overall, boys who attended MSRP had much lower retention rates in the 8th grade than boys who did not attend MSRP. There was no difference in the retention rates of girls who attended MSRP and those who did not.

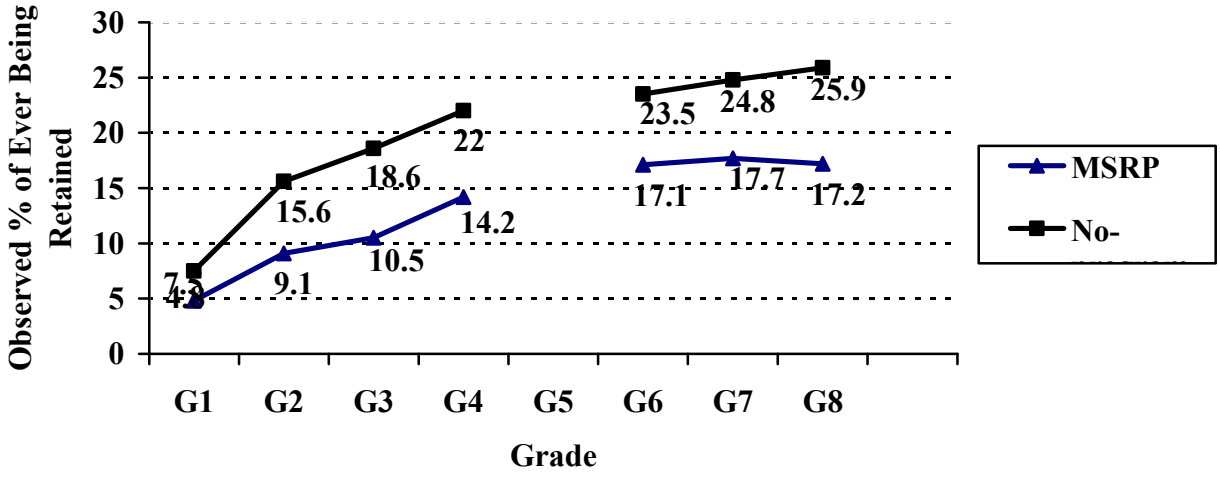
Figure 7. Estimated Probability of Being Retained by Group and Gender, Grade 8



In addition to looking at retention rates (whether a student was at a given grade level or not), we also examined the trend over time from Grades 1 – 4 and 6 – 8 of whether students were ever held back in grade. As Figure 8 indicates, the rate of grade retention (unadjusted for covariates)[9] increased more rapidly for the No-Program group than MSRP group in the first 3 years of elementary school, and since then kept rising, with the program group staying significantly lower than the No-Program group by 6.4 – 7.8% through middle school.

[9] Ever held back in grade data for Grades 1 to 4 presented here has not been adjusted for the covariates used in this 6 to 8 Follow Up study because earlier reports did not use the same child-level covariates (father at home or not, number of people in the household, mother's education, household annual income, age, gender, and study site were used in Grades 1 to 4 data; ethnicity, free/reduced lunch eligibility, age, gender, and mobility were used for Grades 6 to 8 data). In addition, no school-level covariates (regression analyses did not utilize school-level data for Grades 1 to 4 data; percentage of free/reduced lunch eligible students at each school; total number of students reported for a school; pupil-teacher ratio at each of the schools the participants attended, locale, and Education Yes! Preliminary score were used as school-level covariates for Grade 6 to 8 data) were used in earlier reports. Therefore, for comparability we present descriptive analyses for both Grades 1 to 4 and Grades 6 to 8 using raw, unadjusted values.

Figure 8. Accumulated Observed Rates of Ever Being Retained by Grade



Note that the rates for each of the grades were based on over 95% of the entire sample (96 – 98% for Grades 1 – 4, and 95 – 96% for Grades 6 – 8).

Attendance

In addition to grade retention and MEAP scores, we also examined children's attendance rates. As Table 10 indicates, across all grades, there was no difference in children's attendance rates between the MSRP and No-Program groups. The average attendance rates ranged from 93% to 95% for each group, at each grade. Small differences between the groups (for example the difference between 95.07% attendance rate in Grade 6 for children with MSRP experience and 95.25% for No-Program children) proved to be inconsequential. After controlling for background school and child characteristics, no statistically significant differences in attendance rates between the two groups were found.

Table 10. Observed Attendance Rates by Grade and Group

Year	Group	N	Mean Percentage	Standard Deviation
Grade 6	MSRP	295	95.07	5.076
	No-Program	226	95.25	4.772
Grade 7	MSRP	303	94.51	6.663
	No-Program	224	94.67	6.297
Grade 8	MSRP	298	94.19	7.431
	No-Program	225	93.36	6.832

Course Enrollment

It is useful to examine what types of classes students took in math and science and whether there was an association between participation in MSRP and types and number of classes taken by students. We first present results of descriptive and statistical models for math courses taken for grades 7 and 8 separately. We then analyze science course enrollment. A consistent finding was no direct MSRP versus No-Program group differences, but interactions between student-level characteristics and MSRP attendance that were related to math and science outcomes[10]. Overall, across math and science, the relationship between MSRP attendance and course enrollment was inconsistent.

Math Course Enrollment

In Grade 7, about a half (54.3%) of all children were enrolled in math courses. In Grade 8, enrollment in math courses slightly increased (58.6%). As is evident from the descriptive data in Tables 11 and 12, overall the No-Program group took fewer math courses (3.2% less in Grade 7 and 1.0% less in Grade 8) and the courses they did take were less advanced than those taken by their MSRP peers.

Table 11. The Observed Rates of Math Course Enrollment by Level and Group, Grade 7[11]

		Level of Math Course			
		None Taken	Below grade	On grade	Advanced
No-Program	Count	109		105	13
	%	47.6		45.9	5.7
MSRP	Count	136	8	144	19
	%	44.3	2.6	46.9	6.2

Table 12. The Observed Rates of Math Course Enrollment by Level and Group, Grade 8

		Level of Math Courses			
		None Taken	Below grade	On grade	Advanced
No-Program	Count	96	39	66	28
	%	41.9	17.0	28.8	12.2
MSRP	Count	123	57	77	43
	%	41.0	19.0	25.7	14.3

[10] Tables 42 – 45 provide details for all of the models run that support the findings reported in this section of the text.

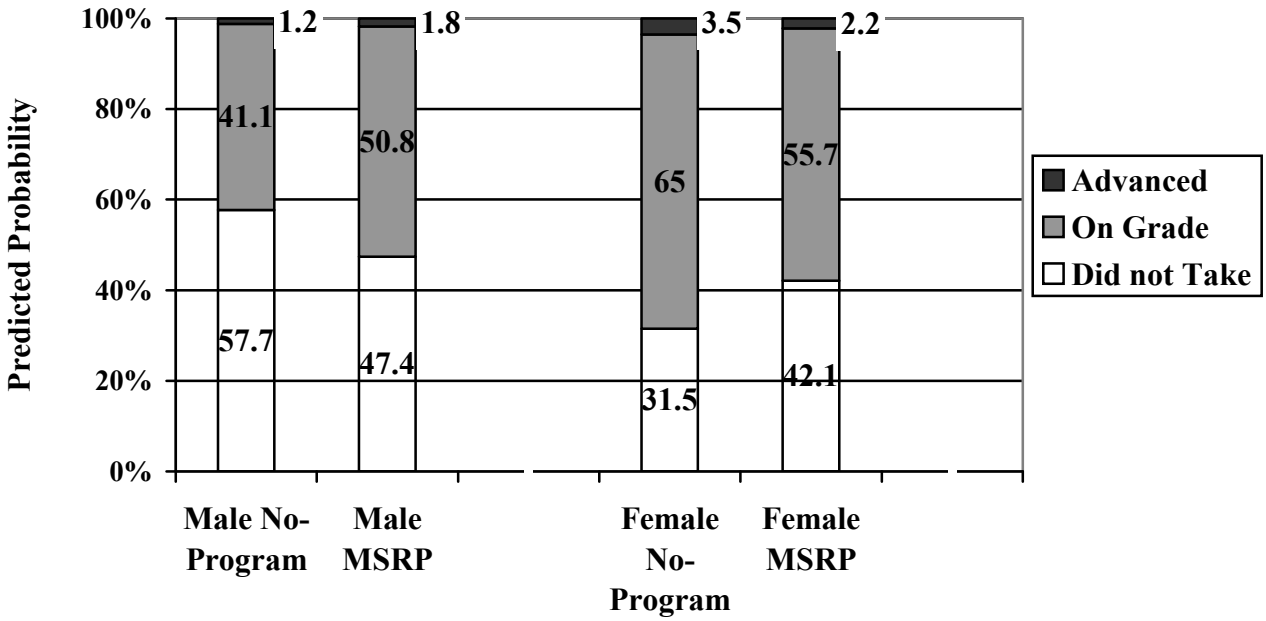
[11] Cells with less than 5 cases are not reported due to confidentiality reasons.

Math Course Enrollment, Grade 7

When we estimated statistical models that predicted the levels of math courses into which students enrolled, adjusting for student-level (i.e., age, gender, ethnicity, receiving free/reduced lunch, mobility) and school-level characteristics (i.e., Education Yes! Preliminary Score, percentage of students on free/reduced lunch, pupil-teacher ratio, locality, and total number of students), we found that gender in combination with group predicted the level of math courses students were enrolled into. Students, who were enrolled in below grade math courses in Grade 7, were not included in these analyses due to low number of students in that category.

Figure 9 below illustrates how MSRP effects differ in male versus female students. More MSRP male graduates were predicted to take a math course than boys in the No-Program group (50.8% in MSRP versus 41.1% in No-Program). MSRP did not just have a positive influence on one group and no effect on another. It appears that attending MSRP actually reduced predicted probabilities of math course enrollment among the female students. Fewer female MSRP students were predicted to enroll in a math course than their No-Program peers (55.7% in MSRP versus 65% in No-Program).

Figure 9.Predicted Probability of Math Course Enrollment by Gender and Group, Grade 7

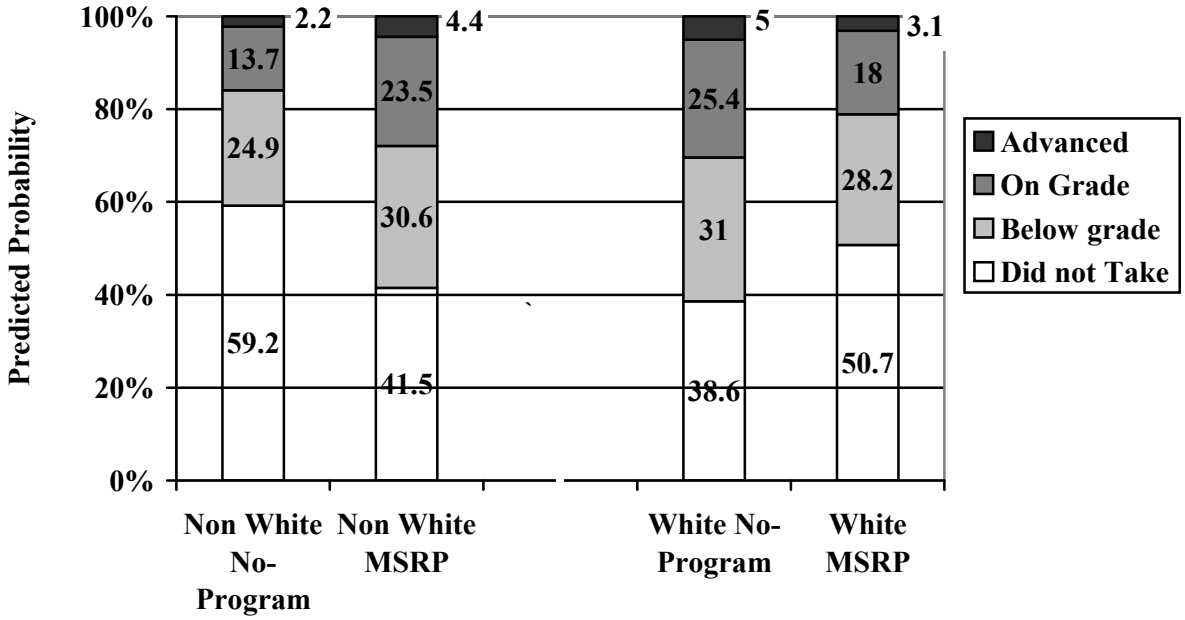


Math Course Enrollment, Grade 8

An interaction between MSRP attendance and ethnicity was found at the eighth grade (it was approaching significance at the seventh grade level). As shown in Figure 10, among the non-white participants, more MSRP students than their counterparts were predicted to take math (i.e., 30.6% versus 24.9% below grade level; 23.5% versus 13.7% on grade level; and 4.4% versus 2.2% at the advanced level). However, among the white students, fewer MSRP students than

their counterparts were predicted to enroll in math courses (i.e., 28.2% versus 31% below grade level; 18 % versus 25.4% on grade level; and 3.1% versus 5% at the advanced level).

Figure 10. Predicted Probability of Math Course Enrollment by Ethnicity and Group, Grade 8



Science Course Enrollment

Science course enrollment data included tracking the number of courses in science into which students were enrolled in Grades 7 and 8. Descriptive information is presented in Tables 13 and 14. Both tables show the number and percentage of children who took 0, 1, 2 or 3 science courses by group. The percentage of participants who took science course was similar to that for math course enrollment in Grade 7. It was 10% higher than that of math enrollment in Grade 8, with most of students taking only one science course.

Table 13. The Number of Science Courses Taken by Group, Grade 7

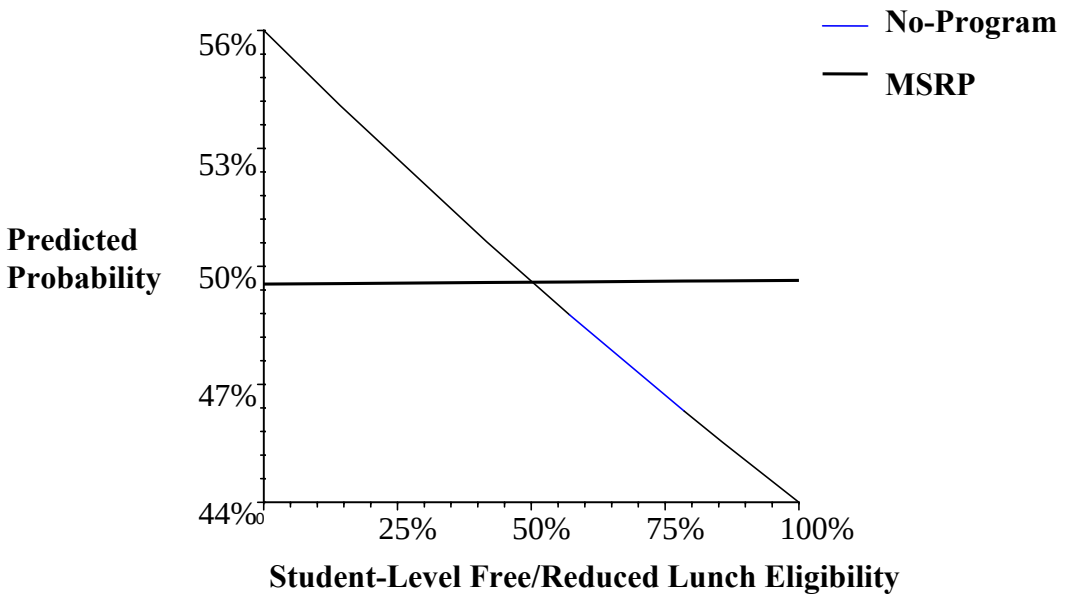
		Number of Science Courses Taken			
		0	1	2	3
No-Program	Count	107	107	14	1
	%	46.7	46.7	6.1	0.4
MSRP	Count	141	153	13	0
	%	45.9	49.8	4.2	0.0

Table 14. The Number of Science Courses Taken by Group, Grade 8

		Number of Science Courses Taken			
		0	1	2	3
No-Program	Count	65	146	17	1
	%	28.4	63.8	7.4	0.4
MSRP	Count	100	184	16	0
	%	33.3	61.3	5.3	0.0

After controlling for student and school level covariates, there was no statistically significant difference between the two groups in eighth grade number of science courses taken. There was an interaction found between group membership and free/reduced lunch eligibility in seventh grade. For seventh graders, science course enrollment for those students who attended MSRP was independent of percentage of time students were eligible for free/reduced lunch. In contrast, for the No-Program group, higher rates of free/reduced lunch receipt lead to significantly less enrollment in science classes. Figure 11 depicts the lack of a relationship between MSRP attendance and the receipt of free/reduced lunch for the science course enrolment by the black solid, horizontal line and the interaction between the receipt of free/reduced lunch and belonging to the No-Program group with a blue slanted line.

Figure 11. Predicted Probability of Science Course Enrollment by Group and Free/Reduced Lunch Eligibility, Grade 7



Special Services Received

Special Education Services

A traditional understanding of the success or failure of an intervention when considering special education assumes that less spending on special education is desirable. Indeed, High/Scope's own longitudinal work points to decreased spending on special education services as a positive result for preschool attendees and society as a whole (e.g., see Schweinhart, et. al., 1993). Yet for MSRP, receipt of special education services must be considered in a slightly different context. Of the 25 risk factors that help qualify a child for MSRP, fully a quarter of them are characteristics that also automatically qualify a child for special education or are critical factors that are highly correlated with a later special need diagnosis. These factors include: low birth weight, developmentally immature, nutritionally deficient, diagnosed handicapping condition, destructive or violent temperament, and language deficiency or immaturity. Built into the MSRP versus No-Program comparison is a selection bias for children in the MSRP group being more likely to require special education services.

Table 15 presents the primary disability for all of the students that received special education program service and/or support services. The distribution of the primary disability was significantly different between the two groups. While most of the participants were defined as learning disabled, the MSRP group had a much higher percentage (70 – 78%) than the No-Program group (48 – 57%). Another difference was that the No-Program group had a relatively higher percentage of speech impairment (14 – 23%), compared to the MSRP group (2%).

Table 15. Observed Primary Disability Rates in Percentage by Grade and Group

Grade	Group	Learning Disabled	Speech Impair.	Cognitive impair.	Emotional impair	Physical Impair.	Other	Stat. Sig.
Grade-6	MSRP	78	2	10	4	6	0	***p* < .05**
	No-Program	53	22	6	11	5	3	
Grade-7	MSRP	77	2	11	5	0	5	***p* < .05**
	No-Program	48	23	6	13	3	7	
Grade-8	MSRP	70	2	13	7	2	6	$p > .05$
	No-Program	57	14	4	14	0	11	

Note. Statistical significance was based on chi square analysis for only those who received special education services. n = 86, 88, 81, for Grade 6, 7, 8 respectively, (MSRP n = 50, 57, 53, No-Program group n =36, 31, 28).

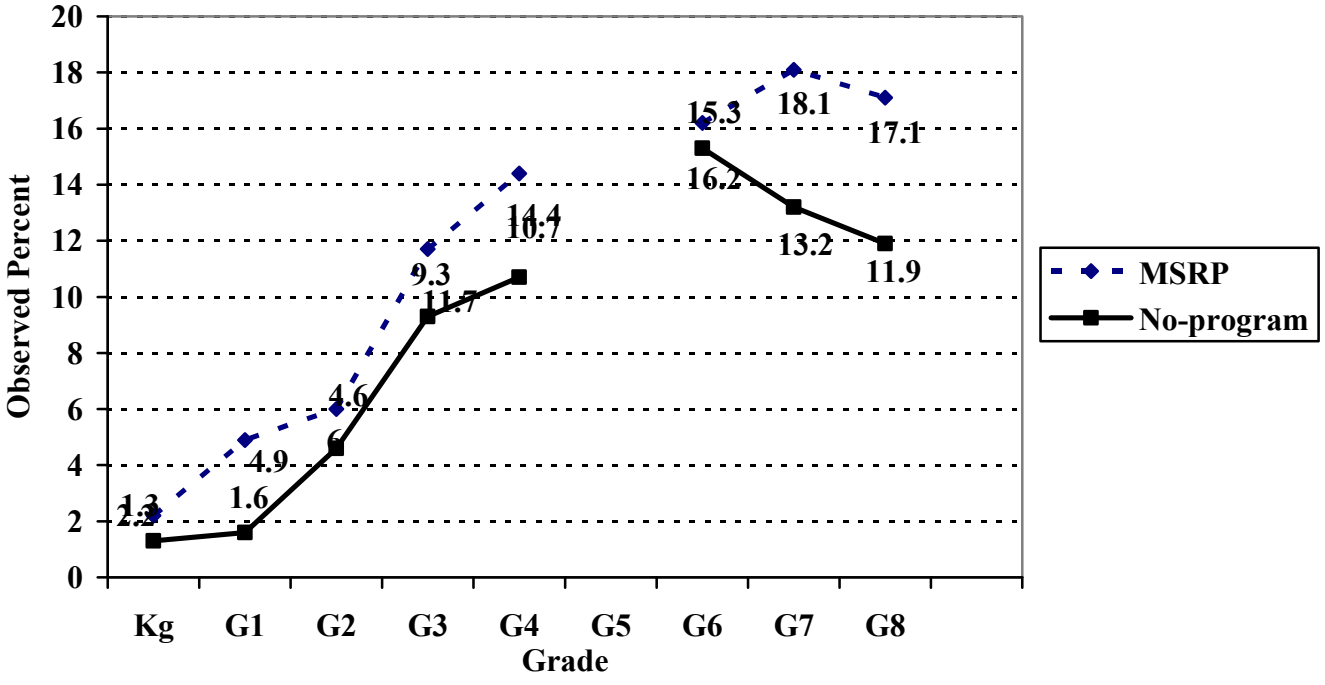
Table 16 shows that overall, students in the MSRP group received consistently more special education services than the No-Program group.

Table 16. Observed Rates of Students Receiving Special Education Services by Grade

		Count (%)
Grade 6	MSRP	49 (16.1)
	No-Program	36 (15.3)
Grade 7	MSRP	55 (17.9)
	No-Program	31 (13.5)
Grade 8	MSRP	52 (17.1)
	No-Program	28 (12.2)

Figure 12 presents the trend of the special education services received from kindergarten through middle school (as with grade retention, unadjusted values are used here). As shown, the rate for receiving special education services increased with time for both groups, with a large leap between second and third grade. The MSRP group maintained a slightly higher rate than the No-Program group from kindergarten through Grade 6. The gap became wider in Grades 7 and 8. During that time, the MSRP group's rate increased and then slightly decreased, while the No-Program group's rate has been decreasing all through middle school.

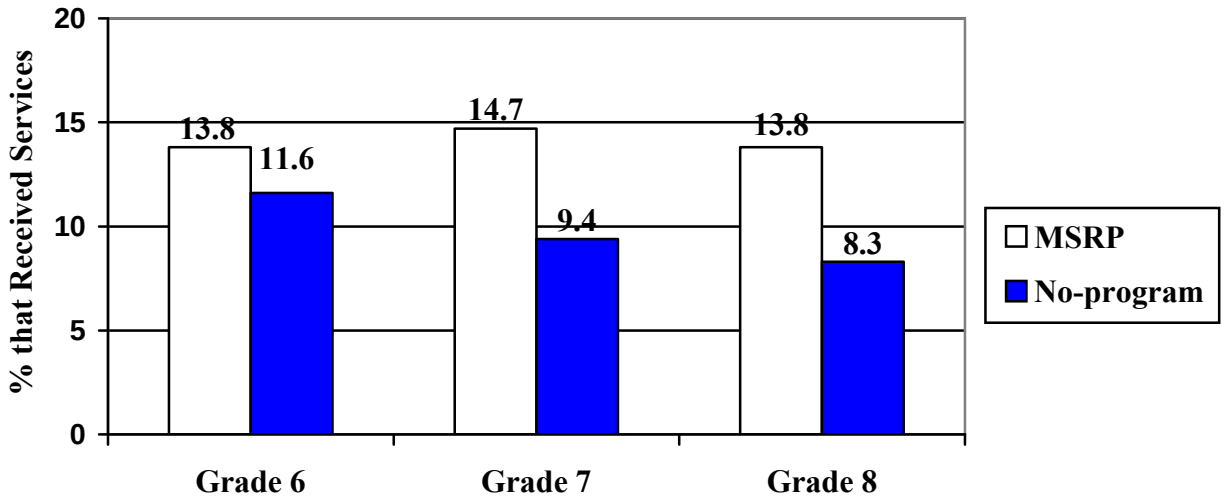
Figure 12. Observed Rates of Special Education Services Received, K – Grade 8



Note: the rates for Grades 1 through 4 were based on the sample sizes between 418 and 454, about 70-76% of the entire sample, while the rates for kindergarten and Grades 6 through 8 were based on 91-92% of the entire sample.

When we examined statistical models that adjusted for background student and school characteristics, no statistically significant group differences were found for the rate of special education services received for sixth graders, a nearly significant difference between groups was found for seventh graders, and that difference between groups became significant at eighth grade. Figure 13, depicts the size of the group differences. In each year, the No-Program group received fewer special education services than the MSRP group.

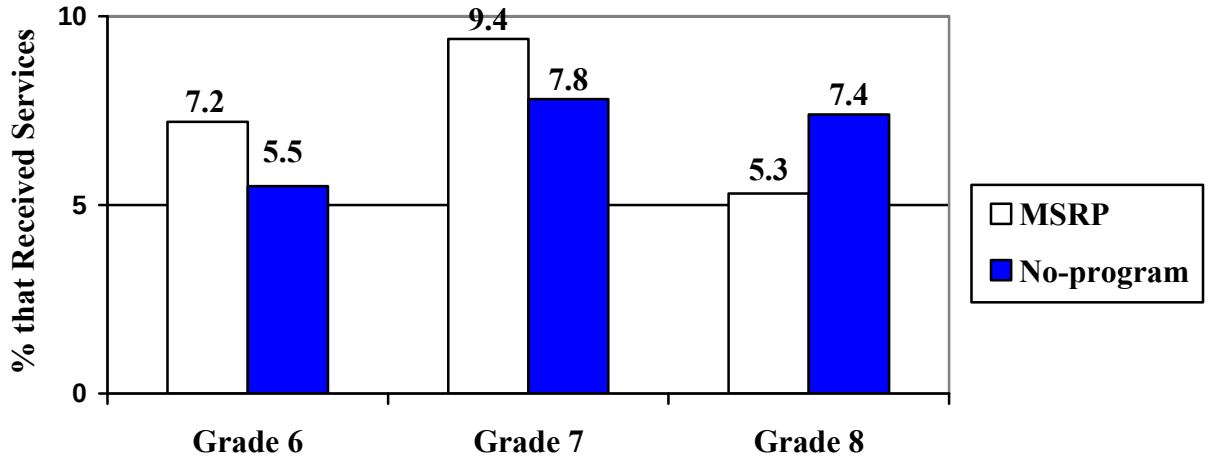
Figure 13. Observed Rates of Special Education Services Received by Group and Grade



Title 1 Services

Figure 14 presents the observed rates of students in targeted assistance school programs receiving Title I instructional services (e.g., instructions in reading, ESL, math, and science), and/or Title I support services (e.g., counseling, social work and health services) in whole or in part with Title I funds.

Figure 14. Observed Rates of Title 1 Services Received by Group and Grade



In general, the percentage of Title 1 services received was higher in Grade 7 than Grade 6 for both groups of children (2.2% higher for MSRP children and 2.5% higher for No-Program children). By Grade 8, 4.1% fewer children were receiving Title 1 services in the MSRP group while .4% less children were receiving Title 1 services in the No-Program group. When we controlled for student and school-level characteristics, these differences were less pronounced and statistically insignificant[12]. Overall, we found no differences in Title 1 services received in Grades 6-8.

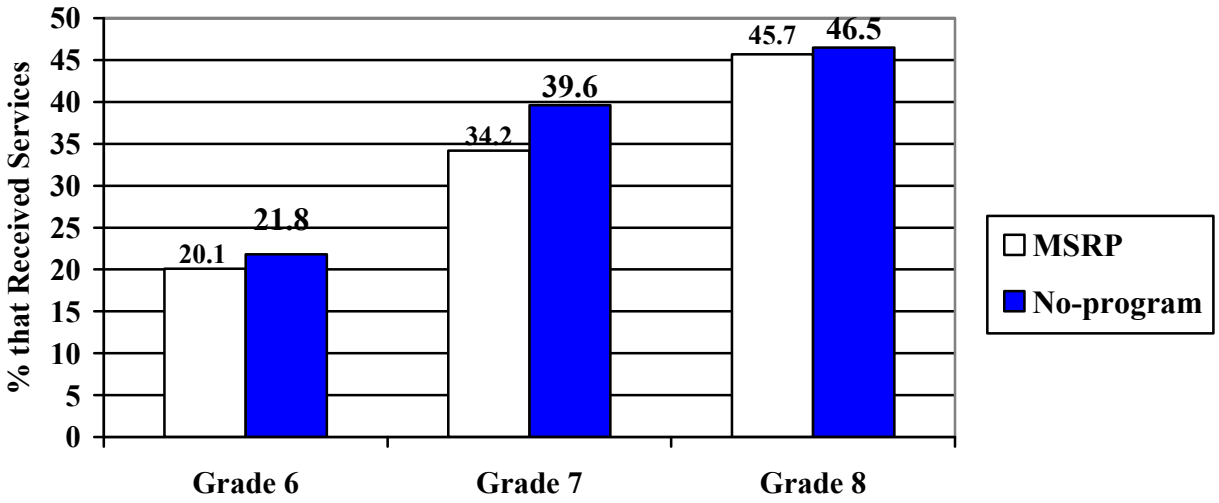
At-Risk Services

Finally, Figure 15 shows results for differences in percentages of children who received at-risk services. Students who qualify to receive at-risk services are those who receive State School Aid Act section 388.1631a funds. Such services usually include instructional services in different subjects, extended or summer programs, and support services covering a broad range of benefits, such as breakfast program, behavior training, mental health, and home/school liaison services. It is worth noting that the percentage of participants receiving at-risk services increased substantially each year from 20% at Grade 6 to 46% at Grade 8. Estimates from a series of statistical models that controlled for child and school characteristics found no statistically significant differences between the MSRP and No-Program groups[13].

[12] The detailed tables with results of those analyses are displayed in Appendix B, Tables 42 – 44.

[13] See Appendix B, Tables 45 – 47 for details.

Figure 15. Observed Rates of At-Risk Services Received by Group and Grade



IV. Summary

This study examined how participation in MSRP was related to middle school outcomes. Specifically, five outcomes of interest were investigated: 7th grade MEAP scores, grade retention measured at the end of Grades 6-8, school attendance measured at the end of Grades 6-8, course enrollment for math and science courses (Grades 7 and 8), and special education services received measured at the end of Grades 6-8. Findings for each outcome are summarized below.

MEAP, Grade 7

- With regards to the 7th grade MEAP scores, there were no statistically significant differences found between students who attended MSRP and those who did not.
- When time of taking the MEAP test was analyzed (MEAP taken at the appropriate grade level or not), it was found that MSRP graduates were more likely to have taken the MEAP on time - that is, at their grade level. A predicted probability of taking MEAP at the grade level was higher for MSRP graduates (87.7%) than children in the No-Program group (81.7%) when adjusted for all covariates.

Grade Retention

Overall, significant decreases in grade retention rates for MSRP graduates were found both in earlier reports and in this study (Xiang & Schweinhart, 2002). The same trend of having a lower rate of being retained was still evident in these data for the MSRP group.

- MSRP attendance was associated with a decreased likelihood of MSRP graduates being retained in Grades 6, 7 and 8. The odds of MSRP children being retained in Grade 6, for example, were .639 – that is, 36.1% less than the odds of retention of otherwise-similar students who did not attend MSRP even after controlling for student and school characteristics.
- Additionally in 7th grade, attending MSRP significantly reduced (by 18.7%) the likelihood of being retained for children of color while having no similar effect among white MSRP graduates. Similarly, in 8th grade there was a significant difference between non-white children (MSRP attendees having lower rates of retention by 21%) but no similar effect for white children (i.e., attending MSRP made no difference in whether or not a white child was retained in 8th grade).
- Finally, in 8th grade there was a statistically significant difference in favor of the MSRP group among boys but not girls. That is, the boys who attended MSRP were less likely to be retained than the boys who did not.

Attendance

There were no differences found in school attendance rates between the MSRP and No-Program groups.

Course Enrollment

The analyses of math and science course enrollment revealed several interactions between individual child characteristics and participation in MSRP. Overall, the relationship between MSRP attendance and course enrollment was inconsistent.

- In 7th grade, boys who attended MSRP were more likely to take more math courses than boys in the No-Program group. Counter intuitively, it appears that participating in MSRP actually decreased the number of math courses taken by girls.
- In addition, in 8th grade, non white children who attended MSRP took more math courses than their non white peers in the No-Program group. As with math enrollment data in Grade 7, MSRP attendance was associated with lower math course enrollment for white students in Grade 8.
- While there was no difference between the MSRP and No-Program groups in the number of science courses taken, children who were in the No-Program group who also had a high rate of receiving free/reduced lunch tended to take significantly fewer science classes (Grade 7).

It is unclear why attending MSRP would have a negative influence on math course enrollment for white children and girls. It is unlikely that the content and teaching practices in the program were intentionally structured to have this effect. Interpreting the findings that suggest that MSRP has more long-term benefits for children of color than white children also demands further consideration. It is a finding that also appears in studies of the short-term impacts of state-funded preschool initiatives (e.g., Browning et. al., 2006). What is it about these populations of children, the MSRP program, and the social and educational contexts they share that lead to better outcomes for some and poorer ones for others?

Special Services Received

- There were no group differences detected for Title I or At-Risk services received.
- Analyses did show that MSRP graduates tended to receive more special education services than the N-program group in both 7th and 8th grade. While at first glance this seems like another counterintuitive finding, it is not as worrisome as those reported for math course enrollment. In the case of special education, it is one of the 25 risk factors that qualify a child for MSRP. Serving children with special needs and connecting them to services is part of the MSRP mission.

Limitations

The context needed to understand group differences in the receipt of special education services has implications for all of the findings presented in this report. Although no group difference was detected in any of the student-level covariates included in these analyses and in the original

Cohort 1 work, most of the 25 MSRP eligibility risk factors were not included in that study. That is, they were not used as covariates, nor was there an effort to match MSRP and No-Program group students on them when the work first began in 1995.

MSRP children in our study had an average of 3.9 risk factors, with 25% of them having experienced 5 or more of the 25 qualifying factors. There is no data available on the number of risk factors experienced by the No-Program group. Without that information, we can not be sure that there were not significant differences between the MSRP and No-Program group. Based on the different recruitment criterion and the analyses performed with risk factors for the program group, it may be that the MSRP group had more risk factors and/or systematically experienced different types of risk than their No-Program counterparts. These possible differences may have shaped the results presented here. Developing a matched control group using propensity score analyses might be a useful future direction to further understand the effect of the MSRP on short and long-term child outcomes.

Conclusions

For more than 10 years, from kindergarten to 8th grade, various aspects of the MSRP program have been evaluated by comparing a group of 1995-1996 MSRP participants to a group of matched No-Program group of students. The results of the current study provide strong evidence of a significant relationship between MSRP attendance and participants' lower grade retention rates and, related, having more MSRP graduates take MEAP at the appropriate grade level. Inconsistent results were found for course enrollment. Differences in MEAP (Grade 7), attendance, Title 1, and at-risk services received were not prominent. Finally, consistent with previous evaluation findings, MSRP graduates continued to receive significantly higher number of special education services throughout middle school.

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Appendix A

Table 17. Outcome Variables and Their Operational Definitions

Category	Variable	Operational Definitions
Grade Retention	Grade level	• Grade level the student was enrolled in for grades 6,7, and 8
	Grade retention	• Ever held back in grade for grades 6, 7, and 8. Participants with previous retention record were coded as 'yes' at the time of reporting. Those who had missing data between years but no retention record before, and were at the expected grade at the later time of reporting were coded as 'no' for the missing year(s). Dropouts were coded as 'yes'.
School Attendance	Attendance rate	• Actual attendance days/scheduled attendance days, for grades 6, 7, and 8. Students whose scheduled attendance days were smaller than 70 days/year for grades 6 and 7, or 50 days/year for grade 8 were coded as missing.
Course Enrollments	Math	• Whether enrolled in any math course and the enrolled level (not enrolled, below grade, on-grade, and above grade) for grade 7 and 8, based on the later wave's data of the school year. If enrolled in two different levels of math courses, only the higher level was counted.
	Science	• Whether enrolled in science courses and the number of enrolled courses (0, 1, 2-3) for grade 7 and 8 (based on the later wave's data of the school year).
Special Education	Special education services received	• Dummy variable to indicate program service or/and support services was received
	Title I services received	• Dummy variable indicating Title I instructional services or/and Title I support services was received
	At-Risk student services received	• Dummy variable indicating At-Risk instructional services or/and At-Risk support services received (Based on the spring data for grade 6 as no end-of-year data were available.)
	At-Risk student services received	• Dummy variable indicating At-Risk instructional services or/and At-Risk support services received (Based on the spring data for grade 6, end of year data for grades 7 and 8)

Table 18. Student-Level Variables Employed From the Single Record Student Database and Their Operational Definitions

Variable	Operational Definitions
Ethnicity	• White, Black, Hispanic, American Indian, Asian/Pacific, or biracial • White and Non-white (as a covariate).
Free/reduced lunch eligibility	• Percentage of time enrolled in free/reduced lunch programs across the number of times data were available
Age	• Age in months
Gender	• Males were coded as 0 and females as 1
Mobility	• The number of times a child moved from school to school from the 6^{th} to the 8^{th} grade

Table 19. School-Level Variables Employed From the Single Record Student Database and Their Operational Definition

Variable	Operational Definition
Free/Reduced Lunch Eligibility	• the total count of students eligible to participate in Free Lunch and Reduced Lunch programs under the National School Lunch Act averaged across grades 6, 7, 8
Number of Students	• the total number of students averaged across grades 6, 7, 8 in the school: the reported total membership of the school
Pupil-Teacher Ratio	• the total reported number of students divided by full-time equivalent classroom teachers averaged across grades 6, 7, 8. Reported to the nearest tenth
Locale	• location of the school relative to populous areas (urban, suburban, rural). Three dummy variables were created. • Schools in urban locations vs. schools in suburban and rural areas combined • Schools in suburban locations vs. schools in urban and rural areas combined • Schools in rural locations vs. schools in urban and suburban areas combined
Education Yes! Preliminary Score	• A scaled score for each school that measures both student academic achievement and school performance (with 100 as the maximum)

Procedures to Minimize Missing Data

Missing data were handled at both student- and school-levels. Children who were not matched in the CEPI database were excluded from the sample and were not included in the missing data procedures described below.

Child-Level Data

Since HLM allows missing data at level-1, outcome variable or covariate imputations were only attempted for “Free/reduced lunch eligibility” and “Grade level” variables. For “Free/reduced

lunch eligibility" variable, we had missing data for 6 children from 3 school districts. The results of the ANOVA indicated that school districts were statistically different in their means on free/reduced lunch eligibility ($p<.01$). Therefore, values were imputed based on the mean free lunch eligibility for a given school district.

For the "Grade Level" variable, when the end of the year or spring data were missing on that variable, a corresponding value was assigned if the following years' data indicated no delay. For example, grade-6 year's missing value was replaced with '6' if grade-7 year's data was '7'; but remained missing if grade-7 year's data was '6'. The 4 participants enrolled in ungraded settings in grade-8 year were assigned to a specific grade based on the student's age which is based on the State Board policy, the No Child Left Behind Act, and the Individuals with Disabilities Education Act regulations. Participants who had been reported as dropped out and were missing since then were coded as '0' for the missing years.

School-Level Data

Since HLM does not allow missing values for higher levels of data, we imputed these missing values using the methods described below (with regression imputation being the primary method). We had 13 missing values for the "Pupil-Teacher Ratio" variable (at the school level), 11 missing values for the "Free/Reduced Lunch" variable (at the school level), and 35 variables for the Education Yes! Preliminary Score.

Pupil Teacher Ratio

We had 13 missing cases for the "Pupil-Teacher Ratio" variable. We first examined correlations between variables of interest at the school level (see Table 22). The following procedures were then applied:

- We examined to which school districts missing schools belonged. A group of 7 missing schools were from a particular school district. We calculated a correlation between pupil-teacher ratio and the total number of students within that district based on the information from 67 other schools in our sample ($r=.33$, $p<.01$).
- For a group of 3 schools, information on pupil-teacher ratio was known for other schools in the same school district. We then imputed the ratio based on the mean pupil-teacher ratio for the other schools in the same school district.
- For a second group of 3 schools (given there were no other schools from those 2 corresponding school districts), we calculated the pupil-teacher ratio based on the mean of pupil-teacher ratio for a specific locality. In these data, pupil-teacher ratio for urban schools was used (correlation of locale with pupil teacher-ratio, $r=.15$, $p<.01$).

Percentage of Students on Free/Reduced Lunch

We had 11 missing cases on the "Percentage of Students on Free/Reduced Lunch" variable in these data. The following procedures were then applied:

- We first examined the range of scores on the "Percentage of Students on Free/Reduced Lunch" variable for schools within a given school district. For 2 schools, we used a district mean for the free/reduced lunch variable given that there was little variation on the free/reduced lunch means for schools within a given district.

- For 1 school (there were 11 schools in that school district with complete data), the percentage of students on free/reduced lunch varied considerably. Given a high correlation of the pupil-teacher ratio and the percentage of students on free/reduced lunch (r=.68, p<.05), we ran a linear regression analysis predicting percentage of students for free/reduced lunch from the pupil-teacher ratio. Based on that regression equation, we imputed the percentage of students on free/reduced lunch score for this school.
- For 8 schools that had missing data on this variable, we calculated percentage of students for free-reduced lunch based on the average percentage of the pupil-teacher ratio for a specific locality. For example, for schools that were urban the percentage of the pupil-teacher ratio for urban schools was used (correlation of locale with percentage of students on free/reduced lunch, r=.41, p<.01).

Education Yes! Preliminary Score

We had 35 missing data points on the Education Yes! Preliminary score. Given a high correlation of the Education Yes! Preliminary Score and the percentage of students on free/reduced lunch (see Table 22, r=.655, p<.01), we ran a linear regression analysis predicting Education Yes! Preliminary Score from percentage of students on free/reduced lunch. Based on regression equation, we imputed the Education Yes! Preliminary Scores that were missing.

Correlations between variables before and after imputation are provided in Tables 20 and 21.

Table 20. Correlations Between School Performance and Other School Variables Before Imputation

Subscale	1	2	3	4	5
1. School Performance	--				
2. Urban	-.390**	--			
3. % of free/reduced lunch	-.655**	.419**	--		
4. Pupil-teacher ratio	-.063	.154**	.051*	--	
5. Total students enrolled	-.050	.196**	-.175**	.426**	--

*Note.*** p<0.01, * p<0.05

Table 21. Correlations Between School Performance and Other School Variables After Imputation

Subscale	1	2	3	4	5
1. School Performance	--				
2. Urban	-.389**				
3. % of free/reduced lunch	-.682**	.413**			
4. Pupil-teacher ratio	-.127*	.204**	.166**		
5. Total students enrolled	-.017	.217**	-.148**	.334**	--

Note. ** p<0.01, * p<0.05

Appendix B

The primary methodological approach used in the MSRP 6 to 8 Follow Up Study was hierarchical linear modeling (Bryk & Raudenbush, 1992). This approach includes student characteristics at level 1 and school characteristics at level 2. Educational data is hierarchical by nature: students belong to classes that are then grouped into schools; schools make up the school districts, etc. Each of the levels can contribute to the lower level of data and, therefore, characteristics of each level are not independent – students in a first grade classroom in school A in a given school district, for example, are more similar to each other than first-grade students in a different class in school B in another school district. When student outcome data are nested within schools, and are therefore hierarchical, it is possible to differentiate between student effects and school effects by accounting for such differences.

Given that some of the decisions (e.g., grade retention) are typically made at the classroom/school level and some of the differences between the experimental and control groups are attributed to school variability, we examined the school system's influence on middle school outcomes and identified characteristics at the school level that could significantly predict children's functioning.

The goal of the 6-8 Longitudinal Follow Up study was to examine students' outcomes (e.g., MEAP achievement data, grade retention) for 2 groups of students (MSRP or No-Program) controlling for the effects of student and school characteristics. Two types of analyses were utilized in this report. Across all of the analyses, we first provided descriptive statistics to analyze middle school outcomes and their relationship to attending/participating in MSRP. We then tested a series of hierarchical two-level models that examined the relationship between MSRP participation and middle school outcomes controlling for variables both at the student and school levels. When results are presented, we talk about 'adjusted models" and "estimates adjusted for covariates" indicating that the reported observed differences between the two groups have taken into account both student and school level characteristics that may also have (in addition to MSRP attendance) an influence on the outcomes of interest.

Below we present the logic of the analysis plan for the statistical models that we examined. We started with a simple statistical model with no predictors in the equation. Such models are called unconditional (as opposed to conditional models that add predictors either at level 1 or higher levels). They were run first to examine the amount of variability in the outcomes that existed between and within schools. We then ran conditional models to regress student and school characteristics on different outcomes of interest. The variation in the student-level outcomes within schools were modeled at level 1; the variation in the effects of the student-level predictors across schools were modeled at level 2. If no significant variations were found for predictors across schools, we modeled them at level 2 as fixed, thereby restricting them to be constant across schools. Further, school characteristics were included in the models next in order to explain differences among schools. Therefore, we estimate the influence of school-level predictors on between-school variability.

A series of models increasing in complexity were tested to select the most parsimonious ones (i.e., that described the data well). All student-level characteristics were centered at the grand mean to produce an adjusted mean and slope for each school. All school-level covariates were grand mean centered. The same covariates mentioned at the beginning of this report were used across all analyses. When binary data were analyzed (i.e., retention rates), the Bernoulli model was used. For math course enrollment data, an ordinal model with 4 possible outcomes was utilized. For count variables (such as days of attendance or the number of science classes enrolled into), we used Poisson model. Due to some missing values, there were slight variations in the sample sizes for different middle school outcomes.

Correlations between variables and parameter estimates for all models are presented below.

Table 22. Correlations Between School Variables for the Full Sample

Subscale	1	2	3	4	5	6	7
1. Education Yes! Preliminary Score	--						
2. % of Students on Free/Reduced Lunch	-.685**	--					
3. Pupil-teacher Ratio	-.081	.085	--				
4. Urban School	-.404**	.425**	.167**	--			
5. Suburban School	.238**	-.255**	-.101	-.644**	--		
6. Rural School	.252**	-.259**	-.101	-.564**	-.269**	--	
7. Total N of Students	-.016	-.157**	.417**	.196**	-.073	-.169**	--

Schools that have a higher Education Yes! Preliminary Score are also associated with:

- lower percentage of students on free/reduced lunch
- being located more often in suburban or rural areas
- the total number of students in a school and pupil-teacher ratio were not related to the Education Yes! Preliminary Score.

Larger schools in our sample were also associated with:

- Lower percentage of students on free/reduced lunch
- Higher student/teacher ratios
- Larger schools were also located in urban areas

Schools with larger percentage of students on free/reduced lunch were also reported:

- To have lower Education Yes! Preliminary Score than schools with lower percentage of students on free/reduced lunch]
- To be located more in urban areas
- To have an overall smaller total number of students in a school.

Table 23. Correlations Between Child-level Variables for the MEAP Analyses

Subscale	1	2	3	4	5	6	7	8	9	10
1. Reading Scaled Score 2004	--									
2. Eng. Language Arts	.966**	--								
3. Writing Achievement 2004	.411**	.633**	--							
4. Group	.001	.011	.026	--						
5. Age	.094*	.101*	.065	.018	--					
6. Gender	.126**	.184**	.273**	.008	-.026	--				
7. White	.069	.058	.010	-.009	-.033	-.039	--			
8. % of time on Free/reduced Lunch Program (7 waves)	-.241**	-.242**	-.135**	-.054	-.078	.077	-.151**	--		
9. Test Cycle for 7th Grade	-.110*	-.130**	-.123**	-.094*	-.200**	-.089*	-.028	.094*	--	
10. Mobile	-.201**	-.195**	-.090*	-.028	-.152**	.002	-.066	.083	.312**	--

Note. ** p<0.01. * p<0.05.

Table 24. Correlations Between School-level Variables for the MEAP Analyses

Subscale	1	2	3	4	5	6	7	8
1. Reading Achievement 2004	--							
2. Eng. Language Arts	.964**	--						
3. Writing Achievement 2004	.454**	.675**	--					
4. Education Yes! Preliminary Score	.305**	.334**	.285**	--				
5. School % of Students on Free/reduced Lunch	-.269**	-.300**	-.266**	-.769**	--			
6. Pupil-teacher Ratio	-.068	-.088	-.120	-.305**	.262**	--		
7. School in Urban Area	-.106	-.123	-.126	-.435**	-.413**	.314**	--	
8. School Total N of Students	.029	.033	.007	-.114	-.050	.460**	.394**	--

Note. ** p<0.01. * p<0.05.

Table 25. Hierarchical Linear Model Estimates For MEAP Reading, Grade 7

Fixed Effects	Coefficient	SE	t
Intercept	533.777	2.156	247.561**
Group	-4.036	4.938	-.817
Age	0.608	.512	1.186
Gender	12.579	4.615	2.726**
Ethnicity	1.282	4.357	.294
Free/Reduced Lunch Eligibility	-29.000	5.619	-5.161**
Mobility	-9.550	2.738	-3.489**

Random Effects	Variance Component	df	X^2	p-value
Variance in school means	35.382	162	153.326	>.50
Variance within schools	2113.978			

Note: ** p<0.01. * p<0.05.

Table 26. Hierarchical Linear Model Estimates For MEAP, Writing, Grade 7

Fixed Effects	Coefficient	SE	t
Intercept			
Intercept	521.951	.853	611.900**
Education Yes! Preliminary Score	0.357	2.250	0.081*
Group	1.444	1.588	.91
Age	0.226	.196	1.151
Gender	9.037	1.363	6.628**
Ethnicity	-1.113	1.1551	-.717
Free/Reduced Lunch Eligibility	-4.559	1.908	-2.389*
Mobility	-9.988	.813	-1.266

Random Effects	Variance Component	df	X^2	p-value
Variance in school means	20.996	163	211.96	0.006**
Variance within schools	217.081			

Note. ** p<0.01. * p<0.05.

Table 27. Hierarchical Linear Model Estimates For MEAP, English Language Arts, Grade 7

Fixed Effects	Coefficient	SE	t
Intercept	527.821	1.259	419.100**
Group	-1.124	2.994	-0.375
Age	0.412	.326	1.265
Gender	11.072	2.685	4.123**
Ethnicity	.403	2.560	.157
Free/Reduced Lunch Eligibility	-17.458	3.427	-5.094**
Mobility	-5.399	1.567	-3.445**

Random Effects	Variance Component	df	X^2	p-value
Variance in school means	11.455	162	160.180	>.50
Variance within schools	720.332			

Note. ** p<0.01. * p<0.05.

Table 28.Hierarchical Linear Model Estimates For MEAP Taken on Time, English Language Arts, Grade 7

Fixed Effects	Coefficient	SE	Odds Ratio	t
Intercept	1.498	.172	4.473	8.700**
Group	.469	.233	1.584	2.014*
Age	0.143	.043	1.154	3.350**
Gender	.634	.238	1.885	2.658*
Ethnicity	.040	.244	1.041	.164
Free/Reduced Lunch Eligibility	-.450	.304	.638	-1.478
Mobility	-.777	.174	.460	-4.463**

Random Effects	Variance Component	df	X^2	p-value
Variance in school means	.690	163	174.002	>.05

Note. ** p<0.01. * p<0.05.

Table 29. Hierarchical Linear Model Estimates For Grade Retention, Grade 6

Fixed Effects	Coefficient	SE	Odds Ratio[14]	t-ratio
Intercept				
Intercept	-1.193	.184	.303	-6.489**
Rural	.615	.357	1.850	1.724
Percentage of Free/Reduced Lunch Eligible Students	1.657	.704	5.244	2.353*
Group	-.447	.217	.639	-2.066*
Age	-.099	.031	.905	-3.241*
Gender	-.651	.217	.522	-2.996**
Ethnicity	-.042	.256	.959	-.164
Free/Reduced Lunch Eligibility	.271	.288	1.312	.939
Random Effects	**Variance Component**	**df**	**X^2**	**p-value**
Variance in school means	.086	196	236.96	0.024*

Note. ** p<0.01. * p<0.05.

[14] On the interpretation of odds ratio. Odds ratio takes a value between 0 and infinity. An odds ratio of 1 means there is no difference between the groups being compared. An odds ratio higher than 1 means that a condition or an event is more likely to occur in a particular group holding the values of the other covariates constant. An odds ratio less than 1 indicates that the condition or event is less likely to occur in one group compared to the other group. For example, an odds ratio of .639 in Table 29 indicates a 36.1% reduction in odds of being retained for children who attended MSRP compared to the No-Program group.

Table 30. Hierarchical Linear Model Estimates For Grade Retention, Grade 7

Fixed Effects	Coefficient	SE	Odds	t-ratio
Intercept				
Intercept	-.761	.233	.467	-3.266**
Rural	.659	.338	1.933	1.950
Percentage of Free/Reduced Lunch Eligible Students	1.588	.613	4.892	2.588*
Group	-1.122	.333	.326	-3.372**
Group by Ethnicity	1.102	.416	3.010	2.647*
Age	-.131	.032	.877	-4.091**
Gender	-.800	.174	.450	-4.596**
Ethnicity	-.608	.302	.545	-2.011*
Free/Reduced Lunch Eligibility	.276	.251	1.318	1.099
Random Effects	**Variance Component**	**df**	**X^2**	**p-value**
Variance in school means	1.095	190	236.42	0.012*

Note. ** p<0.01. * p<0.05.

Table 31. Hierarchical Linear Model Estimates For Grade Retention, Grade 8

Fixed Effects	Coefficient	SE	Odds	t-ratio
Intercept				
Intercept	-.150	.293	.861	-.511
Rural	.754	.341	2.126	2.210*
Percentage of Free/Reduced Lunch Eligible Students	1.168	.600	3.216	1.948 (p=.05)
Group	-1.632	.389	.200	-4.199**
Group by Gender	.757	.361	2.133	2.095*
Group by Ethnicity	1.242	.418	3.463	2.970*
Age	-.133	.033	.875	-4.041**
Gender	-1.128	.272	.324	-4.141**
Ethnicity	-.649	.315	.522	-2.060*
Free/Reduced Lunch Eligibility	.218	.262	1.244	.834
Random Effects	**Variance Component**	**df**	**X^2**	**p-value**
Variance in school means	.944	186	228.704	0.018

Note. ** p<0.01. * p<0.05.

Table 32. Hierarchical Linear Model Estimates For Attendance, Grade 6

Fixed Effects	Coefficient	SE	t	Event Rate Ratio
Intercept	4.558	0.003	1437.440**	95.381
Group	-0.004	0.004	-0.975	0.996
Age	-0.001	0.001	-0.837	0.999
Gender	-0.015	0.004	3.358**	1.015
Ethnicity	-0.002	0.004	-0.436	0.998
Free/Reduced Lunch Eligibility	-0.029	0.005	-6.113**	0.972
Mobility	-0.009	0.003	-3.650**	0.991

Note. **p<0.01. *p<0.05.

Table 33. Hierarchical Linear Model Estimates For Attendance, Grade 7

Fixed Effects	Coefficient	SE	t	Event Rate Ratio
Intercept	4.551	0.005	1011.232**	94.762
Group	-0.003	0.006	-0.609	0.997
Age	-0.001	0.001	-1.036	0.999
Gender	0.010	0.004	2.409*	1.010
Ethnicity	-0.009	0.007	-1.392	0.991
Free/Reduced Lunch Eligibility	-0.018	0.010	-1.899	0.982
Mobility	-0.013	0.004	-3.404**	0.988

Note. **p<0.01. *p<0.05.

Table 34. Hierarchical Linear Model Estimates For Attendance, Grade 8

Fixed Effects	Coefficient	SE	t	Event Rate Ratio
Intercept	4.537	0.005	938.256**	93.451
Group	0.007	0.006	1.060	1.007
Age	-0.001	0.001	-0.979	0.999
Gender	0.005	0.007	0.790	1.005
Ethnicity	-0.003	0.008	-0.404	0.997
Free/Reduced Lunch Eligibility	-0.022	0.009	-2.403*	0.978
Mobility	-0.019	0.005	-3.923**	0.981

Note. **p<0.01. *p<0.05.

Table 35. Hierarchical Linear Model Estimates For Math Course Enrollment, Grade 7[15]

Fixed Effects	Coefficient	SE	t	Odds Ratio
Intercept				
Intercept	3.112	1.151	2.702*	22.457
Pupil-teacher Ratio	0.128	0.059	2.150*	1.136
Group	-0.416	0.338	-1.229	0.660
Group by Gender Interaction	0.873	0.411	2.124*	2.394
Age	-0.090	0.036	-2.471*	0.914
Gender	-1.085	0.281	-3.860**	0.338
Ethnicity	0.031	0.261	0.119	1.032
Free/Reduced Lunch Eligibility	0.734	0.246	2.986*	2.083
Mobility	0.723	0.187	3.876**	2.061
d(1)	4.099	0.349	11.750**	60.265

Random Effects	Variance Component	df	X^2	p-value
Variance in school means	4.364	182	469.748	0.001**

Note. ** p<0.01. * p<0.05.

[15] Students, who were enrolled in below grade math courses in Grade 7, were not included in these analyses due to low number of students in the "Below math grade" category.

Table 36. Hierarchical Linear Model Estimates For Math Course Enrollment, Grade 8

Fixed Effects	**Coefficient**	**SE**	**t**	**Odds Ratio**
Intercept				
Intercept	0.372	0.302	1.233	1.451
Pupil-teacher Ratio	0.144	0.046	3.098**	1.155
Percentage of Free/Reduced Lunch Eligible Students	1.499	0.773	1.939	4.476
Group	-0.717	0.296	-2.421*	0.488
Group by Ethnicity Interaction	1.211	0.375	3.231**	3.357
Age	-0.056	0.030	-1.896	0.945
Gender	-0.451	0.179	-2.522*	0.637
Ethnicity	-0.838	0.322	-2.604**	0.433
Free/Reduced Lunch Eligibility	0.449	0.210	2.134*	1.566
Mobility	0.491	0.172	2.847**	1.634
d(1)	1.294	0.229	5.650**	3.649
d(2)	3.413	0.369	9.241**	30.365

Random Effects	**Variance Component**	**df**	**X^2**	**p-value**
Variance in school means	3.251	180	544.379	>0.001**

Note. ** p<0.01. * p<0.05.

Table 37. Hierarchical Linear Model Estimates For Science Course Enrollment, Grade 7

Fixed Effects	Coefficient	SE	t	Event Rate Ratio
Intercept				
Intercept	-0.528	.094	-5.629**	0.590
Education Yes! Preliminary Score	-0.026	0.011	-2.287*	0.975
Group	-0.137	0.085	-1.611	0.872
Age	0.027	0.008	3.212**	1.027
Group by Lunch Interaction	0.277	0.125	2.219*	1.319
Gender	0.244	0.065	3.759**	1.277
Ethnicity	-0.019	0.074	-0.261	0.981
Free/Reduced Lunch Eligibility	-0.259	0.120	-2.168*	0.772
Mobility	-0.261	0.064	-4.103**	0.770
Random Effects	**Variance Component**	**df**	**X^2**	**p-value**
Variance in school means	0.398	185	281.981	>0.001**

Note. ** p<0.01. * p<0.05.

Table 38. Hierarchical Linear Model Estimates For Science Course Enrollment, Grade 8

Fixed Effects	Coefficient	SE	t	Event Rate Ratio
Intercept				
Intercept	-0.230	0.042	-5.541**	0.794
Group	-0.109	0.056	-1.928	0.897
Age	0.007	0.008	0.953	1.007
Gender	0.245	0.057	4.294**	1.277
Ethnicity	-0.055	0.058	-0.950	0.947
Free/Reduced Lunch Eligibility	-0.069	0.071	-0.972	0.934

Note. ** p<0.01. * p<0.05.

Table 39. Hierarchical Linear Model Estimates For Special Education Received, Grade 6

Fixed Effects	Coefficient	SE	t	Odds Ratio
Intercept	-2.045	0.213	-9.580**	0.129
Group	0.196	0.272	0.721	1.216
Age	-0.005	0.039	-0.138	0.995
Gender	-0.653	0.219	-2.977**	0.521
Ethnicity	0.629	0.283	2.219*	1.875
Free/Reduced Lunch Eligibility	1.813	0.352	5.153**	6.128
Mobility	0.319	0.125	2.544*	1.376

Note. **p<0.01. *p<0.05.

Table 40. Hierarchical Linear Model Estimates For Special Education Received, Grade 7

Fixed Effects	Coefficient	SE	t	Odds Ratio
Intercept	-2.267	0.221	-10.278**	0.104
Group	0.508	0.272	1.866	1.662
Age	-0.026	0.046	-0.568	0.974
Gender	-0.858	0.225	-3.816**	0.424
Ethnicity	0.595	0.267	2.229*	1.813
Free/Reduced Lunch Eligibility	2.077	0.404	5.140**	7.978
Mobility	0.264	0.128	2.068*	1.303

Note. **p<0.01. *p<0.05.

Table 41. Hierarchical Linear Model Estimates For Special Education Received, Grade 8

Fixed Effects	Coefficient	SE	t	Odds Ratio
Intercept	-2.408	0.233	-10.328**	0.090
Group	0.566	0.258	2.192*	1.762
Age	-0.040	0.041	-0.993	0.960
Gender	-0.840	0.236	-3.554**	0.432
Ethnicity	0.568	0.298	1.905	1.765
Free/Reduced Lunch Eligibility	2.101	0.437	4.813**	8.178
Mobility	0.278	0.131	2.132*	1.321

Note. **p<0.01. *p<0.05.

Table 42. Hierarchical Linear Model Estimates For Title 1 Services Received, Grade 6

Fixed Effects	Coefficient	SE	t	Odds Ratio
Intercept	-2.884	0.315	-9.159**	0.056
Group	0.245	0.361	0.679	1.278
Age	0.043	0.031	1.396	1.044
Gender	0.651	0.427	1.524	1.917
Ethnicity	0.060	0.482	0.125	1.062
Free/Reduced Lunch Eligibility	-0.402	0.389	-1.035	0.669
Mobility	-0.053	0.227	-0.234	0.948

Note. **p<0.01. *p<0.05.

Table 43. Hierarchical Linear Model Estimates For Title 1 Services Received, Grade 7

Fixed Effects	Coefficient	SE	t	Odds Ratio
Intercept				
Intercept	-2.936	0.233	-12.621**	0.053
Percentage of Free/Reduced Lunch Eligible Students	-2.696	.579	-4.657**	0.067
Group	0.351	0.225	1.557	1.420
Age	-0.018	0.037	-0.474	0.983
Gender	0.177	0.284	0.622	1.193
Ethnicity	0.370	0.272	1.361	1.447
Free/Reduced Lunch Eligibility	0.362	0.324	1.120	1.437
Mobility	-0.170	0.106	-1.606	0.843

Random Effects	Variance Component	df	X^2	p-value
Variance in school means	2.559	186	219.094	0.049*

Note. ** p<0.01. * p<0.05.

Table 44. Hierarchical Linear Model Estimates for Title 1 Services Received, Grade 8

Fixed Effects	Coefficient	SE	t	Odds Ratio
Intercept				
Intercept	-2.645	0.391	-6.761**	0.071
Group	-0.354	0.352	-1.005	0.702
Age	0.004	0.033	0.113	1.004
Gender	0.307	0.255	1.206	1.360
Ethnicity	-0.321	0.479	-0.671	0.725
Free/Reduced Lunch Eligibility	-0.358	0.501	-0.715	0.699
Mobility	-0.423	0.239	-1.766	0.655

Note. ** p<0.01. * p<0.05.

Table 45. Hierarchical Linear Model Estimates For At-Risk Services Received, Grade 6

Fixed Effects	Coefficient	SE	t	Odds Ratio
Intercept				
Intercept	-1.734	0.213	-8.141**	0.177
Pupil-teacher Ratio	-0.120	0.032	-3.786**	0.887
Locale	0.866	0.373	2.320*	2.377
Group	-0.009	0.192	-0.048	0.991
Age	-0.002	0.023	-0.066	0.998
Gender	0.072	0.181	0.399	1.075
Ethnicity	0.220	0.171	1.288	1.245
Free/Reduced Lunch Eligibility	0.925	0.263	3.523**	2.522
Mobility	0.145	0.112	1.290	1.156

Random Effects	Variance Component	df	X^2	p-value
Variance in school means	2.264	184	312.558	0.001**

Note. ** p<0.01. * p<0.05.

Table 46. Hierarchical Linear Model Estimates For At-Risk Services Received, Grade 7

Fixed Effects	Coefficient	SE	t	Odds Ratio
Intercept				
Intercept	-0.885	0.188	-4.717**	0.413
Percentage of Free/Reduced Lunch Eligible Students	2.289	0.600	3.813**	9.865
Group	-0.211	0.163	-1.292	0.810
Age	-0.012	0.022	-0.566	0.988
Gender	0.136	0.153	0.889	1.146
Ethnicity	0.114	0.189	0.606	1.121
Free/Reduced Lunch Eligibility	1.026	0.363	2.825**	2.791
Mobility	0.058	0.113	0.514	1.060

Random Effects	Variance Component	df	X^2	p-value
Variance in school means	1.882	186	322.672	0.001**

Note. ** p<0.01. * p<0.05.

Table 47. Hierarchical Linear Model Estimates For At-Risk Services Received, Grade 8

Fixed Effects	Coefficient	SE	t	Odds Ratio
Intercept				
Intercept	-0.555	0.169	-3.277*	0.574
Percentage of Free/Reduced Lunch Eligible Students	2.364	0.603	3.921**	9.865
Group	-0.064	0.174	-0.368	0.938
Age	0.007	0.021	0.346	1.007
Gender	-0.019	0.138	-0.136	0.981
Ethnicity	-0.193	0.152	-1.268	0.825
Free/Reduced Lunch Eligibility	0.722	0.249	2.902**	2.059
Mobility	-0.136	0.109	-1.248	0.873

Random Effects	Variance Component	df	X^2	p-value
Variance in school means	1.627	182	303.599	0.001**

Note. ** p<0.01. * p<0.05.