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Longitudinal Trends in Math and Science Partnership-Related Changes in Student Achievement with Management Information System Data Across Five Years (2003/04 – 2007/08)

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The present draft is based on materials, information, and data that were available as of April 2010.

PREFACE

This study is one in a series of briefs for the Math and Science Partnership Program Evaluation (MSP-PE) conducted for the National Science Foundation's Math and Science Partnership Program (NSF-MSP). The MSP-PE is conducted under Contract No. EHR-0456995. Since 2007, Bernice Anderson, Ed.D., Senior Advisor for Evaluation**,** Directorate for Education and Human Resources**,** has served as the NSF Program Officer.

The MSP-PE is led by COSMOS Corporation. Robert K. Yin (COSMOS) serves as Principal Investigator (PI). Darnella Davis (COSMOS) serves as one of three Co-Principal Investigators. Additional Co-Principal Investigators are Kenneth Wong (Brown University) and Patricia Moyer-Packenham (Utah State University). Any opinions, findings, conclusions, and recommendations expressed in this article are those of the authors and do not necessarily reflect the views of the National Science Foundation.

RUNNING HEAD: Longitudinal Trends in MSP-Related Changes

Longitudinal Trends in Math and Science Partnership-Related Changes in Student Achievement With Management Information System Data Across Five Years (2003/04-2007/08)

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Abstract

This substudy in the evaluation design of the Math and Science Partnership (MSP) Program Evaluation examines student proficiency in mathematics and science for the MSPs' schools in terms of changes across five years (2003/04, 2004/05, 2005/06, 2006/07, and 2007/08) and relationships with MSP-related variables using Management Information System data with the Annual K-12 District Survey. First, changes in percentages of students at or above proficient on state assessments in math and science were investigated by gender, ethnicity, special education, and students with limited English using the MIS data available for (a) across the five-year period (2003/04 – 2007/08) and (b) same schools across the last four years (2004/05-2007/08), with the purpose to obtain a sample of schools without missing data for dependable longitudinal analyses. The classification of MSP schools *with* and *without* focus on math or science for the longitudinal data over this four-year time period (2004/05-2007/08) was also taken into account. The results indicated that the MSP-related schools demonstrate sustained increase in percent of students at or above proficient in both math and science at all school levels. This trend was more clearly pronounced for schools *with* focus on math or science. Second, schools were examined by frequency and effect size of increase, decrease, or no change in student math and science proficiency. The schools with positive changes were in much higher numbers and higher mean effect size of change compared to schools with negative changes in student math and science proficiency. This trend was better pronounced for schools *with* focus on math at the elementary and middle school levels and for schools *with* focus on science also at the elementary and middle school levels. Third, longitudinal growth trajectories in mathematics and science proficiency across the four years (2004/05-2007/08) were investigated. The results indicated the existence of different latent classes of growth trajectories of school success on state assessments in mathematics and science—from a single-class linear trajectories to four latent classes of nonlinear trajectories across different school levels in mathematics and two latent classes of linear growth trajectories in science. Overall, the schools *with* MSP focus on math (or science) increase at higher rate in math (or science) proficiency compared to those *without* MSP focus on math (or science) across the identified latent classes of growth trajectories. Fourth, the relationship between the schools' targeted teacher participation in MSP-related activities over the four-year time period (2004/05-2007/08) and the student math and science proficiency at the "end" year of this period (2007/08) was also investigated. For both mathematics and science, this relationship was positive, yet relatively small, at the elementary school level, also positive, yet

somewhat better pronounced, at the high school level, and negligible at the middle school level. Fifth, the relationship between the students' success in mathematics and science courses and proficiency on state assessments in mathematics and science was investigated at the high school level over the four-year time period (2004/05-2007/08). For mathematics, this relationship was positive and sizable in two years (2004/05 and 2007/08) for students who have successfully completed regular mathematics courses. For science, this relationship was also positive, yet more stable compared to mathematics, across different areas in science, especially for biology.

Longitudinal Trends in MSP-Related Changes in Student Achievement With MIS Data Across Five Years (2003/04-2007/08)

This study analyzes data from the MSP-Management Information System (MSP-MIS) initiated by NSF as a web-based data collection system. Specifically, the study examines student proficiency in mathematics and science for the MSPs' schools in terms of changes across five years (2003/04, 2004/05, 2005/06, 2006/07, and 2007/08) and relationships with MSP-related variables. The purpose of the MSP-MIS is, in part, to assess the overall implementation of the MSP Program and to monitor the progress of individual MSP grants. Such implementation and monitoring are complex affairs because of the complexity of the MSP grants. The MSP-MIS data are self-reported at the school level. Each grant is a partnership, minimally involving a K-12 district and an institution of higher education (IHE). More often, however, multiple districts and multiple IHEs are engaged in a single MSP grant. The MSP-MIS collects annual data from all grantees, based on multiple instruments. The present study used data from one of the instruments, the Annual K-12 District (school-level) Survey for years 2003/04, 2004/05, 2005/06, 2006/07, and 2007/08. Descriptive analyses from this survey are reported elsewhere (Silverstein et al., 2005). (Another MSP-MIS instrument provided information on an MSP's math or science focus at the school level.)

The initial year, 2002/2003, is not included in this analysis because the number of schools that provided MIS data for 2002/03 is disproportionately smaller than those in the subsequent four years. For example, the number of schools with MIS data on math performance across all six years, 2002/03-2007/08, versus the number of schools with such data across the last five years, 2003/04-2007/08, is (a) 24 versus 225, for elementary schools, (b) 15 versus 140, for middle schools, and (c) 5 versus 120, for high schools. Also, the initial trends across the first three years, 2002/03-2004/05, are already reported by MSP-PE (e.g., Dimitrov, 2008).

Addressed are the following five major research questions (RQs):

RQ1: What are the trends in mathematics and science proficiency changes across the targeted five-year time period (2003/04–2007/08) for MSP-related schools based on (a) MIS data for schools that reported student achievement data for *any* of the five years and (b) *longitudinal* MIS data —schools with nonmissing student achievement data across the last four years (2004/05-2007/08). Of particular interest is the effect size in longitudinal changes in student proficiency for schools *with* MSP focus on the subject (math or science) and schools *without* MSP focus on the subject (math or science).

RQ2: What is the distribution of MSP-related schools across categories of change (increase, decrease, or no change) in math and science proficiency over the targeted four-year period of time (2004/05-2007/08) for schools *with* MSP focus on the subject (math or science) and schools *without* MSP focus on the subject?

RQ3: What are the longitudinal growth trajectories (with possible latent classes of such trajectories) in math and science proficiency across the four-year period of time (2004/05 – 2007/08) for schools *with* MSP focus on the subject (math or science) and schools *without* MSP focus on the subject?

RQ4: What is the relationship between schools' targeted teacher participation in MSP-related activities over the four-year time period (2004/05 – 2007/08) and the schools' success in math and science proficiency at the end year of this time period (2007/08).

RQ5: What is the relationship between the schools' success in math (or science) at any year of the time period 2004/05-2007/08 and the ratio indicating what proportion of the students who took the state examination in math (or science) have successfully completed a regular or advanced course in math (or a particular subject area in science—Biology, Chemistry, Physics, Earth and Science, or Integrated Science) that year?

The reason for *not* including year 2003/04 in the longitudinal data analyses of the present study is twofold. First, the number of schools that provided MIS data for 2003/04 is disproportionately smaller than those in the subsequent four years (2004/05-2007/08) thus diminishing the dependability of the results from targeted longitudinal analyses that require relatively large samples (e.g., latent class analysis of growth trajectories of proficiency in math or science). For example, as given in Tables 3 and 4, the number of schools with MIS data on math performance across all five years, 2003/04-2007/08, versus the number of schools with such data across the last four years, 2004/05-2007/08, is (a) 225 versus 393, for elementary schools, (b) 140 versus 233, for middle schools, and (c) 120 versus 190, for high schools. Second, intermediate and longitudinal trends across the time periods 2003/04-2005/06 and 2003/04-2006/07, respectively, are already reported by MSP-PE (e.g., Dimitrov, 2009a, 2009b).

The research questions address different aspects of changes in math or science proficiency over the time period 2003/04-2007/08 and longitudinal analyses based on MIS nonmissing data for the last four years (2004/05-2007/08). Of particular interest is the effect size in longitudinal changes in student proficiency for schools *with* (or *without*) MSP focus on math or science across four years (2004/05-2007/08). RQ1 focuses on the statistical significance of changes and their effect size. RQ2 deals with the direction of change (decrease, no change, increase) for

schools. RQ3 investigates the trajectories of change across four years (2004/05-2007/08) and possible latent classes of such trajectories. RQ4 investigates the relationship between school's targeted teacher participation in MSP-related activities over the four-year time period (2004/05-2007/08) and school's success in math and science proficiency at the end year of this time period (2007/08) — that is, to what degree (if any) a "critical mass" of four-year targeted teacher participation in MSP-related activities can explain the school performance in math and science (percent of students at or above proficient) at the end year (2007/08). Finally, RQ5 investigates the relationship between the proportion of the students assessed on the state examination in math (or science) and the proportion of students who successfully completed a regular or advanced course in math (or a particular subject area in science).

Table 1 summarizes the information about the data used by research questions.

Table 1

Data Sets Used in the Statistical Analysis, by Research Questions

Research Question	**Data**
RQ1: What is the distribution of percent of students at or above proficient in math or science for MSP-related schools over (a) the five-year time period (2003/04-2007/08) and (b) the four-year time period (2004/05-2007/08) *without* missing data and the effect size of changes in this distribution by schools *with* MSP focus on the subject (math or science) and schools *without* MSP focus on the subject?	MSP-MIS student achievement data from MSP-related schools in three scenarios using (a) schools that have reported such data for *any* of the years (Appendix A), (b) same schools that have reported such data for all five years (2003/04-2007/08) – Appendix B, and (c) same schools that have reported data across the last four years (2004/05-2007/08) -- Appendix C.
RQ2: What is the distribution of MSP-related schools across categories of change (increase, decrease, or no change) in math and science proficiency across the four-year period of time (2004/05 to 2007/08) by schools *with* or *without* MSP focus on the subject (math or science)?	Longitudinal data from scenario (c) in RQ1—only schools with MSP-MIS data on student proficiency in math (or science) for the last four years (2004/05-2007/08) -- Appendix C.
RQ3: What are the longitudinal growth trajectories (and possible latent classes of such trajectories) in math and science proficiency across the targeted four-year period (2004/05 – 2007/08) for schools *with* MSP focus on the subject (math or science) and schools *without* MSP focus on the subject?	Data used in RQ2 and scenario (c) of RQ1 — only schools for which MSP-MIS student achievement data were available across the last four years (Appendix C). The school scores were adjusted to obtain stability in variation across school years.
RQ4: What is the relationship between schools' targeted teacher participation in MSP-related activities over the four-year time period (2004/05-2007/08) and the schools' success in math and science proficiency at the end year of this time period (2007/08)?	Schools with MSP-MIS data available on (a) targeted teacher participation at any of the four years (2004/05-2007/08) and (b) student achievement data for the last year of this time period (2007/08).

RQ5: What is the relationship between the schools' success in math (or science) proficiency at any year of the time period 2004/05-2007/08 and the ratio indicating what proportion of the students who took the state examination in math (or science) have successfully completed a regular or advanced course in math (or particular subject area in science) that year?	High schools for which MSP-MIS data are available at any of the four years (2004/05-2007/08) on (a) student proficiency on state examinations in math (or science) and (b) the proportion of students being assessed on the state examination in math (or science) who have successfully completed a regular or advanced course in math (or a particular subject area in science – Biology, Chemistry, Physics, Earth and Science, or Integrated Science).

The first research question (RQ1) was addressed using MSP-MIS student achievement data from MSP-related schools in three scenarios. Namely (a) using schools that have reported such data for *any* of the five years 2003/04, 2004/05, 2005/06, 2006/07, and 2007/08 (see Appendix A), (b) using only schools that have reported data for each of these five years (see Appendix B), and (c) using only schools that have reported data for each of the last four years (see Appendix C), taking into account the school's focus on math or science. The first two scenarios data (Appendices A and B) are used only for descriptive purposes, whereas the third scenario data (Appendix C) are used for inferential longitudinal analysis of changes in school math and science proficiency, including effect sizes for changes of particular interest in this study — specifically, changes in the span of two time periods, namely (a) "sustained" changes from the year 2004/05 to the end year (2007/08) and (b) a "step-down" period (2004/05-2006/07) to capture changes prior to the end year of the targeted four-year time period (2004/05-2007/08).

The second research question (RQ2) was addressed using the longitudinal data from scenario (c) in RQ1—only schools with MSP-MIS data on student proficiency in math (or science) for the targeted four-year period of time (2004/05-2007/08)—see Appendix C. This question was answered by examining the frequency distribution of MSP-related schools across categories of change (increase, decrease, or no change) in math and science for schools *with* MSP focus on the subject (math or science) and schools *without* MSP focus on the subject over the four-year period of time (2004/05- 2007/08).

The third research question (RQ3) was also addressed with the data used in RQ2 and scenario (c) of RQ1—only schools for which MSP-MIS student achievement data were available across the targeted four-year period of time (2004/05-2007/08)—see Appendix C. The school scores (proportion of students at or above proficient on a state assessment in math or science) in this longitudinal analysis were transformed using *the arcsin-root transformation* to stabilize the scores in normality and variability across repeated measures (four school years: 2004/05-

2007/08) (e.g., see Sokal & Rohlf, 1995; Zar, 1999). It is important to emphasize in this regard that the main purpose of RQ3 is to examine trends and factors of growth (*initial status* and *rate of change*) in math and science proficiency for two groups of schools — *with* or *without* MSP focus on math (or science) — not to compare these two groups of schools on percent of students at of above proficient; (such comparisons are addressed, from different angles, with research questions RQ1 and RQ2).

The fourth research question (RQ4) was addressed using schools for which MSP-MIS data were available on (a) targeted teacher participation at any of the four years (2004/05-2007/08) and (b) student achievement data for the end year (2007/08). As alluded to earlier, the idea was to investigate the relationship between the school's "critical mass" of targeted teacher participation in MSP-related activities over all four years and student math and science proficiency at the end of this time period. The variable "targeted teacher participation in MSP-related activities" is not involved in the previous three research questions.

Finally, the fifth research (RQ5) was addressed using schools for which MSP-MIS data were available at any of the four years (2004/05-2007/08) on (a) the proportion of students who passed the state examination in math (or science), and (b) the proportion of students who have successfully completed a regular or advanced course in math (or a particular subject area in science — Biology, Chemistry, Physics, Earth and Science, or Integrated Science). Such MIS data are available only at the high school level.

Method

Data

From the Annual K-12 District Survey, the data used in this paper covered schools with available data for the five research questions as described in the previous section. Appendix A provides data on (a) number of schools for which MSP-MIS data on student math or science proficiency were available for any of the five years (2003/04, 2004/05, 2005/06, 2006/07, and 2007/08), (b) number of students in these schools who had taken the state assessment in math or science, and (c) number of students who "pass" (at or above proficient) the assessment. The data are also provided by gender, ethnicity, special education students, and limited English proficiency students. The examination of the data in Appendix A shows, for example, that the highest relative sample representation of schools is for mathematics at the elementary school level. Appendix B is the longitudinal counterparts of Appendix A for math and science, respectively — only schools with MSP-MIS student achievement data across all five years

(2003/04-2007/08). Appendix C describes the longitudinal MSP-MIS student achievement data across the last four years—that is, same schools that have provided such data at each of the four years (2004/05-2007/08). As noted earlier, the data in Appendix C provide larger samples of nonmissing data for dependable longitudinal analyses targeted with the research questions in the present study.

Variables and Scales

There are four main variables investigated in this school-level MSP-MIS study:

● S*tudent achievement* — the proportion of students at or above proficient on state assessments in mathematics and science, calculated by the number of students attaining proficiency divided by the total number of students taking the test;

● *Targeted teacher participation in MSP-related activities* — this variable is identified in MSP-MIS by the condition that 30 percent or more of a school's targeted teachers participated in 30 or more hours of MSP-sponsored activities during a single school year. Given the binary scale (1 if the condition was met, and 0 otherwise), the score for any school on this specific variable over four school years (2004/05, 2005/06, 2006/07, and 2007/08) may vary from zero to four (0 = the condition was not met during any of the three years, and 4 = the condition was met all four years); and

● MSP focus on math (or science) for each school (0 = No, 1 = Yes), with "yes" meaning that the MSP indicated such a focus in any of the four years being studied.

● The proportion of students assessed on the state proficiency examination in math (or science) at any of the four years (2004/05, 2005/06, 2006/07, and 2007/08) who have successfully completed a regular or advanced course in math (or a particular subject area in science: Biology, Chemistry, Physics, Earth and Science, or Integrated Science) that year.

Statistical Analysis

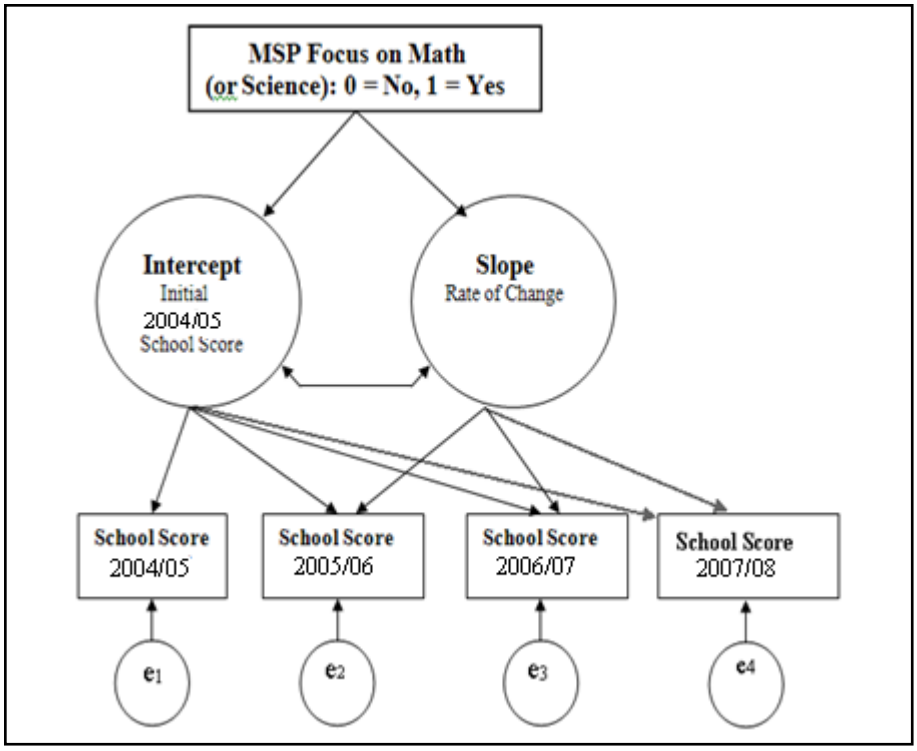
All research questions were addressed by school level (elementary, middle, and high school). To address RQ1, longitudinal analyses were conducted to compare schools *with* an MSP focus on math (or science) versus schools *without* such focus on trends and effect size of changes in percent of students at or above proficient. Cohen's effect size (*ES*) index for a difference in two proportions, *h* (Cohen, 1988), was calculated to measure the magnitude of changes in school proficiency in math (or science). The effect for the difference in two proportions, say $P_1 - P_2$,

is: $h = 2\arcsin\sqrt{P_1} - 2\arcsin\sqrt{P_2}$. The magnitude of the effect size is operationally defined as *small* (*h* = .20), *medium* (*h* = .50), and *large* (*h* = .80) effect size (Cohen, 1988, p. 181).

To address RQ2, each school was assigned to one of three categories of change by percent of students at or above proficient in math or science: (a) *increase*, if the school has a statistically significant positive change, (b) *decrease*, if the school has a statistically significant negative change, and (c) *no change*, if the school's change was not statistically significant. The frequency distribution of schools by direction of change (increase, decrease, no change) in math and science proficiency was examined by schools *with* or *without* MSP focus on math (or science). The *changes* were measured by the differences in percent of students at or above proficient on state assessments in mathematics and science (a) from 2004/05 to 2007/08, for sustained changes from the first year (2004/05) to the end year (2007/08) of the targeted four-year period of time, and (b) a "step-down" period of time (from 2004/05 to 2006/07) — to capture changes from the first year (2004/05) to the year preceding the end year (2006/07) of the four-year period of time. This choice was guided by preliminary results that indicated a trend of disrupted linear growth for MSP-MIS student achievement data in year 2006/07.

To address RQ3, longitudinal growth mixture modeling (GMM; e.g., Muthén, 2004) was used to investigate the growth trajectories—*initial status* (intercept) and *rate of change* (slope)—, as well as the presence of different latent classes of such trajectories, in math and science across the targeted four-year period of time (2004/05-2007/08). The individual schools were the units of analysis and the adjusted (*arcsin-root* transformation) proportion of students at or above proficient was the outcome variable measured across all four years (2004/05-2007/08). The school variable "MSP focus on math or science" (0 = No, 1 = Yes) was used as a background variable (see Figure 1). The longitudinal growth analysis was conducted separately for math and science at each (elementary, middle, and high) school level using the computer program M*plus* (Muthén & Muthén, 2007). In addition, chi-square tests for association between categorical variables were used to investigate possible dependence (association) between school membership to latent classes of growth trajectories *and* school focus (Yes/No) on the subject (math or science) by school level — elementary, middle, and high.

Figure 1. Longitudinal growth model of changes in school math and science proficiency across four years (2004/05-2007/08)



To address RQ4, the Pearson product-moment correlation was used to investigate the relationship between the school's targeted teacher participation in MSP-related activities over the time period of all four years (2004/05-2007/08) and student math and science proficiency at the end of this time period (2007/08). This analysis was conducted separately for math and science at each (elementary, middle, and high) school level.

Finally, to address RQ5, the Pearson product-moment correlation was used to investigate the relationship between the student proficiency on the state examination in math (or science) at any of the four years (2004/05-2007/08) and the proportion of students assessed on that examination who have successfully completed a regular or advanced course in math (or a particular subject area in science: Biology, Chemistry, Physics, Earth and Science, or Integrated Science) that year.

Results

The results are reported in five parts representing the five research questions (RQ1, RQ2, RQ3, RQ4, and RQ5) addressed in this MSP-PE substudy.

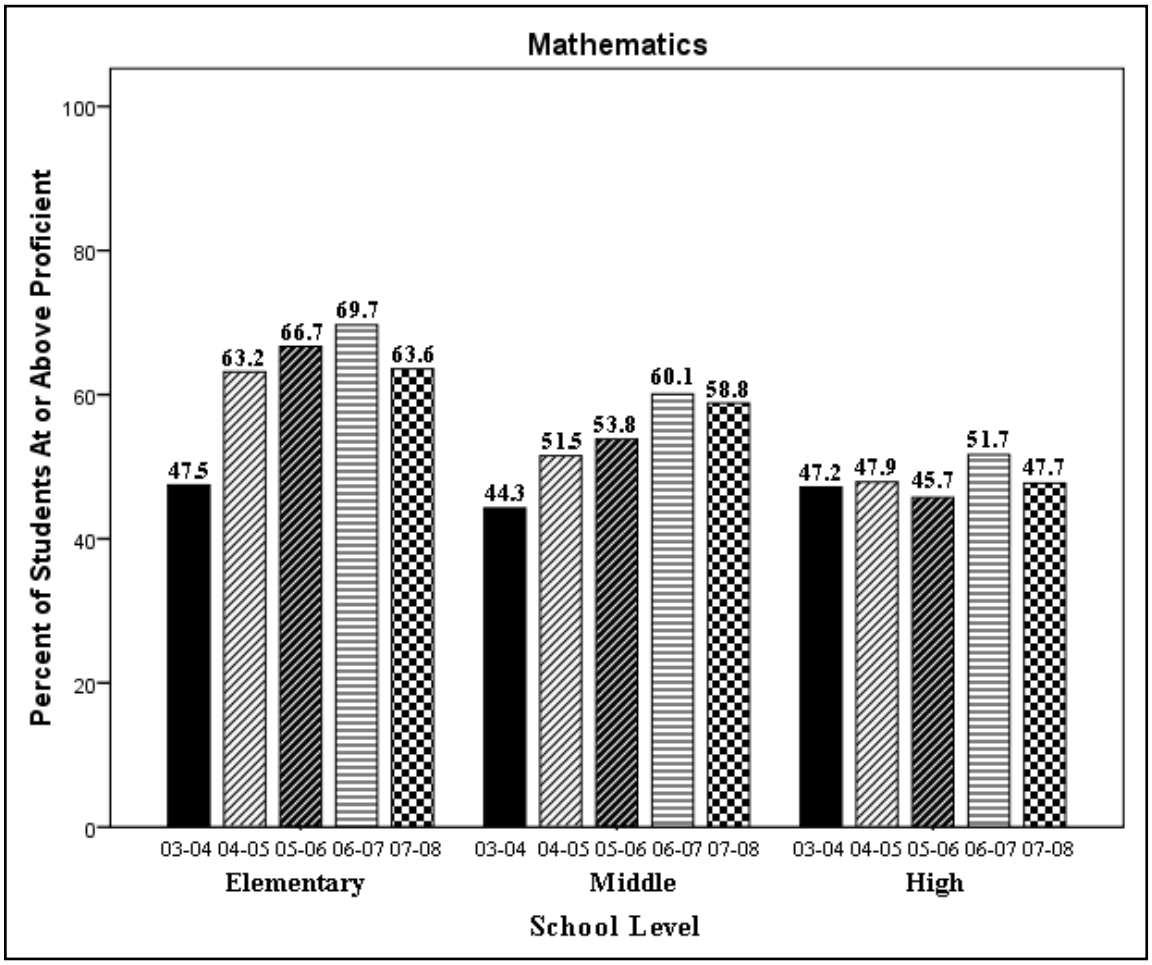
Trends and Effect Sizes of Changes in Math and Science Proficiency

This section provides results related to the first research question, RQ1: "What are the trends in mathematics and science proficiency changes based on (a) MIS data for all schools that reported student achievement data for *any* of the five years 2003/04-2007/08, (b) MIS longitudinal data for schools that reported student achievement data for each of the five years (2003/04-2007/08), and (c) MIS longitudinal data for schools that reported student achievement data for each of the last four years (2004/05-2007/08)?" The four-year longitudinal MIS data involve larger samples for more dependable statistical inferences. Therefore, while the results based on data in the first two scenarios of RQ1 are reported at descriptive level, the four-year longitudinal data in the third scenario are used for inferential statistical analyses with reports of effect size for schools *with* and *without* focus on mathematics (or science). The change in percent of students at or above proficient in math (or science), reported in Tables 2 and 6, is tested for statistical significance using a 95% confidence interval for change.

Mathematics

The percent of students at or above proficient on state assessments in mathematics by school level, for all schools with MSP-MIS student achievement data at any of the five years (2003/04-2007/08), was computed from the data in Appendix A (left panel) and presented in Figure 2. As can be seen, despite the decrease in school rate of math proficiency across the last two years (from 2006/07 to 2007/08), there is a sustained increase in this rate across the entire time period of five years (from 2003/04 to 2007/08). This trend is even more clearly pronounced in Figures 3 and 4, where the results are based on longitudinal data in Appendix B and Appendix C, respectively. The data in Appendix B are for schools that have reported MSP-MIS student achievement data in each of the five years (2003/04-2007/08), whereas the longitudinal data in Appendix C come from larger samples of schools that have reported such data in each of the last four years (2004/05-2007/08). Further refinement of the trend depicted in Figure 4 was achieved by investigating the effect size of changes in math proficiency across the four-year period of time (2004/05-2007/08) for schools *with* (or *without*) focus on mathematics. The results are depicted in Figures 5, 6, and 7 and tabulated in Tables 2, 3, 4, and 5 across school levels and student demographics (gender, ethnicity, special education, and limited English proficiency).

Figure 2. Percent of students at or above proficient on state assessments in mathematics by school level (elementary, middle, and high) for all schools with MSP-MIS student achievement data at *any* of the five years (2003/04-2007/08).



School Year	Elementary Schools	Middle Schools	High Schools
2003/04	*N* = 52,926 *P* = 47.46% 317 Schools	*N* = 71,380 *P* = 44.27% 178 Schools	*N* = 78,849 *P* = 47.16% 176 Schools
2004/05	*N* = 91,338 *P* = 63.16% 560 Schools	*N* = 135,845 *P* = 51.52% 289 Schools	*N* = 110,004 *P* = 47.88% 264 Schools
2005/06	*N* = 158,044 *P* = 66.70% 733 Schools	*N* = 260,274 *P* = 53.81% 457 Schools	*N* = 140,575 *P* = 45.72% 330 Schools
2006/07	*N* = 199,853 *P* = 69.66% 801 Schools	*N* = 276,193 *P* = 60.07% 481 Schools	*N* = 134,755 *P* = 51.67% 343 Schools
2007/08	*N* = 201,500 *P* = 63.59% 828 Schools	*N* = 236,747 *P* = 58.83% 458 Schools	*N* = 115,496 *P* = 47.73% 344 Schools

Note. *N* = Number of students; *P* = Percent of students at or above proficient in math.

Figure 3. Percent of students at or above proficient on state assessments in mathematics for the same schools with MSP-MIS longitudinal student achievement data across five years (2003/04-2007/08)

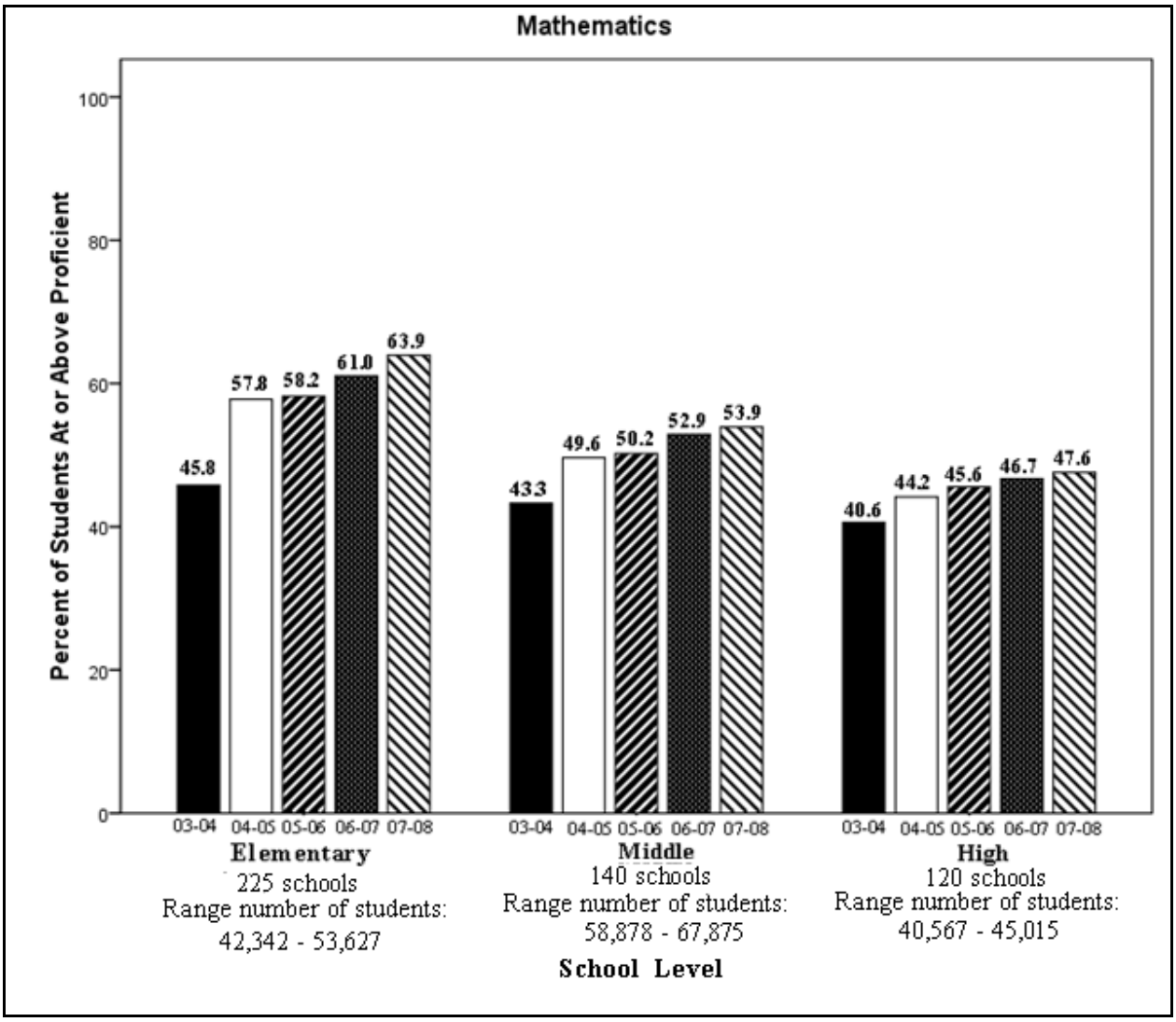


Figure 4. Percent of students at or above proficient on state assessments in mathematics for the same schools with MSP-MIS longitudinal student achievement data across the last four years (2004/05-2007/08).

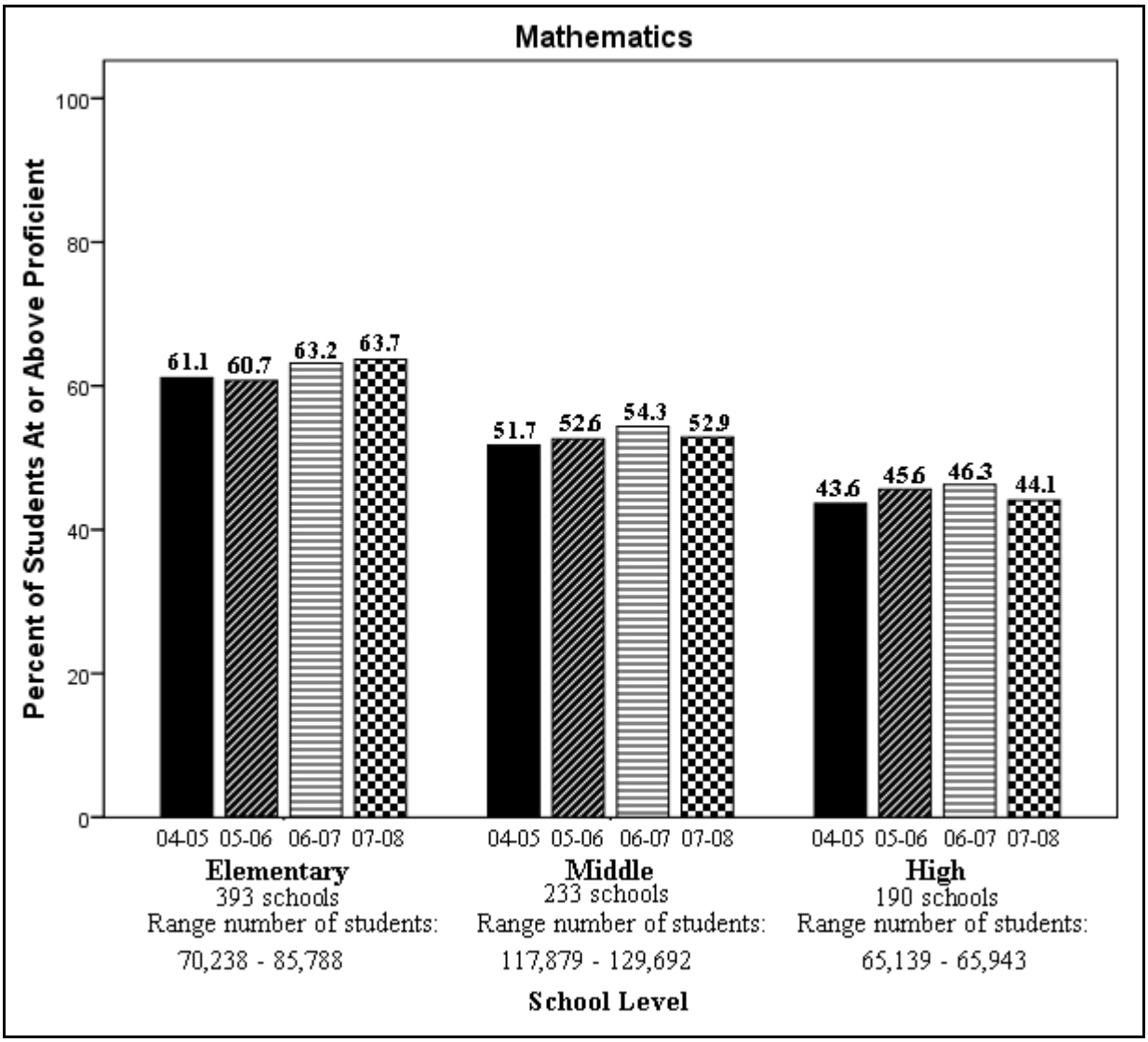
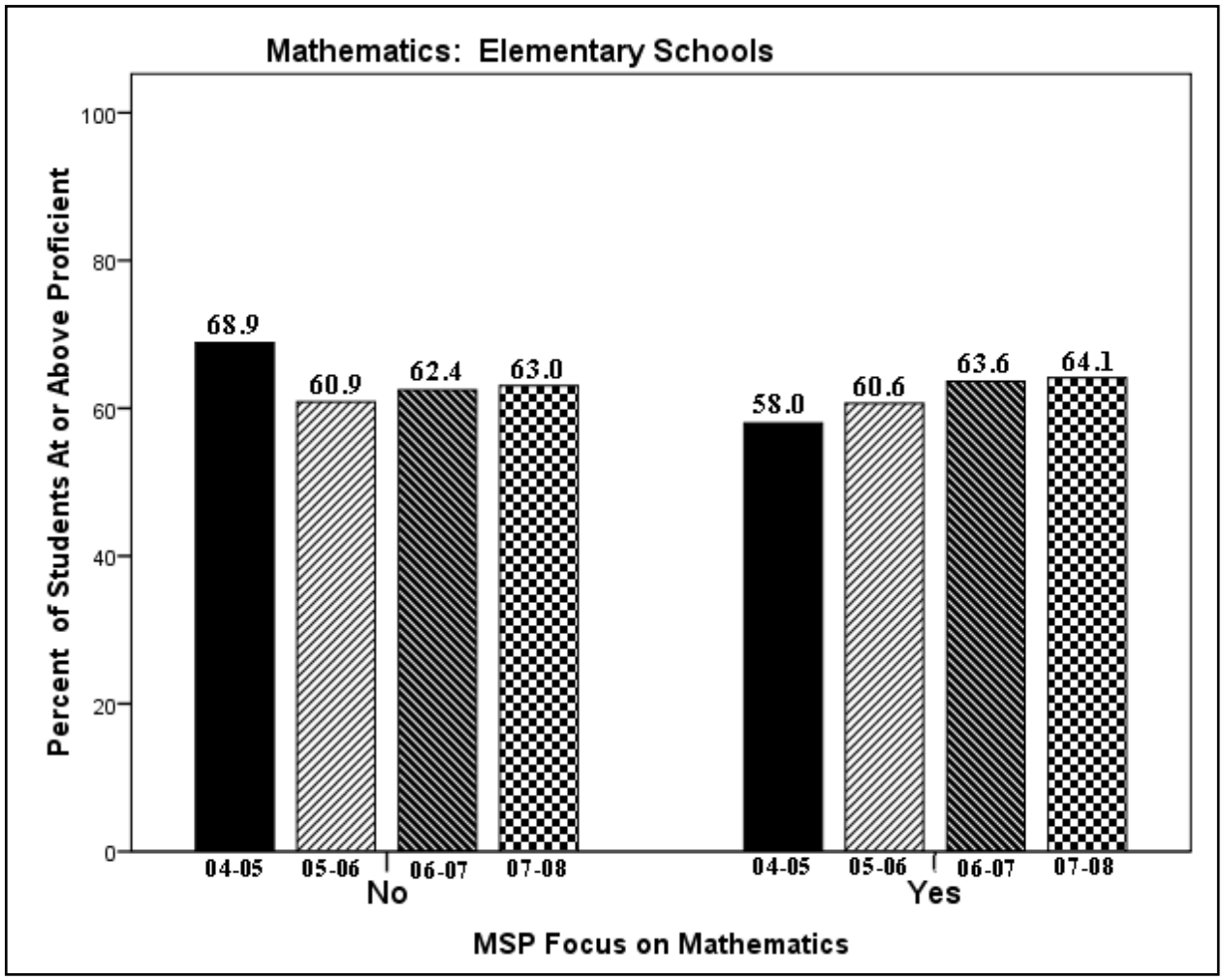
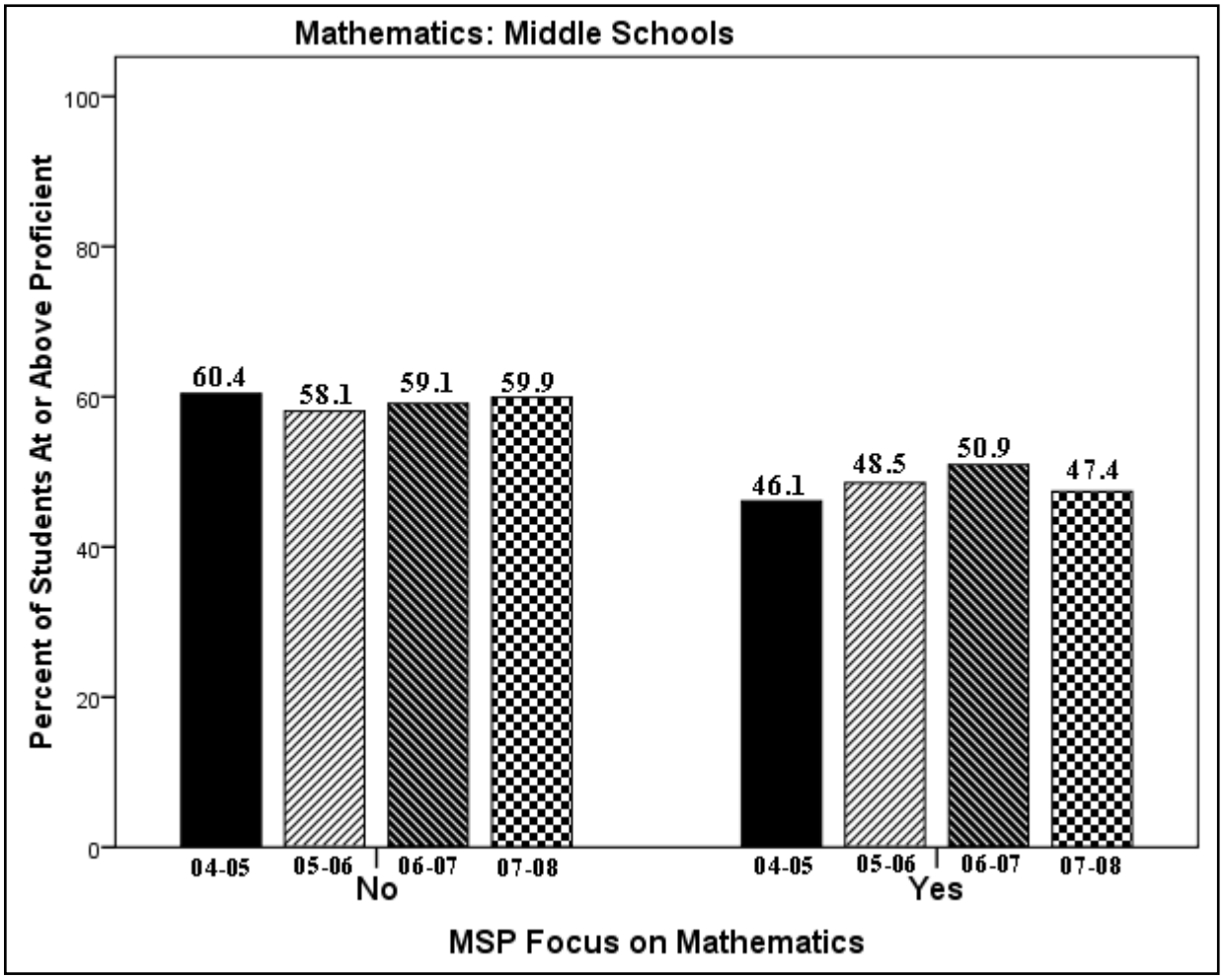


Figure 5. Percent of students at or above proficient on state assessments in mathematics for the elementary schools with MSP-MIS student achievement data at each of the four years (2004/05-2007/08) by school focus on mathematics.



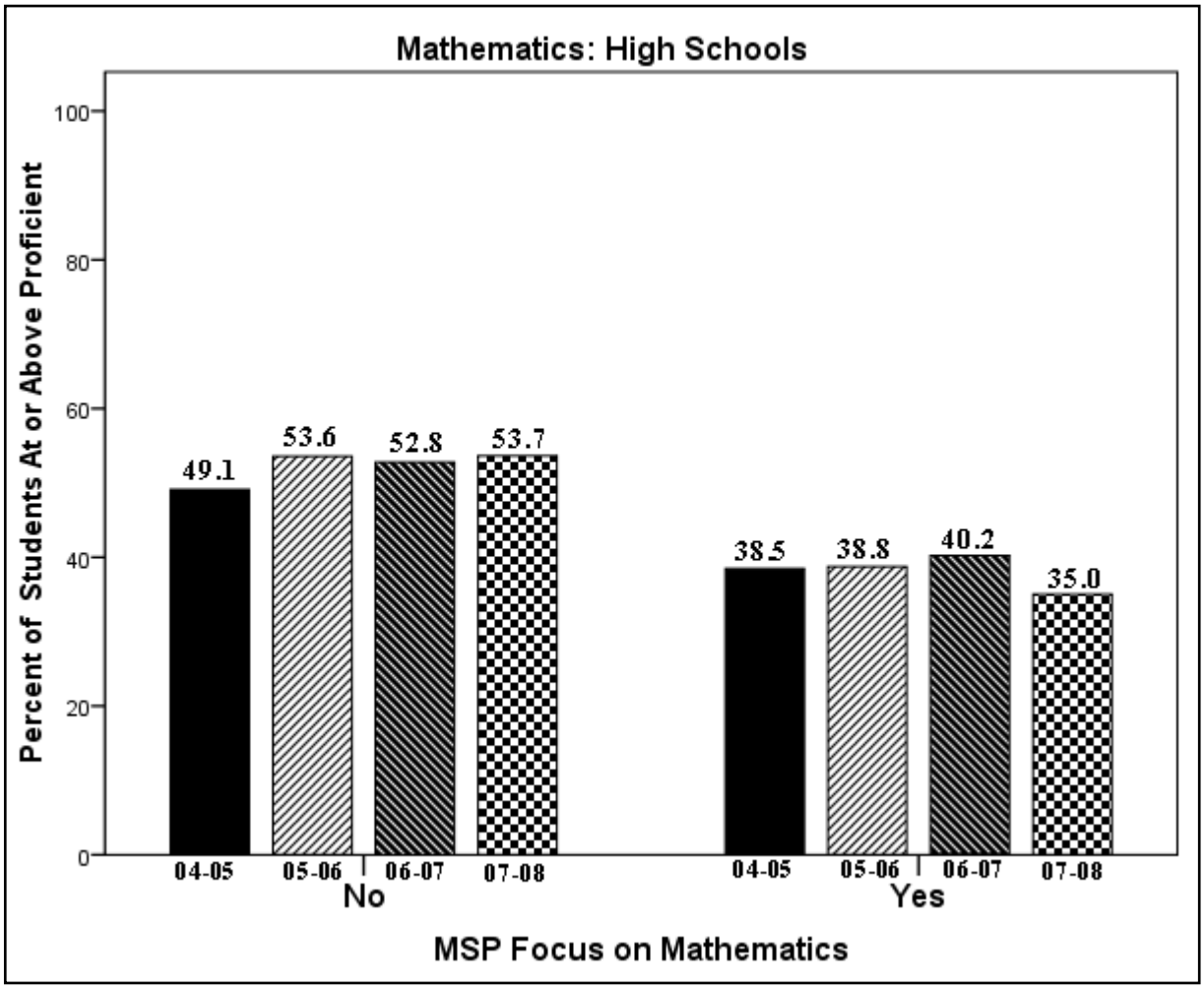
The results for elementary schools in Table 2, graphically represented in Figures 5, show that while there is some decrease in math proficiency after the first year followed by a moderate increase across the next three years for schools *without* MSP focus on math, there is a sustained increase in math proficiency for schools *with* MSP focus on math across all four years (2004/05-2007/08). In effect size (*ES*) measures, the largest increase in student math proficiency is from the first year (2004/05) to the end year (2007/08) for schools *with* MSP focus on mathematics: *ES* = + 0.13 (a *small to medium* effect size, according to Cohen, 1988, p. 181). These results, along with those for elementary schools regardless of their focus on math (see Figure 4), indicate that there is an overall increase in math proficiency from 2004/05 to 2007/08 at the elementary school level and this trend is more clearly pronounced for schools *with* focus on math.

Figure 6. Percent of students at or above proficient on state assessments in mathematics for the middle schools with MSP-MIS student achievement data at each of the four years (2004/05-2007/08) by school focus on mathematics



The results for middle schools in Table 2, graphically represented in Figures 6, show that for schools *without* focus on math there is an initial decrease in math proficiency from year 2004/05 to 2005/06 followed by a slight increase over the next three years (2005/06-2007/08) of the four-year period of time (2004/05-2007/08). This trend is somewhat consistent with that for schools *without* focus on math at the elementary school level. For schools *with* focus on math, there is an increase in math proficiency over the first three years (2004/05-2006/07) followed by a decrease of 3.5% at the last year (2007/08) of the four-year period of time (2004/05-2007/08), but the overall trend over the entire four-year period of time (2004/05-2007/08) is positive. Specifically, there is an increase over this four-year time period (with a small effect size, *ES* = 0.03) which is more clearly pronounced during the first three years (2004/05-2006/07) with a small to medium effect size, *ES* = 0.13 (Cohen, 1988, p. 181).

Figure 7. Percent of students at or above proficient on state assessments in mathematics for the high schools with MSP-MIS student achievement data at each of the four years (2004/05-2007/08) by school focus on mathematics.



The results for high schools in Table 2, graphically represented in Figure 7, indicate that for schools *without* focus on math, there is an overall increase with a small effect size (*ES* = 0.09) in math proficiency over the four-year period of time (2004/05-2007/08), but the performance across the last three years of this time period (2005/06-2007/08) is about the same. For high schools *with* focus on math, there is an increase with a small effect size (*ES* = 0.03) in math proficiency over the first three years (2004/05-2006/07) followed by a decrease of 5.2% at the end year (2007/08). This trend is similar to that for middle schools *with* focus on math.

Overall, the trend of an increase in math proficiency is more clearly pronounced for schools *with* focus on math compared to schools *without* focus on math over the four-year period of time (2004/05-2007/08) for elementary schools, yet only over the first three years of this time period for middle and high schools.

Table 2
Longitudinal School Changes in Mathematics Proficiency

School Year	Percent Proficient Students		Effect Size (*ES*) of Change	
	MSP FOCUS ON MATH		MSP FOCUS ON MATH	
	YES	NO	YES	NO
Elementary Schools			**2004/05-07/08**	
2004/05	**58.00%** Students: 49920 Schools: 247	68.85**%** 20318 146	Increase *ES* = +0.13	Decrease *ES* = -0.12
2005/06	**60.65%** Students: 51595 Schools: 247	**60.88%** 34193 146	**2004/05-06/07**	
2006/07	**63.64%** Students: 50648 Schools: 247	**62.45%** 34496 146	Increase *ES* = +0.12	Decrease *ES* = -0.14
2007/08	**64.13%** Students: 50153 Schools: 247	**63.04%** 35020 146		
Middle Schools			**2004/05-07/08**	
2004/05	**46.10%** Students: 71365 Schools: 133	**60.41%** 46514 100	Increase *ES* = +0.03	Decrease *ES* = -0.01
2005/06	**48.52%** Students: 73542 Schools: 133	**58.07%** 54993 100	**2004/05-06/07**	
2006/07	**50.93%** Students: 75389 Schools: 133	**59.09%** 54303 100	Increase *ES* = +0.10	Decrease *ES* = -0.03
2007/08	**47.37%** Students: 69280 Schools: 133	**59.92%** 53895 100		
High Schools			**2004/05-07/08**	
2004/05	**38.49%** Students: 34003 Schools: 95	**49.10%** 31828 95	Decrease *ES* = -0.07	Increase *ES* = +0.09
2005/06	**38.75%** Students: 35417 Schools: 95	**53.57%** 30526 95	**2004/05-06/07**	
2006/07	**40.24%** Students: 34559 Schools 95	**52.78%** 31960 95	Increase *ES* = +0.04	Increase *ES* = +0.08
2007/08	**35.03%** Students: 33505 Schools: 95	**53.66%** 31625 95		

Table 3

Longitudinal Changes in Mathematics Proficiency by Gender and School Focus on Math

Gender	School Level	MSP Focus on Math	Percent at or above proficient				*Effect Size* (*ES*)	
			2004/05	2005/06	2006/07	2007/08	**2004/05-06/07**	**2004/05-07/08**
Males	Elem.	**Yes**	54.53	59.77	62.45	63.49	+0.16	+ 0.18
		No	67.73	55.92	60.29	61.57	-0.15	-0.13
	Middle	**Yes**	38.60	48.07	50.06	47.00	+0.23	+0.17
		No	58.30	48.78	56.30	57.54	-0.04	-0.02
	High	**Yes**	32.21	37.96	39.45	34.21	+0.15	+0.04
		No	48.18	53.46	53.71	53.38	+0.11	+0.10
Females	Elem.	**Yes**	55.64	61.35	64.19	65.18	+0.17	+.20
		No	69.95	56.21	62.04	63.87	-0.17	-0.13
	Middle	**Yes**	37.93	50.02	52.02	47.44	+0.28	+0.19
		No	61.10	51.54	58.46	59.85	-0.05	-0.02
	High	**Yes**	31.56	39.42	40.89	34.80	+0.19	+0.06
		No	49.87	53.84	53.53	53.79	+0.07	+0.08

By gender, the results in Table 3 indicate that there is an increase in math proficiency of about the same magnitude for both males and females over the four-years (2004/05-2007/08) for schools *with* focus on math at all school levels. For schools *without* focus on math, regardless of gender, there is a decrease in math proficiency at the elementary and middle school levels and an increase at the high school level. The largest increase in math proficiency over the four-years (2004/05-2007/08) is for the elementary schools *with* focus on math for males (*ES* = 0.18) and females (*ES* = 0.20). The largest decrease in math proficiency is for the elementary schools *without* focus on math for males (*ES* = -0.13) and females (*ES* = -0.13).

By ethnicity, the results in Table 4 indicate that the largest increase in math proficiency over the four years (2004/05-2007/08) at the elementary school level is for Asian students (*ES* = 0.35) followed by African-American students (*ES* = 0.31) and Hispanic students (*ES* = 0.19) **—** all in schools *with* focus on math. At the middle school level, the largest increase in math proficiency is for African-American students (*ES* = 0.78) followed at much lower level by Hispanic students (*ES* = 0.19) and Asian students (*ES* = 0.05) **—** all in schools *with* focus on math. At the high school level, the largest increase in math proficiency is for African-American students (*ES* = 0.97) followed at much lower level by Asian students (*ES* = 0.04) and Hispanic students (*ES* = 0.01) **—** all in schools *with* focus on math. At all school levels, for schools *with* focus on math, White students demonstrate an increase in math proficiency over the first three years (2004/05-2006/07) followed by a decrease at the end year (2007/08) of the four-year period of time. For schools *without* focus on math, White students have a sustained decrease in math

proficiency at the elementary and middle school level and a sustained increase at the high school level. Finally, the ethnic group *Other* exhibits a relatively large sustained decrease at all school levels for both schools *with* and *without* focus on math, with the largest decrease at the high school level for schools *with* focus on math (*ES* = -1.30).

Table 4

Longitudinal Changes in Mathematics Proficiency by Ethnicity and School Focus on Math

Ethnicity	School Level	MSP Focus on Math	Percent at or above proficient				*Effect Size* of Change	
			2004/05	2005/06	2006/07	2007/08	2004/05-06/07	2004/05-07/08
White	Elem.	**Yes**	79.70	81.40	81.99	77.24	+0.06	-0.06
		No	77.39	64.11	70.48	71.05	-0.16	-0.14
	Middle	**Yes**	65.90	73.11	76.28	56.95	+0.22	-0.18
		No	72.52	61.81	70.08	69.49	-0.05	-0.07
	High	**Yes**	63.93	61.52	71.79	56.15	+0.17	-0.16
		No	67.95	72.91	73.25	72.40	+0.11	+0.10
African-American	Elem.	**Yes**	37.80	53.42	56.09	53.26	+0.37	+0.31
		No	57.54	48.12	51.38	52.73	-0.12	-0.10
	Middle	**Yes**	13.75	45.60	52.42	48.71	+0.86	+0.78
		No	47.69	40.01	47.17	48.39	-0.01	+0.01
	High	**Yes**	6.23	7.03	53.56	44.31	+1.14	+0.95
		No	36.40	44.65	45.46	47.02	+0.18	+0.21
Hispanic	Elem.	**Yes**	52.25	53.50	57.46	61.54	+0.10	+0.19
		No	53.00	38.65	43.30	43.40	-0.19	-0.19
	Middle	**Yes**	27.33	30.27	31.61	36.23	+0.09	+0.19
		No	34.94	30.83	31.36	32.35	-0.08	-0.05
	High	**Yes**	24.84	24.12	25.47	25.08	+0.01	+0.01
		No	29.07	28.88	27.62	32.37	-0.03	+0.07
Asian	Elem.	**Yes**	68.84	84.11	85.99	83.50	+0.42	+0.35
		No	84.88	71.00	75.96	70.92	-0.23	-0.34
	Middle	**Yes**	81.06	82.25	81.60	82.84	+0.01	+0.05
		No	71.04	68.97	69.11	70.16	-0.04	-0.02
	High	**Yes**	36.10	40.00	53.73	38.16	+0.36	+0.04
		No	56.47	59.72	61.63	60.51	+0.10	+0.08
Other	Elem.	**Yes**	78.73	59.84	64.98	56.25	-0.31	-0.49
		No	73.68	54.62	45.81	48.93	-0.58	-0.51
	Middle	**Yes**	65.07	69.72	45.24	45.68	-0.40	-0.39
		No	55.57	42.84	46.98	51.79	-0.17	-0.08
	High	**Yes**	85.58	81.91	30.41	25.87	-1.19	-1.30
		No	49.46	22.03	41.01	39.10	-0.17	-0.21

For special education students, the results in Table 5 show that the largest increase in math proficiency over the four years (2004/05-2007/08) is for elementary schools *with* focus on math (*ES* = 0.25) followed by a smaller increase for middle schools *with* focus on math (*ES* = 0.08). For elementary and middle schools *without* focus on math, however, there is a decrease in math proficiency (*ES* = -0.17 and *ES* = -0.03, respectively). For high schools with focus on *math*, there

is an increase over the first three years (2004/05-2006/07) followed by a decrease at the end year (2007/08). For high schools *without* focus on math, there is a sustained increase in math proficiency (*ES* = 0.12) over the four-year period of time (2004/05-2007/08).

For students with limited English proficiency, there is a sustained increase in math proficiency over the four years (2004/05-2007/08) for schools *with* focus on math at all school levels — elementary (*ES* = 0.20), middle (*ES* = 0.18), and high (*ES* = 0.04). For schools *without* focus on math, there is relatively large decrease in math proficiency at the elementary school level (*ES* = -0.48), a very small decrease at the middle school level (*ES* = -0.02), and a small increase at the high school level (*ES* = 0.06).

Table 5

Longitudinal Changes in Mathematics Proficiency for Special Education (SED) and Limited English Proficiency (LEP) Students by School Focus on Math

SED LEP	School Level	MSP Focus on Math	Percent at or above proficient				*Effect Size*	
			2004/05	2005/06	2006/07	2007/08	**2004/05-06/07**	**2004/05-07/08**
Special Education Students (SED)	Elem.	**Yes**	30.23	41.02	45.52	42.14	+0.32	+0.25
		No	37.64	27.40	28.32	29.48	-0.20	-0.17
	Middle	**Yes**	15.27	21.32	24.12	18.12	+0.22	+0.08
		No	24.75	17.03	18.13	23.63	-0.16	-0.03
	High	**Yes**	9.05	9.78	13.16	8.42	+0.13	-0.02
		No	21.92	30.21	24.61	26.98	+0.06	+0.12
Limited English Proficiency (LEP)	Elem.	**Yes**	50.20	50.30	55.48	60.42	+0.10	+0.20
		No	50.33	31.82	28.73	27.27	-0.45	-0.48
	Middle	**Yes**	20.80	23.35	25.67	28.36	+0.12	+0.18
		No	25.99	20.08	30.51	25.28	+0.10	-0.02
	High	**Yes**	23.44	22.56	25.00	24.95	+0.04	+0.04
		No	23.02	20.12	29.17	25.43	+0.14	+0.06

Science

The percent of students at or above proficient on state assessments in science by school level (elementary, middle, and high) for all schools with MSP-MIS student achievement data at *any* of the five years (2003/04-2007/08) was computed from the data in Appendix A (right panel) and graphically presented in Figure 8. Regarding the overall change in percent of students at or above proficient in science, there are intermediate fluctuations from first year (2003/04) to the end year (2007/08) resulting in (a) an increase of about 19% at the elementary school level, (b) an increase of about 6% at the middle school level, and (c) a decrease of about 9% at the high school level. The longitudinal data for the five-year time period—only schools that have reported

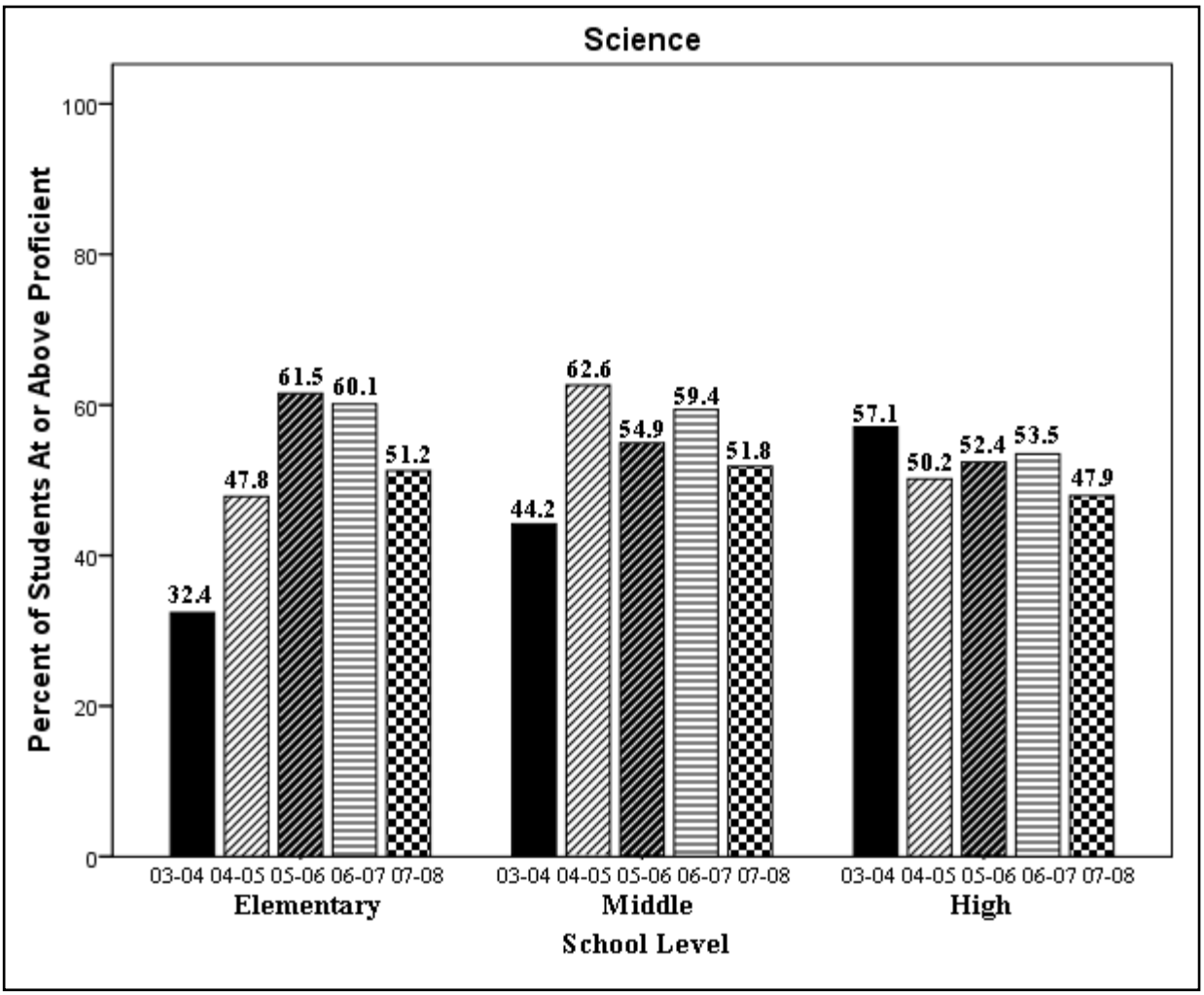
MSP-MIS student achievement data at *each* of the five years (2003/05-2007/08)—produces a trend of a sustained increase from first year (2003/04) to the end year (2007/08) at all school levels (elementary, middle, and high). As depicted in Figure 9, there is an increase of about 17%, 11%, and 4% at the elementary, middle, and high school level, respectively. Further, the longitudinal data for the targeted four-year time period (2004/05-2007/08), with larger samples of schools for this time period compared to the five-year longitudinal data, produces (a) an increase of about 4% at the elementary school level, (b) a decrease of about 17% at the middle school level, and (c) an increase of about 2% at the high school level, from year 2004/05 to the end year (2007/08). Graphically, this trend is depicted in Figure 10.

Further refinement of the trend depicted in Figure 10 was achieved by investigating the effect size of longitudinal changes in science proficiency across the four-year period of time (2004/05-2007/08) for schools *with* (or *without*) focus on science. The results are depicted in Figures 11, 12, and 13 and tabulated in Tables 6, 7, 8, and 10 across school levels and student demographics (gender, ethnicity, special education, and limited English proficiency). The results for elementary schools in Table 6 (see also Figures 11), show that there is a sustained increase in science proficiency for both schools *with* and *without* focus on science, with slightly large effect size (*ES* = 0.10 versus *ES* = 0.06) in favor of schools *without* focus on science over the four-year period of time (2004/05-2007/08).

The results for middle schools in Table 6, graphically depicted in Figure 12, show that there is a substantial decrease of about 27% in science proficiency from year 2004/05 to the end year 2007/08, with a large effect size (*ES* = -0.56), for schools *without* focus on science. Conversely, there is an increase of about 7% (*ES* = 0.14), for schools *with* focus on science over the same period of time (2004/05-2007/08). Clearly, the overall decrease in science proficiency for middle schools depicted in Figure 10 (for schools *with* and *without* focus on science together) is due to a decrease in schools *without* focus on science over the four-year period of time.

The results for high schools in Table 6, graphically depicted in Figure 13, show that there is a sustained increase in science proficiency of about 8% (*ES* = 0.17) for schools *without* focus on science over the four-year period of time (2004/05-2007/08). For schools *with* focus on science, there is an increase in science proficiency of about 6% (*ES* = 0.13) over the first three years of this time period (2004/05-2006/07) followed by a decrease of about 8% across the last two years of this time period (from 2006/07 to 2007/08).

Figure 8. Percent of students at or above proficient on state assessments in science by school level (elementary, middle, and high) for all schools with MSP-MIS student achievement data at *any* of the five years (2003/04-2007/08).



School Year	Elementary Schools	Middle Schools	High Schools
2003/04	*N* = 10,838 *P* = 32.40% 134 Schools	*N* = 14,458 *P* = 44.19% 66 Schools	*N* = 39,647 *P* = 57.07% 107 Schools
2004/05	*N* = 16,876 *P* = 47.84% 197 Schools	*N* = 46,037 *P* = 62.63% 151 Schools	*N* = 65,675 *P* = 50.15% 181 Schools
2005/06	*N* = 32,817 *P* = 61.510% 301 Schools	*N* = 78,812 *P* = 54.93% 235 Schools	*N* = 78,994 *P* = 52.39% 227 Schools
2006/07	*N* = 57,646 *P* = 60.09% 450 Schools	*N* = 90,216 *P* = 59.37% 302 Schools	*N* = 84,687 *P* = 53.48% 268 Schools
2007/08	*N* = 63,427 *P* = 51.24% 516 Schools	*N* = 82,276 *P* = 51.85% 286 Schools	*N* = 76,211 *P* = 47.92% 259 Schools

Note. *N* = Number of schools; *P* = Percent of students at or above proficient in science

Figure 9. Percent of students at or above proficient on state assessments in science for the same schools with MSP-MIS student achievement data across all five years (2003/04-2007/08).

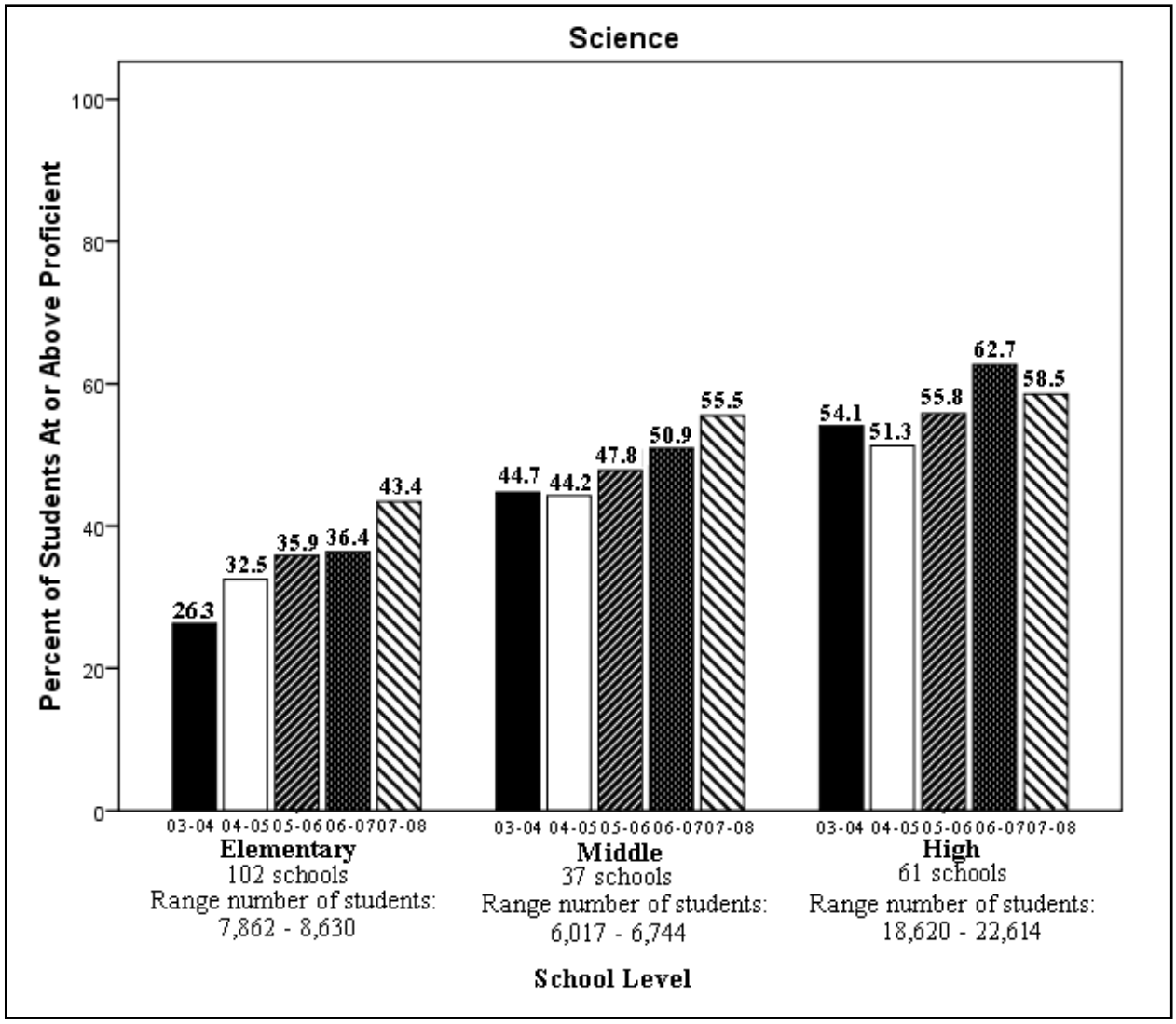


Figure 10. Percent of students at or above proficient on state assessments in science for the same schools with MSP-MIS student achievement data across four years (2004/05-2007/08).

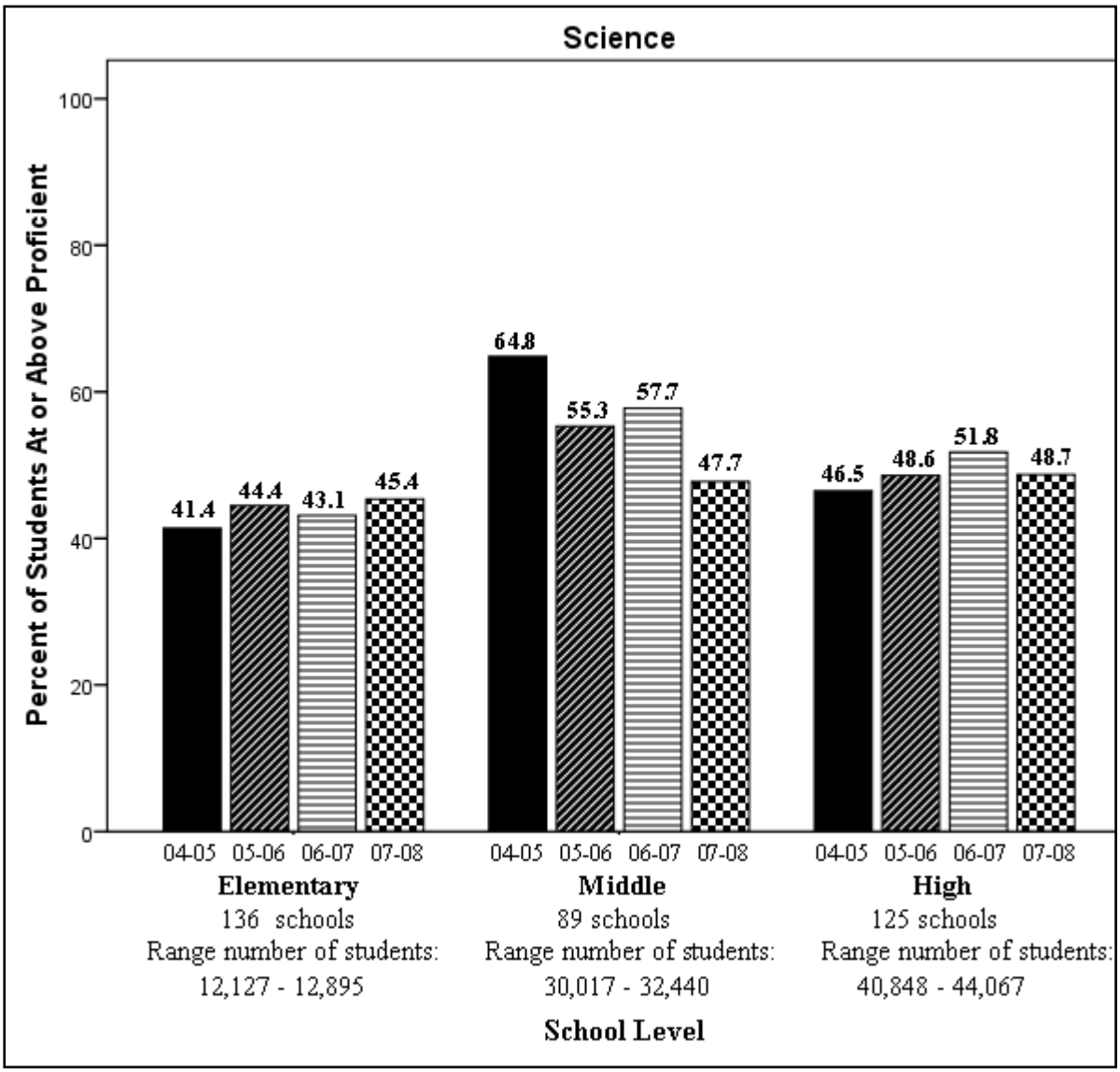


Figure 11. Percent of students at or above proficient on state assessments in science for the elementary schools with MSP-MIS student achievement data at each of the four years (2004/05-2007/08) by school focus on science.

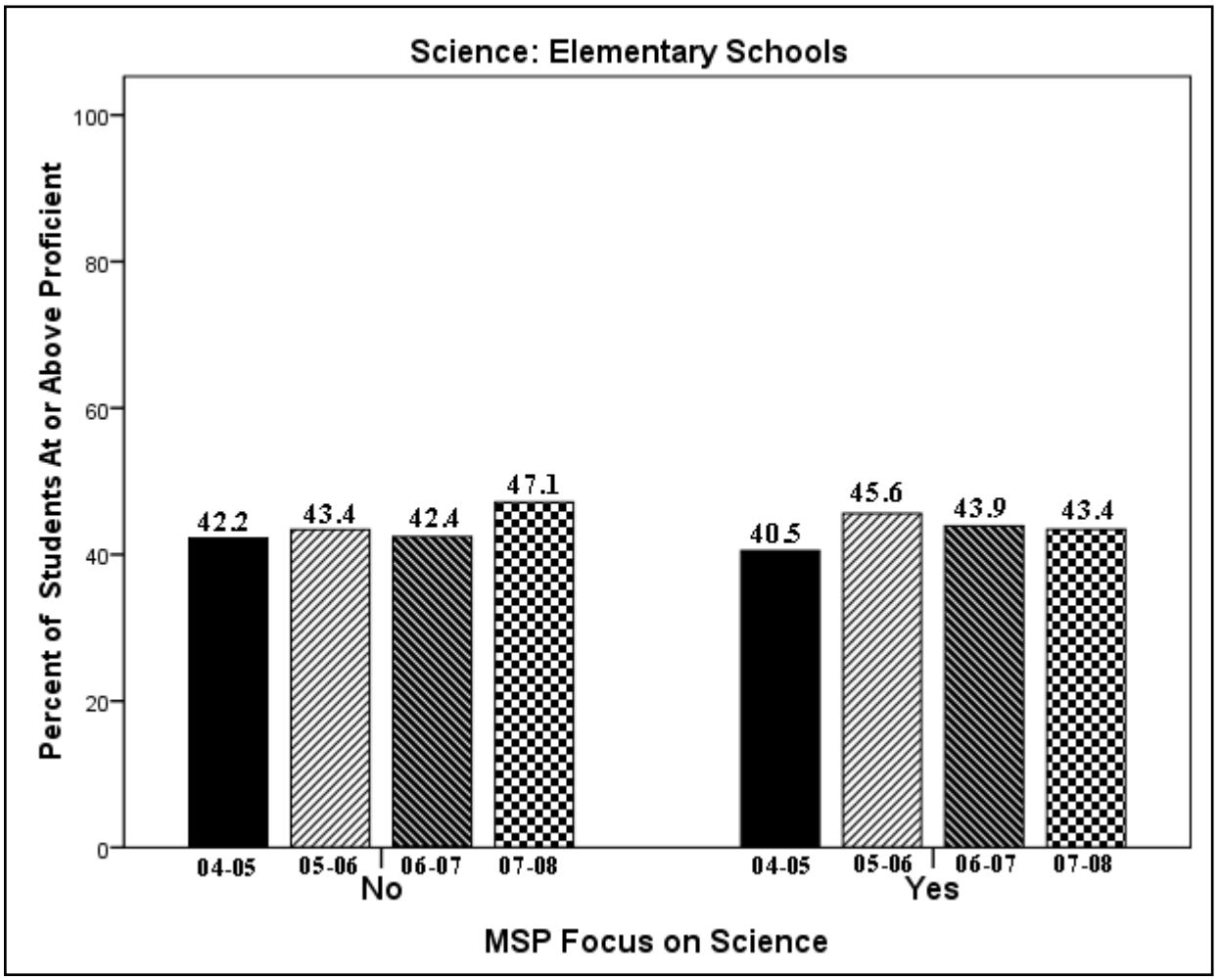


Figure 12. Percent of students at or above proficient on state assessments in science for the middle schools with MSP-MIS student achievement data at each of the four years (2004/05-2007/08) by school focus on science.

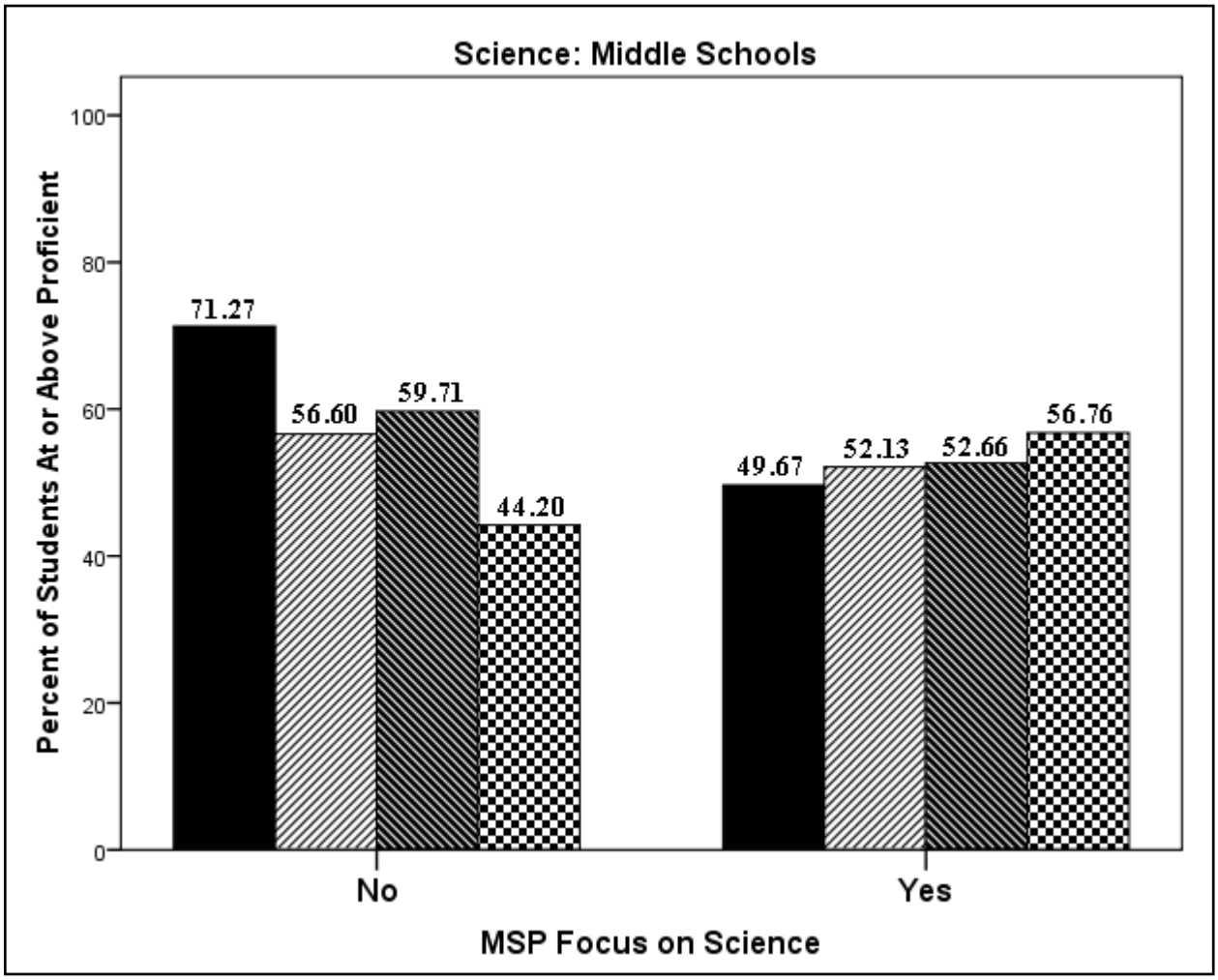


Figure 13. Percent of students at or above proficient on state assessments in science for the high schools with MSP-MIS student achievement data at each of the four years (2004/05-2007/08) by school focus on science.

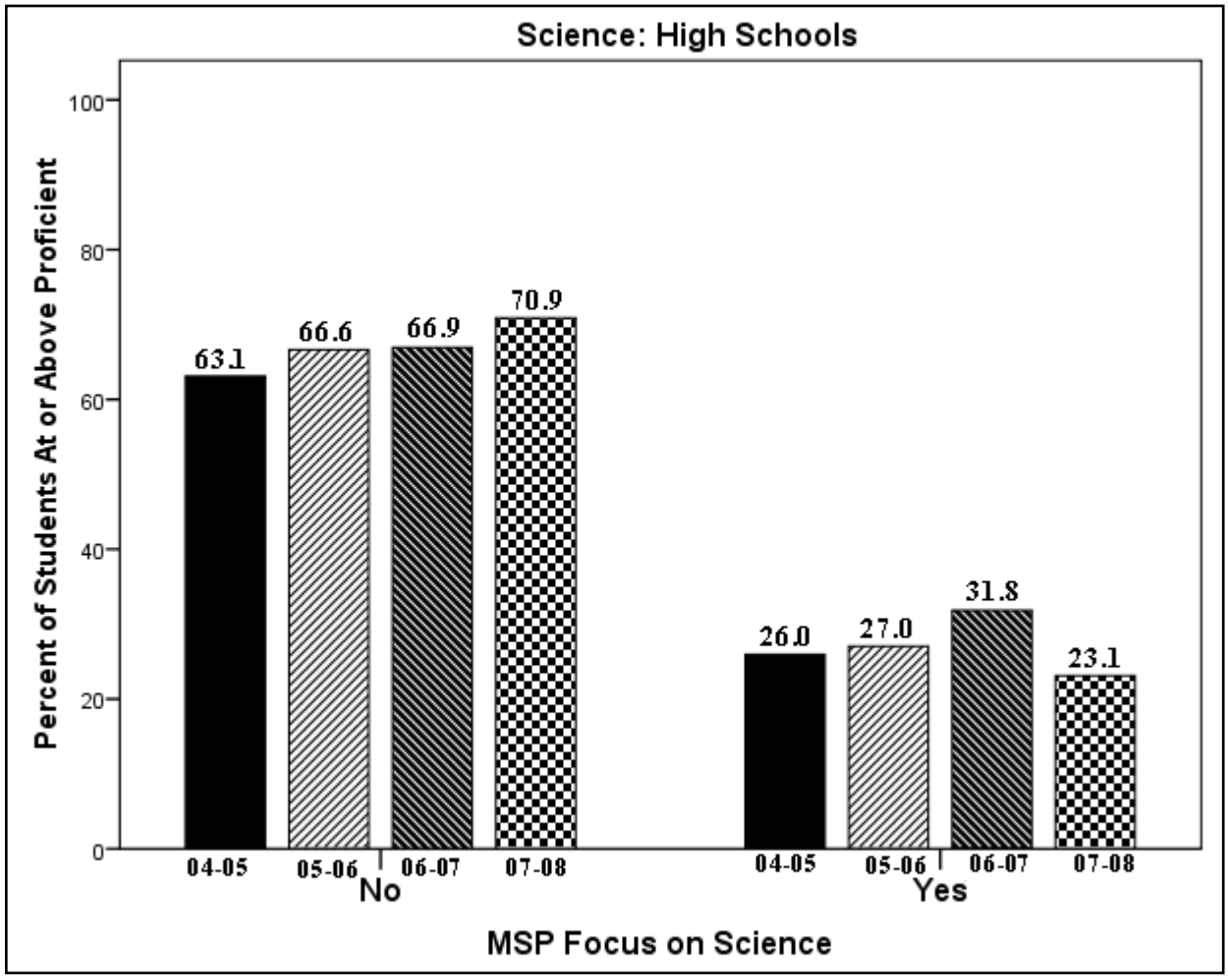


Table 6

Longitudinal School Changes in Science Proficiency

School Year	Percent Proficient Students		Effect Size (*ES*) of Change	
	MSP FOCUS ON SCIENCE		MSP FOCUS ON SCIENCE	
	YES	NO	YES	NO
Elementary Schools			**2004/05-07/08**	
2004/05	**40.52%** Students: 6,527 Schools: 48	**42.23%** Students: 6,368 Schools: 88	Increase *ES* = +0.06	Increase *ES* = +0.10
2005/06	**45.58%** Students: 6,217 Schools: 48	**43.37%** Students: 6,488 Schools: 88	**2004/05-06/07**	
2006/07	**43.90%** Students: 6,009 Schools: 48	**42.42%** Students: 6,323 Schools: 88	Increase *ES* = +0.07	Increase *ES* = +0.01
2007/08	**43.41%** Students: 5,704 Schools: 48	**47.13%** Students: 6,423 Schools: 88		
Middle Schools			**2004/05-07/08**	
2004/05	**49.67%** Students: 9,656 Schools: 43	**71.27%** Students: 22,784 Schools: 46	Increase *ES* = +0.14	Decrease *ES* = -0.56
2005/06	**52.13%** Students: 9,325 Schools: 43	**56.60%** Students: 23,008 Schools: 46	**2004/05-06/07**	
2006/07	**52.66%** Students: 8,850 Schools: 43	**59.71%** Students: 22,967 Schools: 46	Increase *ES* = +0.06	Decrease *ES* = -0.24
2007/08	**56.76%** Students: 8,476 Schools: 43	**44.20%** Students: 21,541 Schools: 46		
High Schools			**2004/05-07/08**	
2004/05	**25.96%** Students: 18,978 Schools: 45	**63.08%** Students: 23,431 Schools: 80	Decrease *ES* = -0.07	Increase *ES* = +0.17
2005/06	**27.03%** Students: 18,948 Schools: 45	**66.63%** Students: 22,612 Schools: 80	**2004/05-06/07**	
2006/07	**31.83%** Students: 17,638 Schools: 45	**66.94%** Students: 23,210 Schools: 80	Increase *ES* = +0.13	Increase *ES* = +0.08
2007/08	**23.11%** Students: 20,464 Schools: 45	**70.87%** Students: 23,603 Schools: 80		

Table 7

Longitudinal Changes in Science Proficiency by Gender and School Focus on Science

Gender	School Level	MSP Focus on Science	Percent at or above proficient				*Effect Size*	
			2004/05	2005/06	2006/07	2007/08	**2004/05-06/07**	**2004/05-07/08**
Males	Elem.	**Yes**	20.82	47.25	45.36	41.37	+0.53	**+0.45**
		No	42.11	42.18	40.80	46.02	-0.02	+0.08
	Middle	**Yes**	48.65	52.24	51.54	57.94	+0.06	+0.19
		No	59.96	57.69	58.86	42.37	-0.02	-0.35
	High	**Yes**	11.49	24.63	30.22	20.31	+0.47	+0.24
		No	62.09	66.34	66.68	70.18	+0.10	+0.17
Females	Elem.	**Yes**	18.77	43.43	41.23	44.36	+0.50	**+0.56**
		No	42.34	44.60	44.10	48.26	+0.04	+0.12
	Middle	**Yes**	48.98	51.39	51.34	55.54	+0.05	+0.13
		No	59.08	58.98	61.45	42.61	+0.05	-0.33
	High	**Yes**	8.11	24.39	28.54	19.08	+0.54	+0.32
		No	64.11	66.92	69.52	71.60	+0.11	+0.16

By gender, the results in Table 7 indicate that there is an increase in science proficiency of about the same magnitude for both males and females over the four-years (2004/05-2007/08) for schools *with* focus on science at all school levels. For schools *without* focus on science, regardless of gender, there is a decrease in science proficiency at the middle school levels and an increase at the elementary and high school level. The largest increase in science proficiency over the four-years (2004/05-2007/08) is for the elementary schools *with* focus on science for males (*ES* = 0.45) and females (*ES* = 0.56). The largest decrease in science proficiency is for the middle schools *without* focus on science for males (*ES* = -0.35) and females (*ES* = -0.33).

By ethnicity, the results in Table 8 indicate that the largest increase in science proficiency over the four years (2004/05-2007/08) is for African-American students at the high and elementary schools *with* focus on science (*ES* = 1.20 and *ES* = 0.68, respectively) followed by Asian students in the elementary schools *with* focus on science (*ES* = 0.49) and Hispanic students in the elementary schools *with* focus on science (*ES* = 0.40). Conversely, the largest decrease is for White students in the middle schools *without* focus on science (*ES* = -1.36) and the ethnic group *Other* in the high and elementary schools *with* focus on science (*ES* = -1.10 and *ES* = -1.00, respectively). Noteworthy is the sharp decrease in science proficiency for White students in the high schools *with* focus on science — from a strong increase (*ES* = 1.44) over the first three years (2004/05-2006/07 to an overall decrease (*ES* = -0.01) over the four-year period of time (2004/05-2007/08) due to a sharp decrease at the end year of this time period (2007/08).

Table 8

Longitudinal Changes in Science Proficiency by Ethnicity and School Focus on Science

Ethnicity	School Level	MSP Focus on Science	Percent at or above proficient				*Effect Size* of Change	
			2004/05	2005/06	2006/07	2007/08	2004/05-06/07	2004/05-07/08
White	Elem.	**Yes**	70.15	86.78	86.81	64.66	+0.41	-0.12
		No	46.94	48.51	48.07	54.62	+0.02	+0.15
	Middle	**Yes**	57.69	60.74	61.06	63.10	+0.07	+0.11
		No	94.01	82.05	82.76	35.95	-0.36	-1.36
	High	**Yes**	12.92	24.43	78.44	12.47	+1.44	-0.01
		No	75.11	76.05	76.24	79.30	+0.03	+0.10
African-American	Elem.	**Yes**	15.03	57.29	45.21	45.27	+0.68	+0.68
		No	35.95	38.12	37.36	37.42	+0.03	+0.03
	Middle	**Yes**	43.13	45.69	44.17	51.76	+0.02	+0.17
		No	52.20	45.97	48.21	47.91	-0.08	-0.09
	High	**Yes**	1.62	3.97	52.10	44.42	+1.36	+1.20
		No	42.91	49.10	50.18	57.78	+0.15	+0.30
Hispanic	Elem.	**Yes**	13.35	17.88	20.60	29.37	+0.19	+0.40
		No	38.66	38.79	35.90	33.75	-0.06	-0.10
	Middle	**Yes**	37.26	40.64	36.64	30.52	-0.01	-0.14
		No	45.01	29.20	32.99	34.30	-0.25	-0.22
	High	**Yes**	10.40	9.76	12.50	12.15	+0.06	+0.06
		No	40.31	49.37	46.18	55.95	+0.12	+0.31
Asian	Elem.	**Yes**	54.44	78.01	83.33	77.40	+0.64	+0.49
		No	57.14	66.07	52.38	51.64	-0.10	-0.11
	Middle	**Yes**	63.51	63.01	59.78	63.24	-0.08	-0.01
		No	84.62	78.95	81.71	61.47	-0.08	-0.53
	High	**Yes**	23.71	26.84	37.07	25.35	+0.29	+0.04
		No	75.80	80.57	40.53	82.78	-0.73	+0.17
Other	Elem.	**Yes**	87.35	71.11	63.64	42.40	-0.57	-1.00
		No	57.14	53.85	49.56	47.05	-0.15	-0.20
	Middle	**Yes**	83.09	62.07	52.91	61.36	-0.66	-0.49
		No	76.10	75.25	74.60	44.70	-0.03	-0.66
	High	**Yes**	62.80	63.58	30.00	12.72	-0.67	-1.10
		No	45.88	26.13	39.31	30.36	-0.13	-0.32

For special education students, the results in Table 9 indicate that, despite a decrease at the end year (2007/08) of the four-year time period (2004/05-2007/08), there is an overall increase in science proficiency for the elementary, middle, and high schools *with* focus on science (*ES* = 0.24, *ES* = 0.20, and *ES* = 0.07, respectively) across the four years. The largest decrease in science proficiency on the four-year period of time (2004/05-2007/08) is for the middle schools *without* focus on science (*ES* = -0.54).

For students with limited English proficiency (LEP), the results (still in Table 9) show that there is a sustained increase in science proficiency over the four years (2004/05-2007/08) for the elementary and middle schools *with* focus on science (*ES* = 0.35 and *ES* = 0.46, respectively).

For the high schools *with* focus on science, there is a shift from a slight increase (*ES* = 0.02) over the first three years (2004/05-2007/08) to a slight decrease (*ES* = -0.01) over the four-year period of time (2004/05-2007/08). It is worth noting also that there is an increase in science proficiency over the four years (2004/05-2007/08) for schools *without* focus on science at all school levels (elementary, middle, and high).

Table 9

Longitudinal School Changes in Science Proficiency for Special Education (SED) and Limited English Proficiency (LEP) Students by School Focus on Science

SED LEP	School Level	MSP Focus on Science	Percent at or above proficient				*Effect Size*	
			2004/05	2005/06	2006/07	2007/08	**2004/05-06/07**	**2004/05-07/08**
Special Education Students (SED)	Elem.	**Yes**	13.33	53.00	42.60	22.60	+0.67	+0.24
		No	19.85	25.41	23.59	25.84	+0.09	+0.14
	Middle	**Yes**	18.00	20.69	18.95	26.48	+0.02	+0.20
		No	48.91	29.06	30.51	23.12	-0.38	-0.54
	High	**Yes**	1.73	2.55	5.92	2.72	+0.23	+0.07
		No	26.01	29.67	32.89	38.80	+0.15	+0.27
Limited English Proficiency (LEP)	Elem.	**Yes**	5.87	10.96	12.02	16.49	+0.21	+0.35
		No	23.52	28.61	26.48	28.77	+0.07	+0.12
	Middle	**Yes**	7.62	17.51	16.93	24.02	+0.29	+0.46
		No	3.17	12.17	11.90	9.51	+0.35	+0.27
	High	**Yes**	3.18	3.80	3.64	3.02	+0.02	-0.01
		No	25.14	33.43	33.89	33.25	+0.19	+0.18

Schools by Direction of Change in Math and Science Proficiency

The results in this section relate to the second research question, RQ2: "What is the distribution of MSP-related schools across categories of change (increase, decrease, or no change) in math and science proficiency over the targeted four-year period of time (2004/05-2007/08) for schools *with* MSP focus on the subject (math or science) and schools *without* MSP focus on the subject?" Specifically, this section provides information about the percentage of schools by direction of change in math and science proficiency over the time period from year 2004/05 to the end year (2007/08)— see Figures 14, 15, and 16, for math, and Figures 17, 18, and 19, for science.

For **math proficiency**, the percentage of schools with an increase is much higher than the percentage of schools with a decrease at all (elementary, middle, and high) school levels. For schools that fall into the "increase" category, the percentage of schools *with* MSP focus on math is much higher than the percentage of schools *without* MSP focus on math for the elementary

schools (32.8% versus 19.9%) and the middle schools (50.4% versus 26.0%). At the high school level, the increase in math proficiency is at a higher rate for schools *without* MSP focus on math (36.8%) compared to schools *with* MSP focus on math (23.2%).

Figure 14. Percentage of elementary schools *with* (or *without*) MSP focus on math by direction of change (decrease, no change, increase) in math proficiency.

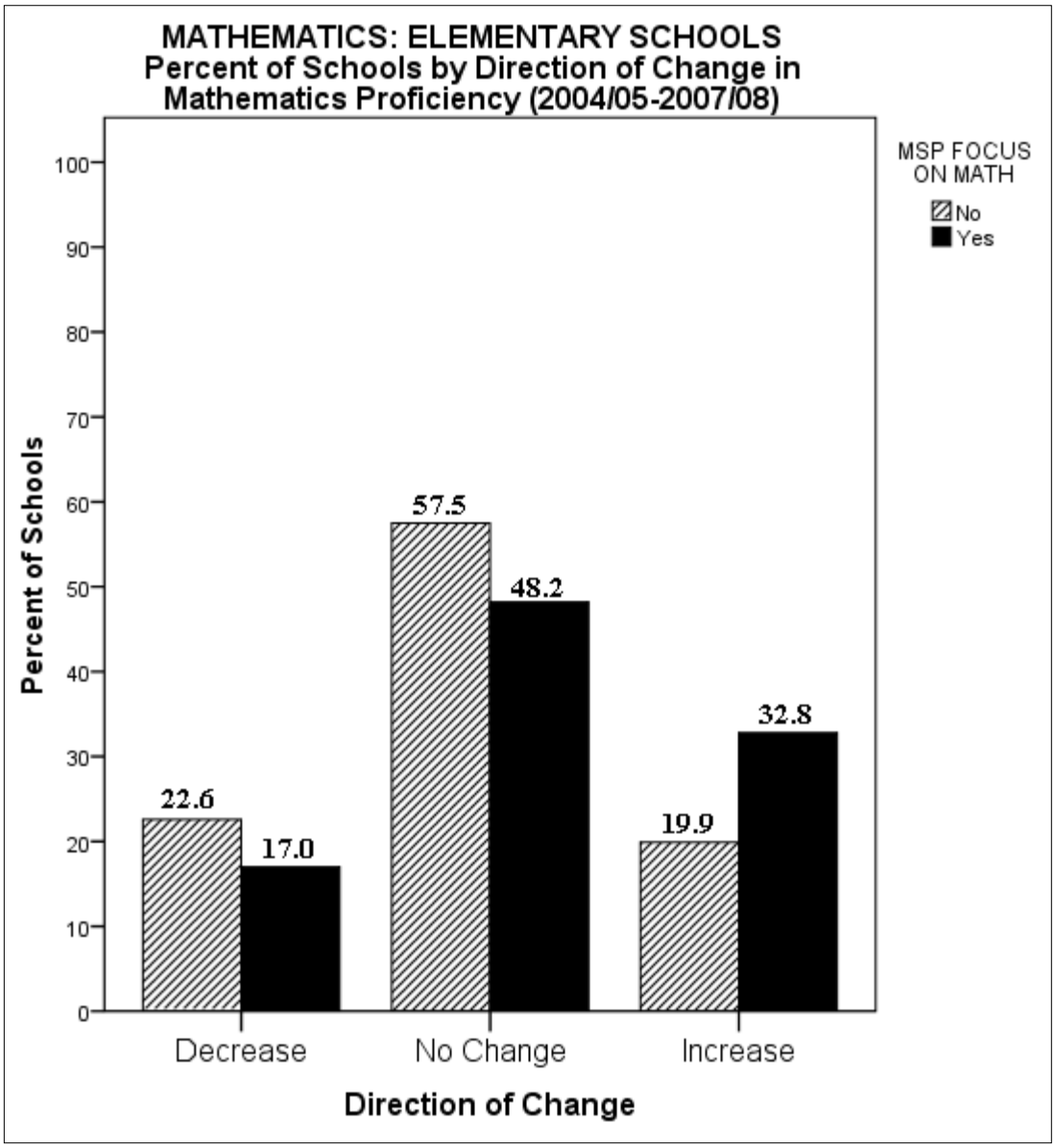


Figure 15. Percentage of middle schools *with* (or *without*) MSP focus on math by direction of change (decrease, no change, increase) in math proficiency.

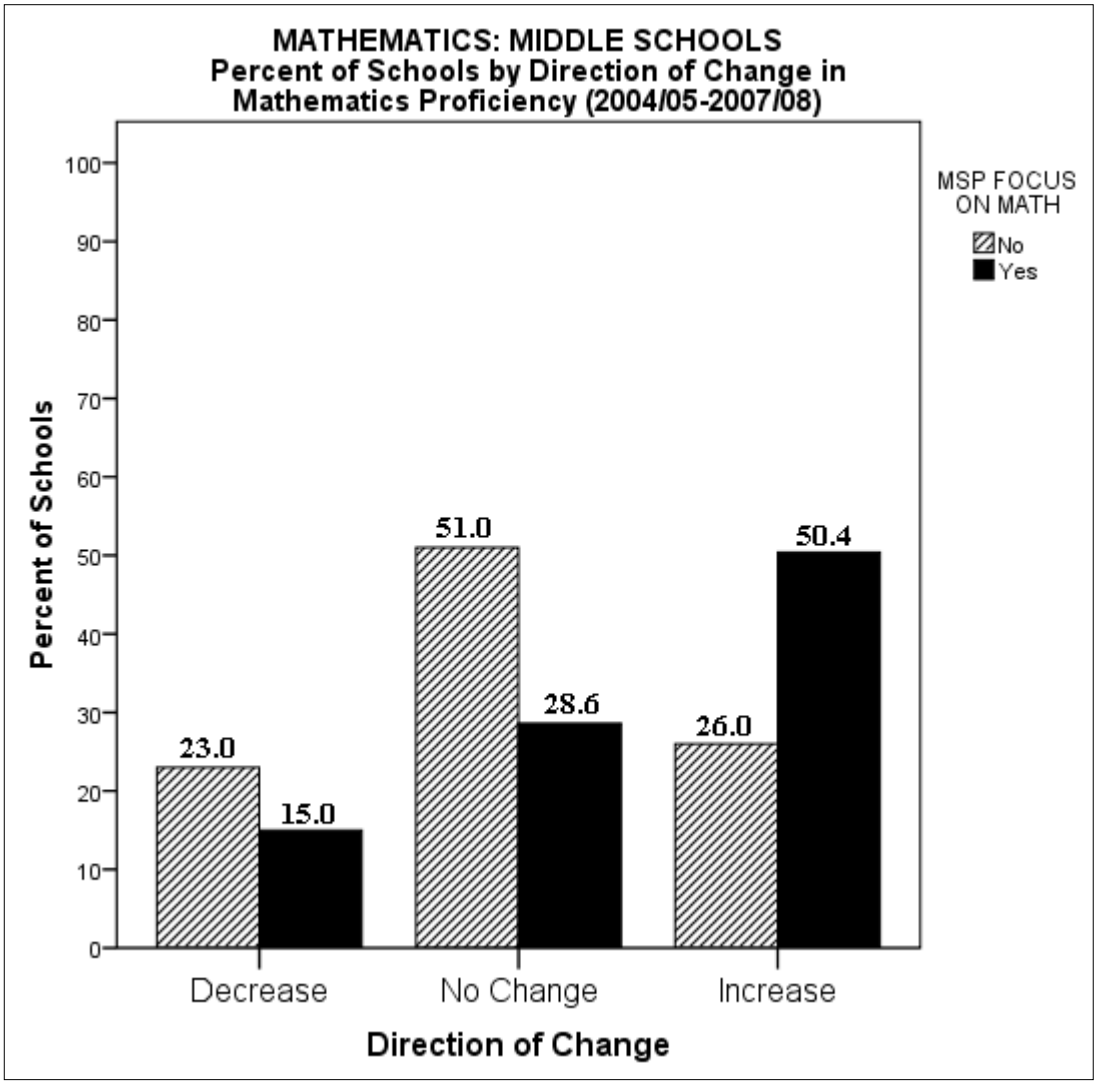
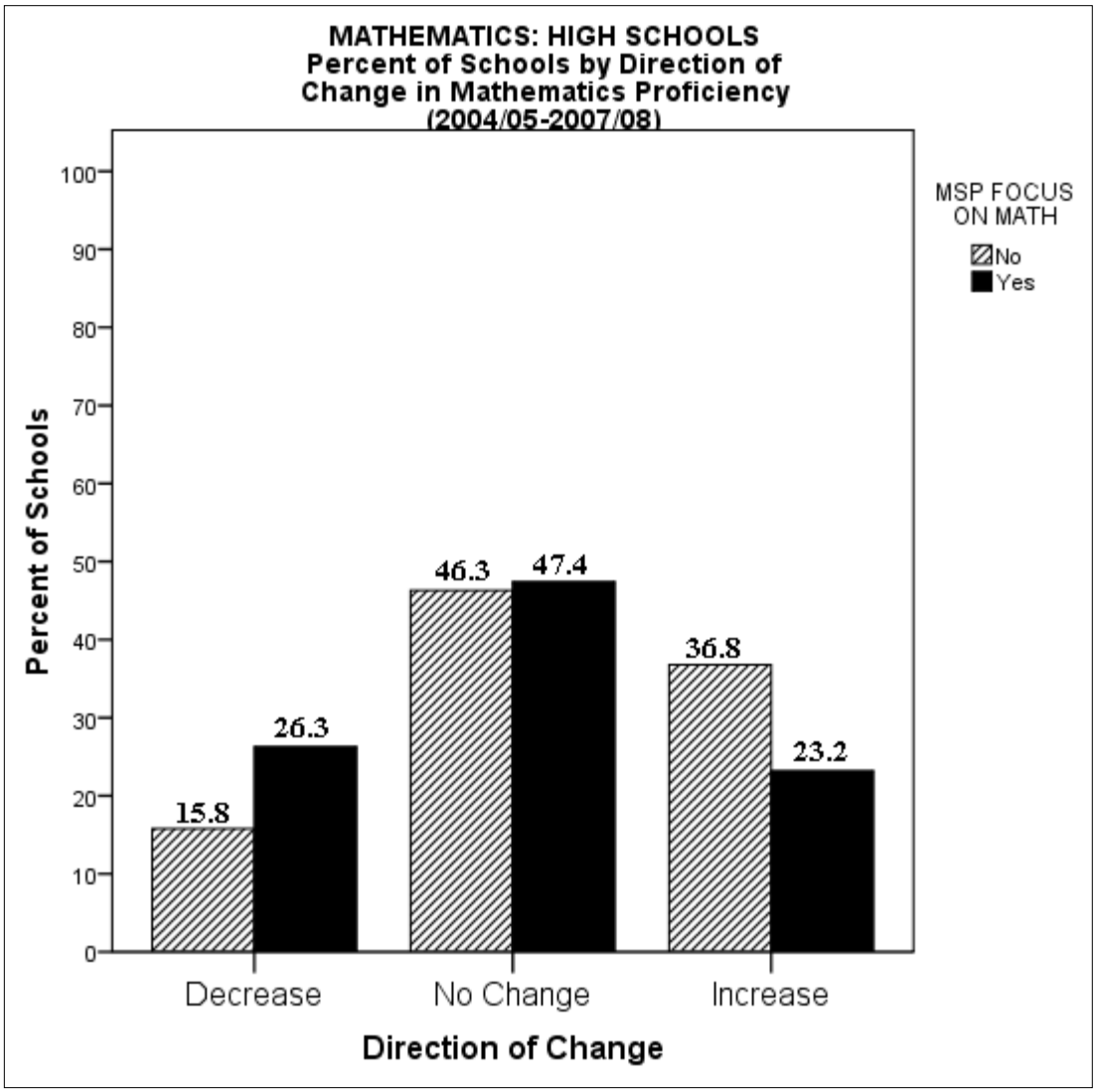


Figure 16. Percentage of high schools *with* (or *without*) MSP focus on math by direction of change (decrease, no change, increase) in math proficiency.



For **science proficiency**, the percentage of schools with a four-year increase is much higher than the percentage of schools with a four-year decrease at all school levels. Also, for the schools that fall into the "increase" category, the percentage of schools *with* MSP focus on science is much higher than the percentage of schools *without* MSP focus on science for the elementary schools (66.7% versus 25.0%) and the middle schools (60.5% versus 28.3%), but at the high school level the schools *without* MSP focus on science increase in science proficiency at higher rate (36.3%) compared to schools *with* MSP focus on science (28.9%).

Figure 17. Percentage of elementary schools *with* (or *without*) MSP focus on science by direction of change (decrease, no change, increase) in science proficiency.

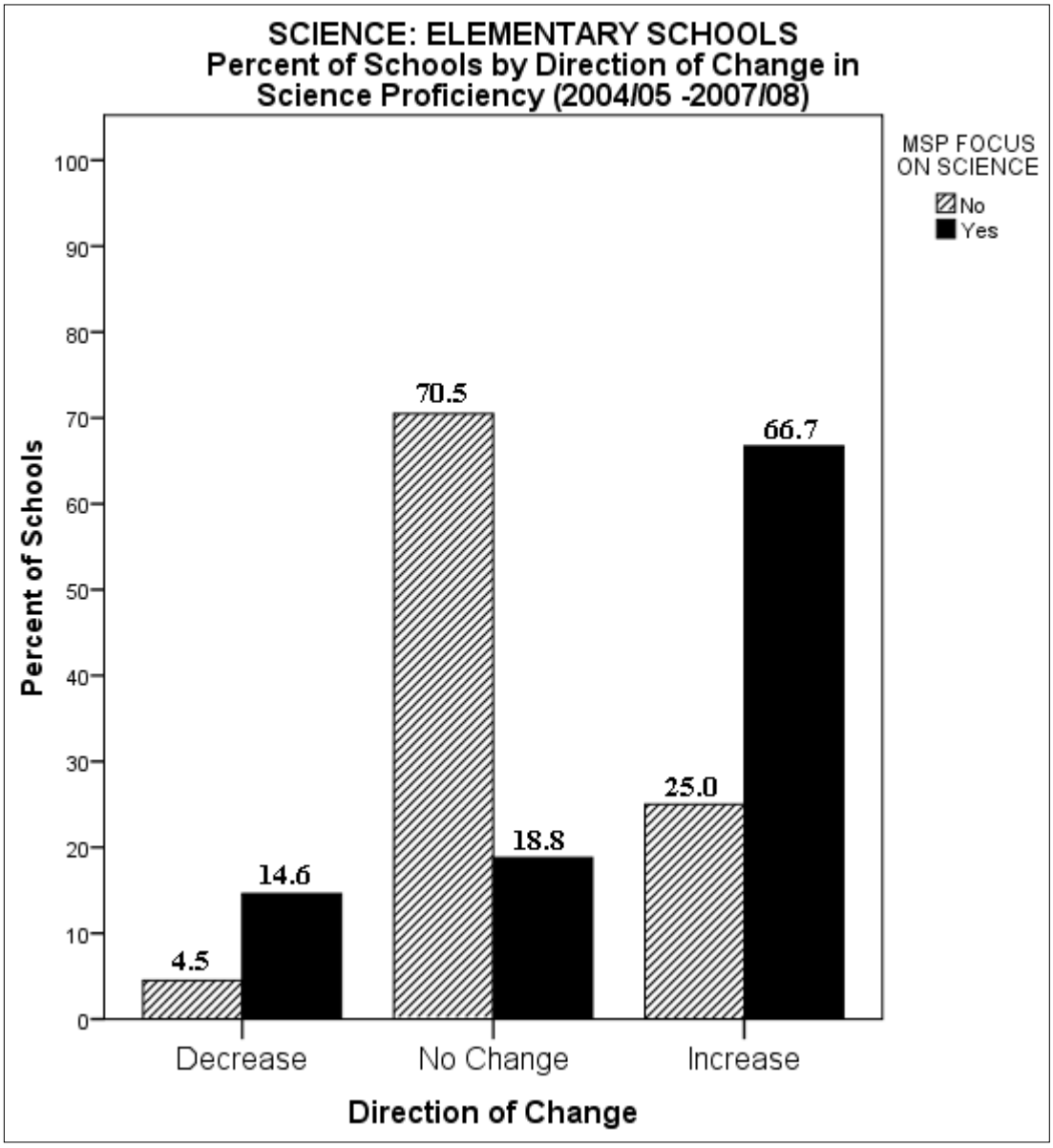


Figure 18. Percentage of middle schools *with* (or *without*) MSP focus on science by direction of change (decrease, no change, increase) in science proficiency.

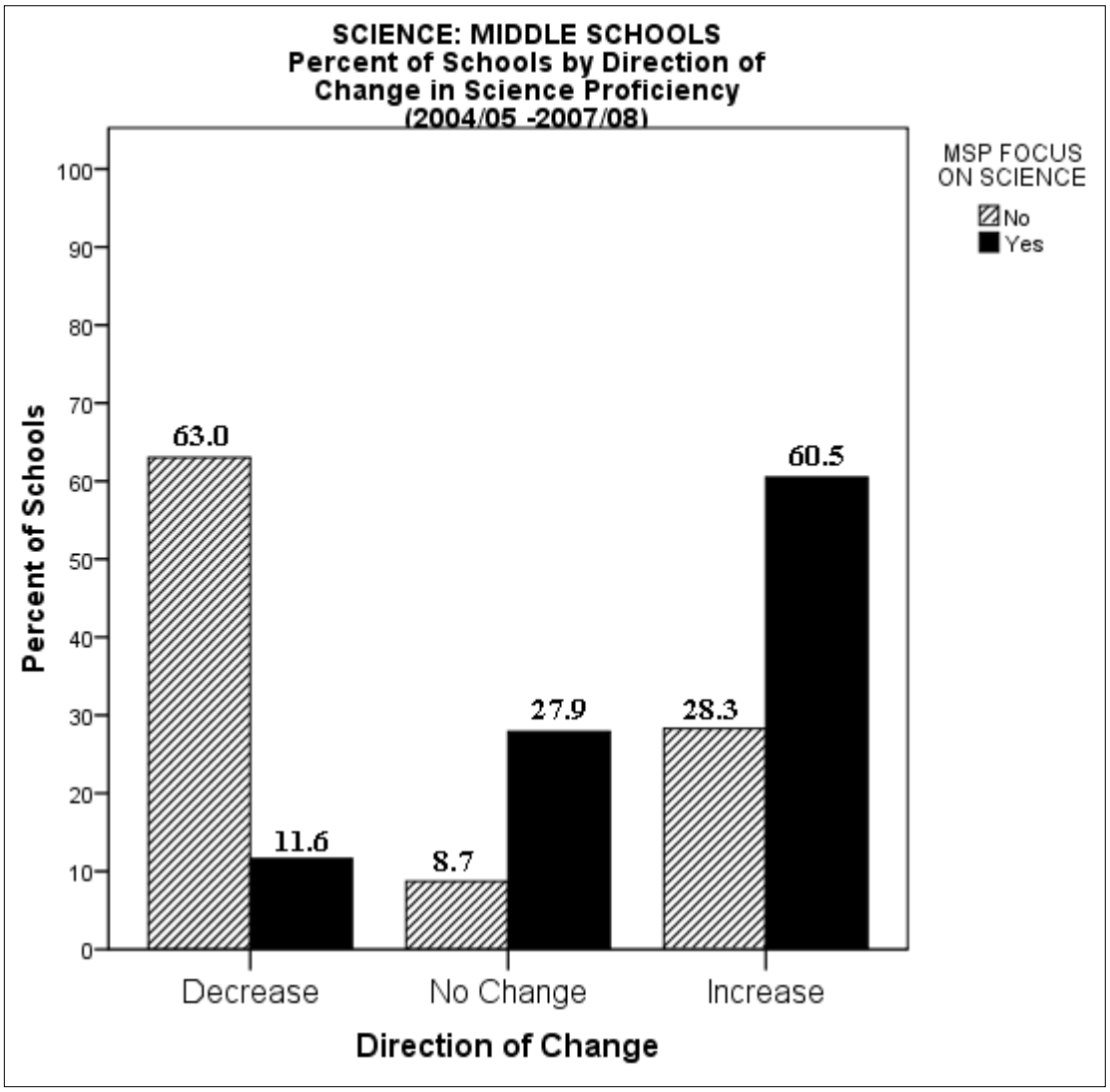
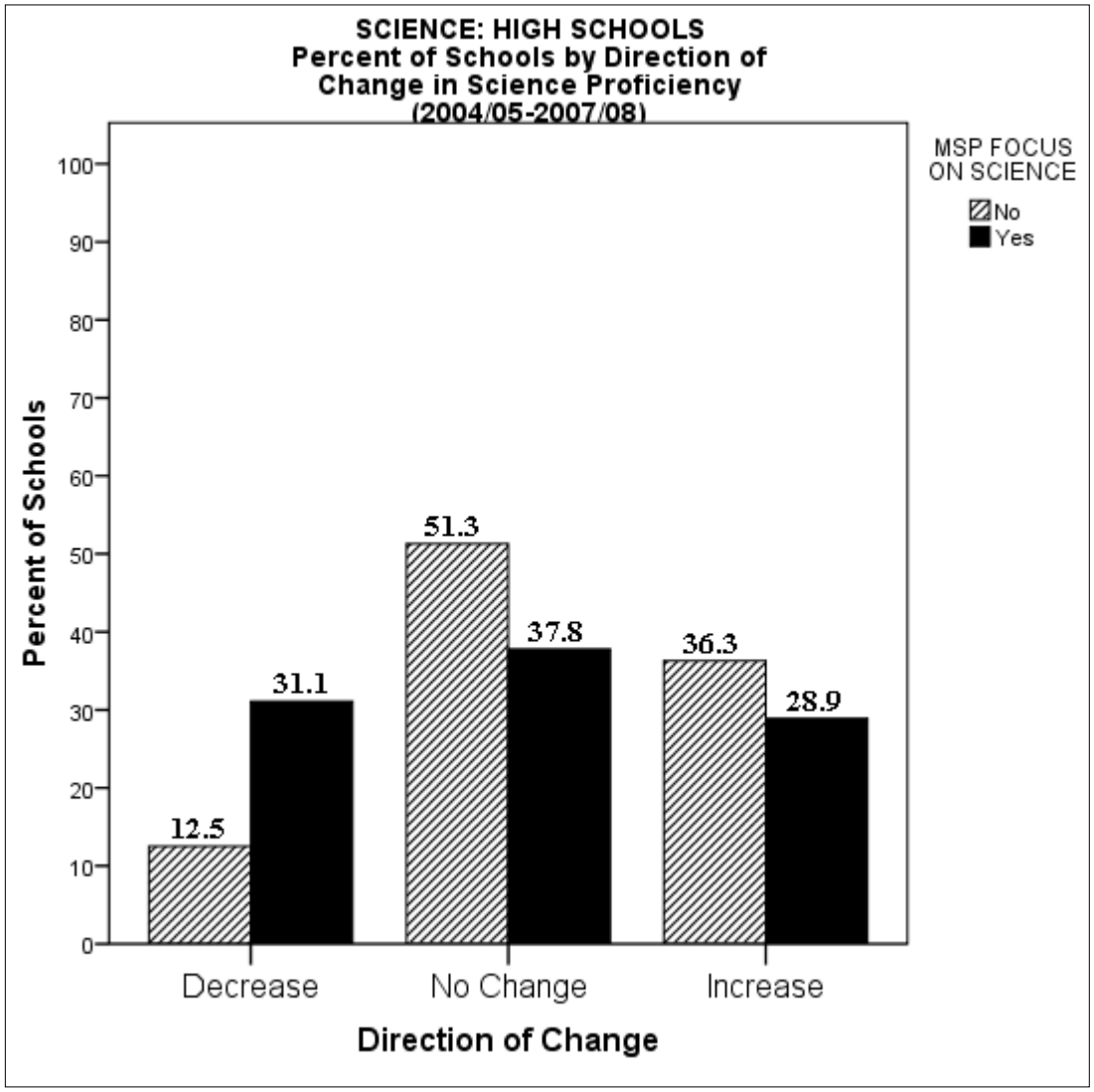


Figure 19. Percentage of high schools *with* (or *without*) MSP focus on science by direction of change (decrease, no change, increase) in science proficiency.



Longitudinal Growth Trajectories in School Math and Science Proficiency

The results in this section relate to the third research questions, RQ3: "What are the longitudinal growth trajectories (with possible latent classes of such trajectories) in math and science proficiency across the four-year period (2004/05 – 2007/08) for schools *with* MSP focus on the subject (math or science) and schools *without* MSP focus on the subject?" Graphically, the longitudinal growth model (LGM) of change in school math and science proficiency across four years (2004/05-2007/08) is depicted in Figure 1. To examine for possible latent classes of growth trajectories in math (or science) proficiency, this model was upgraded with adding a latent class component (not shown in Figure 1 for space consideration). The resulting model is referred to as *growth mixture model* (GMM; e.g., Muthén, 2004). All computations were performed using the computer program for statistical analysis with latent variables M*plus* (Muthén & Muthén, 2007).

Based on preliminary data analyses (e.g., see Figures 4 and 10), the growth trajectories in math and science proficiency were tested for both linear and nonlinear (e.g., quadratic) shape using the Lo-Mendel-Rubin Adjusted Likelihood Ratio Test (LMR-Adj. LRT). The results are summarized in Table 10, where the number of classes retained and the shape of the growth trajectories identified through the testing procedure are given in bold. A statistically significant LMR-Adj. LRT indicates that the number of classes being tested under a specified shape of growth trajectories (e.g., liner or quadratic) is more appropriate compared to the number of classes specified in the preceding step of the testing procedure. The magnitude of *Entropy* is also taken into account. The closer the Entropy to 1.00, the more suitable the tested model for number of classes and shape of growth trajectories (a value of .80 or higher is considered acceptable). The results in Table 10, related to latent classes of growth trajectories for student proficiency in math and science across the four-year period of time (2004/05-2007/08), are discussed next. As noted earlier (see Method section, p. 10), the arcsin-root transformation of the proportion of students at or above proficient was the outcome variable across the four-years (2004/05-2007/08) in the growth mixture modeling used to address RQ3. Along with investigating the rate of change in math (or science) proficiency for schools *with* focus on math (or science) compared to schools *without* focus on math (or science), possible dependence (association) between school membership to latent classes of growth trajectories and "focus on the subject" (math or science) was also tested using a chi-square test for association between categorical variables.

Mathematics

At the elementary school level, the results in Table 10 indicate that there is a *single class* of linear growth trajectories for student proficiency in math (note that the LMR-Adj. LRT in testing

for two latent classes is not statistically significant). The goodness-of-fit indexes for this single class indicated a reasonable data fit of the model: $\chi^2(5) = 11.581$, $p = .041$; CFI = .961, TLI = .953, RMSEA = .058, SRMR = .019. The growth trajectories are depicted in Figure 20.

Table 10

Testing for Latent Classes of Growth Trajectories in Math and Science Proficiency Across Four Years (2004/05-2007/08) by School Level

Subject/School level	Number of latent classes[a]	Shape of latent class trajectories	Entropy	LMR-Adj. LRT	*p*-value
Math/ Elementary	**One** Two	**Linear** Linear	**—** 0.804	**—** 553.450	**—** .108
Math/ Middle	**Two** Three	**Quadratic** Quadratic	0.867 0.850	**403.28***** 135.305	.0001 .335
Math/ High	Two Three **Four** Five	Quadratic Quadratic **Quadratic** Quadratic	0.891 0.943 0.971 0.952	315.197* 296.543* **182.069***** 95.162	.024 .016 .001 .240
Science/ Elementary	**Two** Three	**Linear** Linear	1.000 0.926	**365.129***** 154.815	< .001 .0761
Science/Middle	**Two** Three	**Linear** Linear	0.883 0.934	**145.709*** 79.019	.010 .230
Science/High	**Two** Three	**Linear** Linear	0.987 0.925	**399.184***** 80.051	< .001 .098

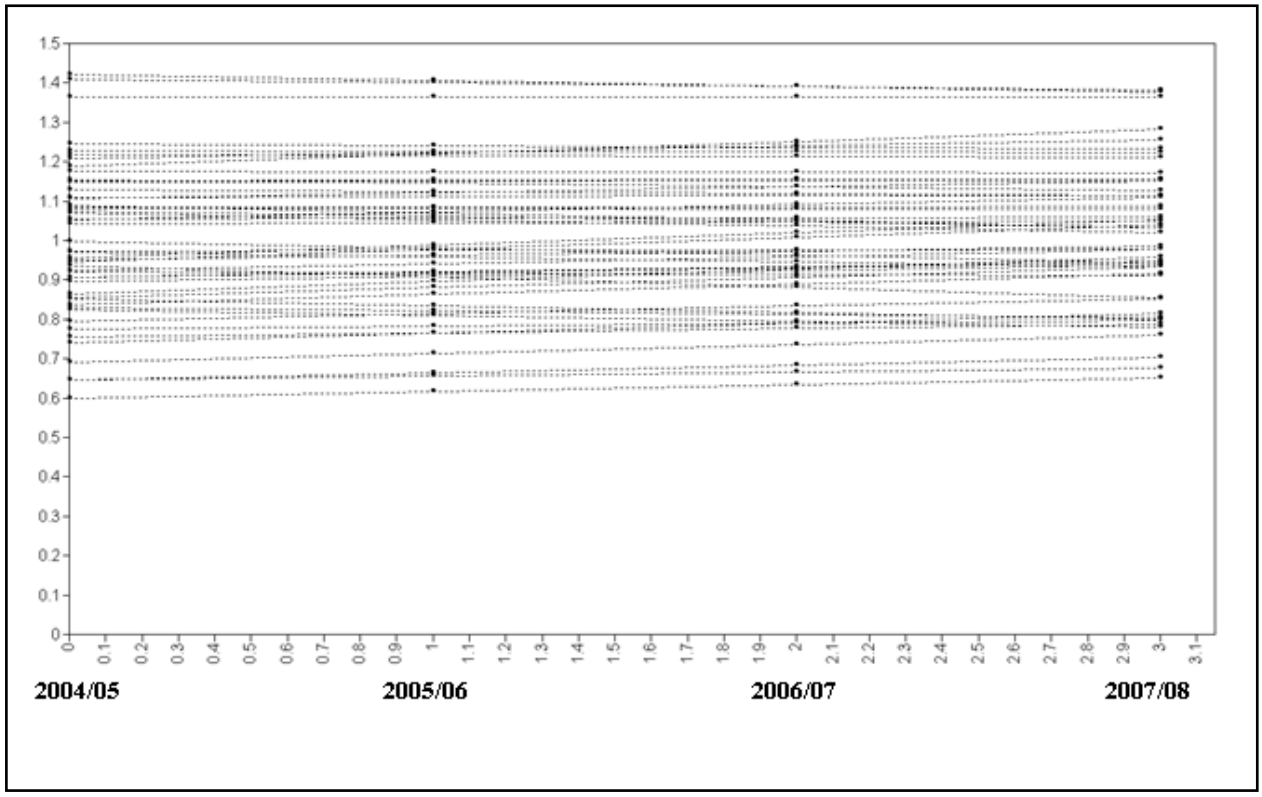
Note: LMR-Adj. LRT = Lo-Mendel-Rubin Adjusted Likelihood Ratio Test.
The conclusions about the number of latent classes was also supported by the estimates of some other indexes such as AIC (Akaike Information Criterion) and Adj. BIC = Sample-Size Adjusted Bayesian Information Criterion. These indexes are not reported here for space consideration and clarity of interpretation as LMR-Adj. LRT is considered more dependable.

[a] The number of classes retained and the shape of the growth trajectories are given in bold.

At the middle school level, the results in Table 10 indicate that there are two latent classes of quadratic growth trajectories in math proficiency across the four years (2004/05-2007/08). To avoid confusion, instead of representing individual growth trajectories for these two latent classes, provided in Figure 21 are only the estimated means of the trajectories at each of the four years. As can be seen, the first class (Class 1), which contains 51.1% of the growth trajectories (i.e., 51.1% of the middle schools belong to this class), consistently exceeds the second class (Class 2, 49.9%) in math proficiency across the four years. However, the trends of

changes in math proficiency delineated by the two classes of growth trajectories are different. Specifically, while the lower performing schools (in Class 2) demonstrate a sustained increase, the better performing schools exhibit a quadratic trend of a slight initial increase followed by a slight decrease in math proficiency across the four years (2004/05-2007/08).

Figure 20. A single class of linear growth trajectories in math proficiency across four years (2004/05-2007/08) for the elementary schools.



Note. On the vertical axis are the school scores (arcsin-root transformation of the proportion of students at or above proficient) for individual growth trajectories across the four years.

At the high school level, the results in Table 10 indicate that there are four latent classes of quadratic growth trajectories in math proficiency across the four years (2004/05-2007/08). The estimated means of these trajectories at each of the four years are depicted in Figure 22. As can be seen, the first three classes contain schools with relatively stable performance and almost negligible change across the four years, with Class 2 (25.1% of the high schools) performing consistently higher than Class 3 (53.2% of the high schools) and Class 1 (16.9% of the high schools). Class 4, which contains the smallest percent of high schools (4.7%), demonstrates a quadratic trend of initial increase (2004/05-2005/06) followed by a sharp decrease (2005/06-2007/08) in trajectories of math proficiency over the four-year period of time (2004/05-2007/08).

Figure 21. Two latent classes of quadratic growth trajectories in math proficiency across four years (2004/05-2007/08) for the middle schools.

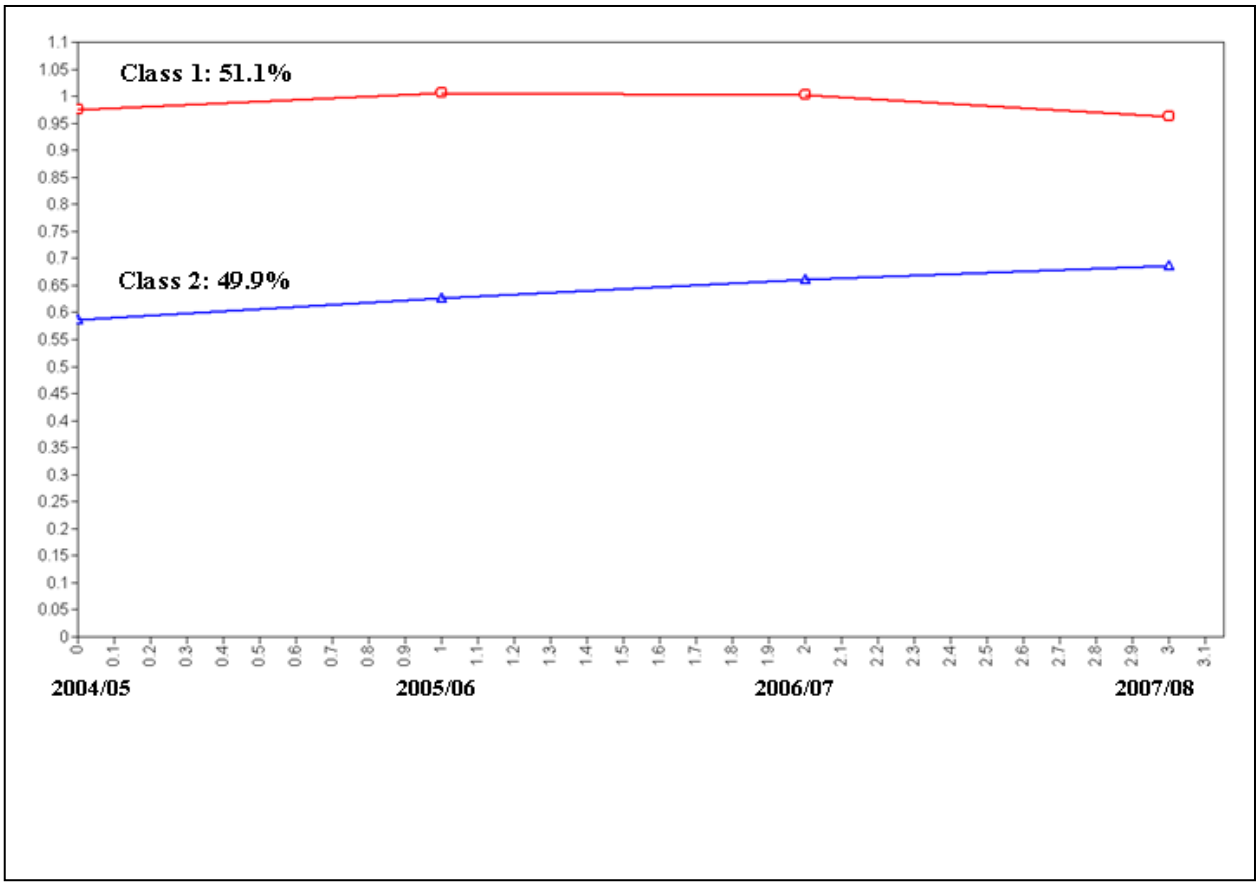
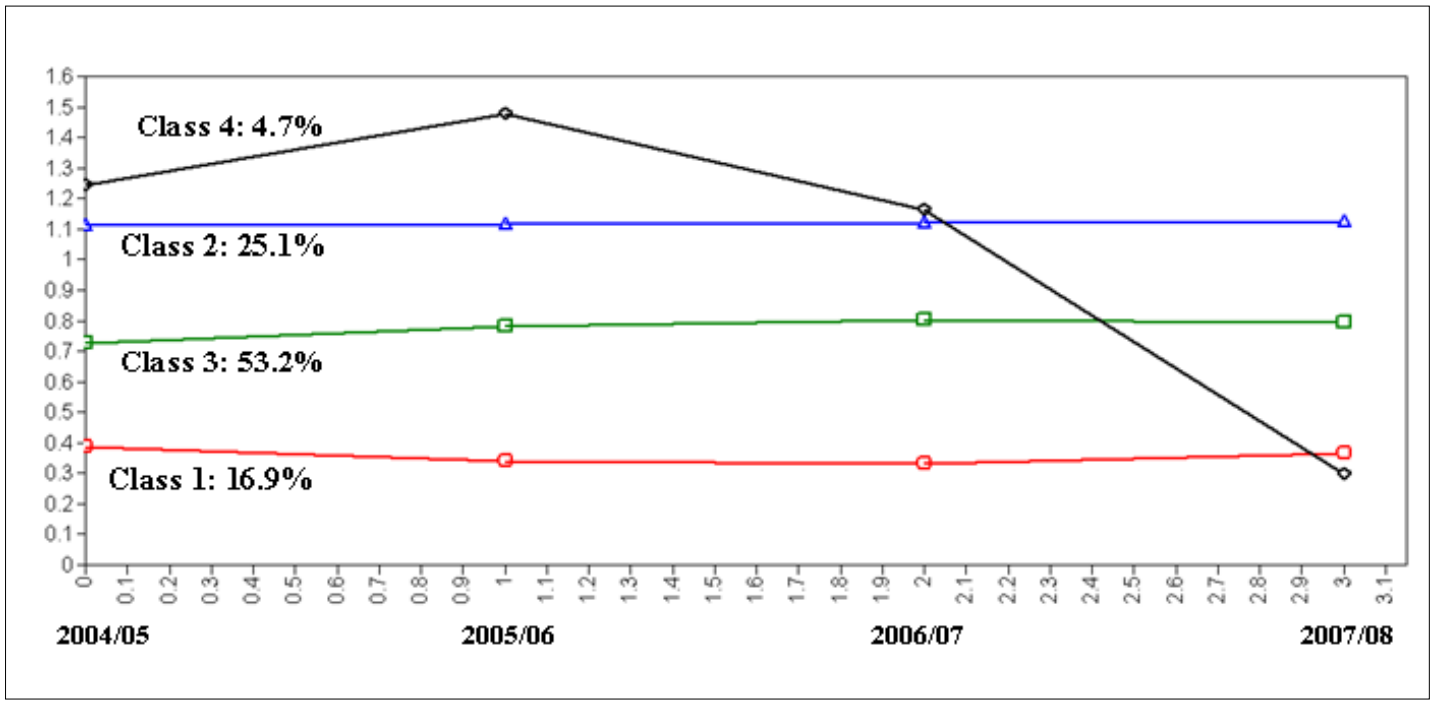


Figure 22. Four latent classes of quadratic growth trajectories in math proficiency across four years (2004/05-2007/08) for the high schools.



The results from the growth analyses of math proficiency also indicated that the elementary and middle schools *with* focus on math increased at a higher rate in math proficiency compared to their counterparts *without* focus on math, but the rate of change in math proficiency for the high schools does not depend on whether the schools are *with* or *without* focus on math across the identified latent classes across the four-year period of time. It was also found that, for both schools *with* and *without* focus on math, schools with lower initial status (i.e., lower percent of students at or above proficient in math) tend to increase at a higher rate in math proficiency over the four-year period of time.

Table 11

Frequency of Schools with (or without) Focus on Math that Fall Into Latent Classes of Growth Trajectories in Math Proficiency Across Four Years (2004/05-2007/08) and Chi-square Tests for Dependence Between Class Membership and Focus on Math (Yes/No) by School Level

SUBJECT/School Level/Class	**Description**[1]	**Focus on math**		**Statistical *Class* x *Focus* Dependence**[2]
MATHEMATICS		Yes	No	
Elementary				
A single class	A slight overall increase	247	146	NA
Middle				
Class 1 (51.1%)	Higher level: slight increase followed by a slight decrease	59	55	$\chi^2(1) = 2.59$
Class 2 (49.9%)	Lower level: slight sustained increase	74	45	
High				
Class 1 (16.9%)	Lowest level: *no* changes	12	20	$\chi^2(3) = 11.17$*
Class 2 (25.1%)	Higher than Classes 1 and 3: *no* changes	25	23	
Class 3 (53.2%)	Higher than Class 1: *no* changes	49	52	
Class 4 (16.9%)	Highest start with a sharp initial increase followed by a sharp decrease	9	0	

Note. In the first column, given in parentheses is the percentage of schools that fall into the respective class. The numbers in the column "Focus of math" show the frequency of schools *with* or *without* focus on math that fall into the respective class.

[1] A *higher level* class means higher average proficiency in math across the four years (2004/05-2007/08) for the schools that fall into this class.

[2] A statistically significant *chi-square* value [asterisk(s) assigned] indicates dependence between class membership of the schools and their "focus on math" status (Yes/No).

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 11 provides information about (a) the frequency of schools *with* and *without* focus on math that fall within identified latent classes of math proficiency across the four years (2004/05-

2007/08) and (b) a Pearson *chi-square* test for dependence between *class membership* and *focus on math* (Yes/No) by school level (elementary, medium, and high). For the elementary schools, the chi-square test is *not* appropriate as all schools fall within a single class of growth trajectories with a slight overall increase in math proficiency. At the middle school level, the chi-square test is not statistically significant thus indicating the lack of dependence between *class membership* and *focus on math* (Yes/No). That is, the schools *with* (or *without*) focus on math are neither overrepresented nor underrepresented into some of the two latent classes of math proficiency. At the high school level, however, the chi-square test is statistically significant thus indicating that there is a dependence between *class membership* and *focus on math* (Yes/No). Particularly salient in this regard is the overrepresentation of schools *with* focus on math in Class 4. This class exhibits the highest start in 2004/05 and a sharp initial increase followed by a sharper decrease in math proficiency (see Figure 22) — there are nine high schools *with* focus on math that fall into Class 4, whereas none of the high schools without focus on math falls into Class 4. To a large degree (if not entirely), this finding can explain the decrease in math proficiency for high schools *with* focus on math at the end year (2007/08) — see Figure 7.

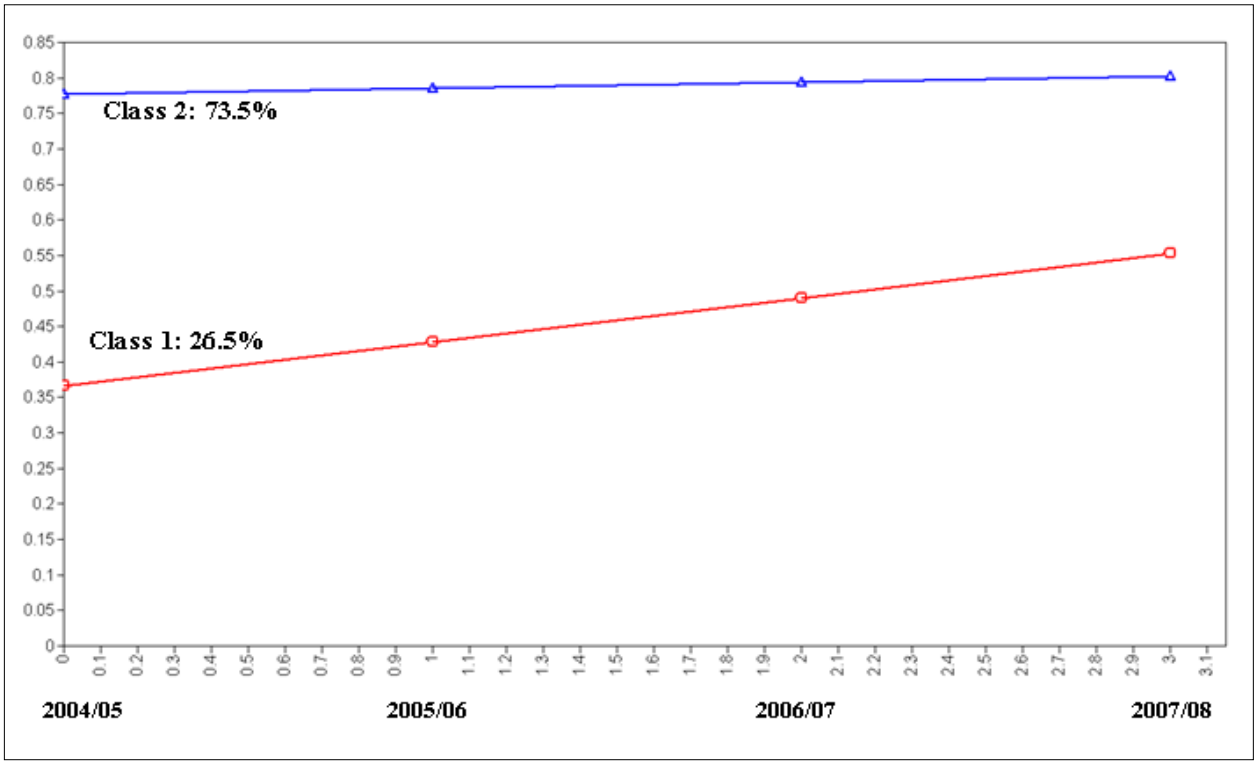
Science

The results in Table 10 for science indicate that there are two latent classes of linear growth trajectories across the four years (2004/05-2007/08) at all school levels (elementary, middle, and high). For the elementary schools, the estimated means of linear growth trajectories in two latent classes are depicted in Figure 23. The first class (Class 1, 26.5% of the elementary schools) is consitently lower than the second class (Class 2, 73.5% of the elementary schools), yet provides a more pronounced trend of sustained increase across the four years.

For the middle schools, the estimated means of linear growth trajectories in the two latent classes are depicted in Figure 24. In this case, the lower performing class (Class 1, 57.3% of the middle schools) provides a trend of sustained increase, whereas the higher performing class (Class 2, 42.7% of the middle schools) provides a trend of sustained decrease, across the four years (2004/05-2007/08).

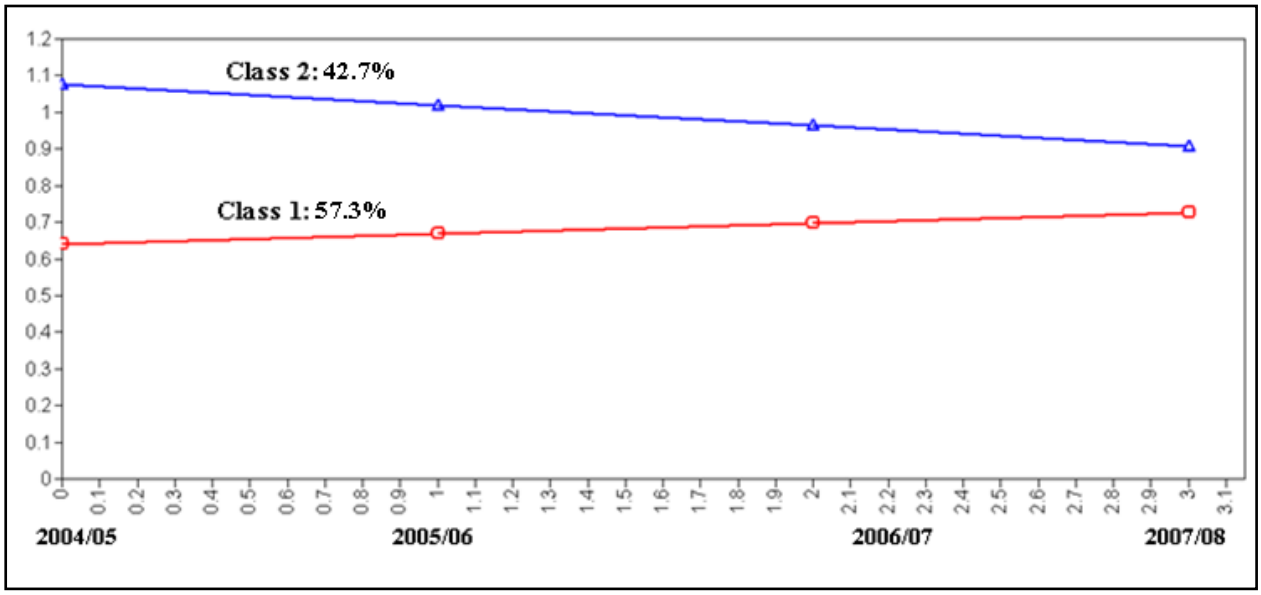
For the high schools, the estimated means of linear growth trajectories in the two latent classes are depicted in Figure 25. The first class (Class 1, 62.4% of the high schools) performs better than the second class (Class 2, 37.6% of the high schools) but there is a trend of *no change* in science proficiency across the four years (2004/05-2007/08) for the high schools in each of these two latent classes.

Figure 23. Two latent classes of linear growth trajectories in science proficiency across four years (2004/05-2007/08) for the elementary schools.



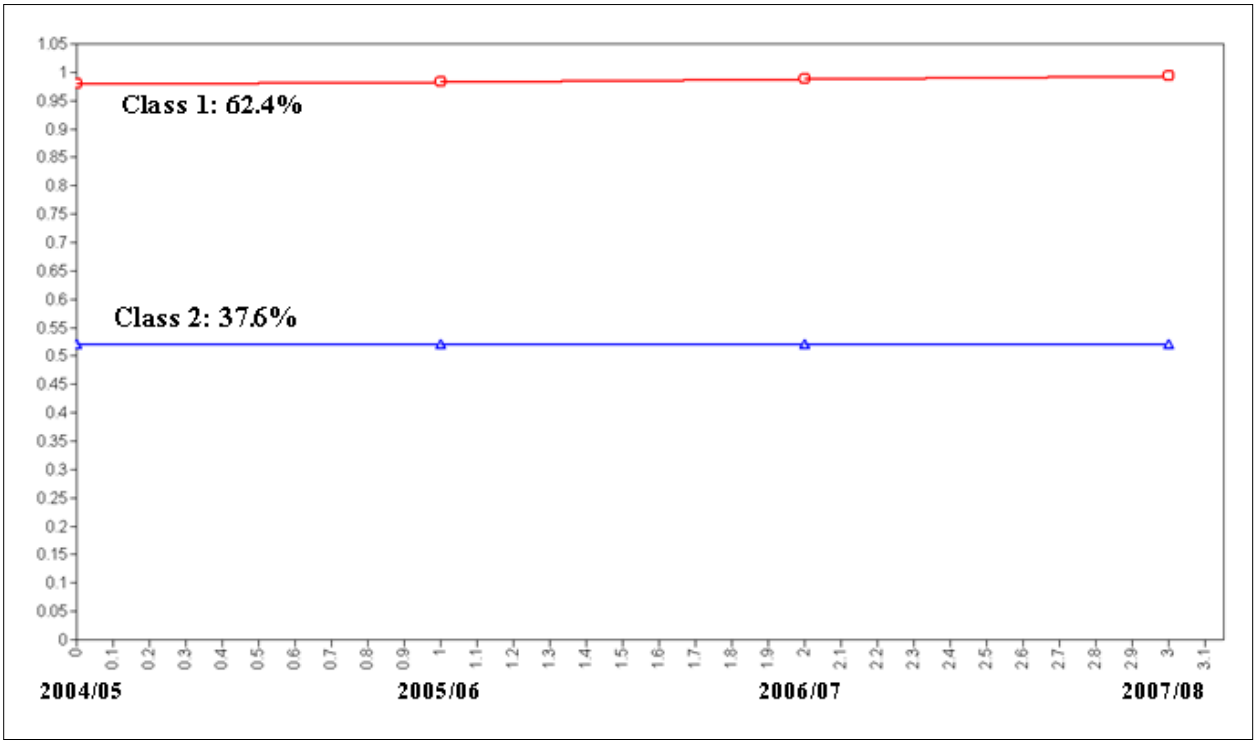
Note. On the vertical axis is the estimated mean of the school score (arcsin-root transformation of the proportion of students at or above proficient) for each latent class across the four years.

Figure 24. Two latent classes of linear growth trajectories in science proficiency across four years (2004/05-2007/08) for the middle schools.



Note. On the vertical axis is the estimated mean of the school score (arcsin-root transformation of the proportion of students at or above proficient) for each latent class across the four years.

Figure 25. Two latent classes of linear growth trajectories in science proficiency across four years (2004/05-2007/08) for the high schools.



Note. On the vertical axis is the estimated mean of the school score (arcsin-root transformation of the proportion of students at or above proficient) for each latent class across the four years.

The results from the growth analyses of science proficiency also indicated the schools *with* focus on science tend to have lower initial status (lower percent of students at or above proficient in year 2004/05) at all school levels (elementary, middle, and high) compared to schools *without* focus on science. On the other hand, (a) there is no significant difference in rate of growth between schools *with* and *without* focus on science at the elementary school level, (b) middle schools *with* focus on science increase at higher rate compared to middle schools *without* focus on science, and (c) high schools *without* focus on science start higher (in 2004/05) and tend to increase at higher rate compared to high schools *with* focus on science across the four-year period of time (2004/05-2007/08).

Table 12 provides information about (a) the frequency of schools *with* and *without* focus on science that fall within identified latent classes of science proficiency across the four years (2004/05-2007/08) and (b) a Pearson *chi-square* test for dependence between *class membership* and *focus on science* (Yes/No). At all school levels, the chi-square test is statistically significant thus indicating that there is a dependence between *class membership* and *focus on science* (Yes/No) for the elementary, middle, and high schools. At the elementary school level, with two

latent classes of growth trajectories in science proficiency, (a) the schools *with* focus on science are overrepresented in Class 2—the higher-level class with a small sustained increase in growth trajectories—and (b) almost all schools *without* focus on science fall into Class 1—the lower-level class with a more pronounced sustained increase in growth trajectories across the four years (2004/05-2007/08). At the middle school level, with two latent classes of growth trajectories in science proficiency, (a) schools *with* focus on science dominate Class 2—the higher-level class with a small sustained increase—and (b) schools *without* focus on science dominate Class 1—the lower-level class with a very small sustained increase. At the high school level, with two latent classes of growth trajectories in science proficiency, both the schools *with* and *without* focus are represented at a higher rate in Class 1—the higher-level class of growth trajectories with no statistically significant changes across the four years (2004/05-2007/08). It should be noted that this finding does not provide a direct (if any) explanation of the decrease in science proficiency at the end year (2007/08) for high schools *with* focus on science (see Figure 19).

Table 12

Frequency of Schools with (or without) Focus on Science that Fall Into Latent Classes of Growth Trajectories in Science Proficiency Across Four Years (2004/05-2007/08) and Chi-square tests for Dependence Between Class Membership and Focus on Science (Yes/No) by School Level

SUBJECT/School Level/Class	**Description**[1]	**Focus on science**		**Statistical *Class* x *Focus* Dependence**[2]
SCIENCE		Yes	No	
Elementary				
Class 1 (26.5%)	Lower level: pronounced sustained increase	13	87	$\chi^2(1) = 82.22^{***}$
Class 2 (73.5%)	Higher level: very small sustained increase	35	1	
Middle				
Class 1 (57.3%)	Lower level: very small sustained increase	21	30	$\chi^2(1) = 5.28^{*}$
Class 2 (42.7%)	Higher level: small sustained decrease	25	13	
High				
Class 1 (62.4%)	Higher level: *no* changes	35	43	$\chi^2(1) = 7.09^{**}$
Class 2 (37.6%)	Lower level: *no* changes	10	37	

Note. In the first column, given in parentheses is the percentage of schools that fall into the respective class. The numbers in the column "Focus of science" show the frequency of schools *with* or *without* focus on science that fall into the respective class.

[1] A *higher level* class means higher average proficiency in science across the four years (2004/05-2007/08).for the schools that fall into this class.

[2] A statistically significant *chi-square* value [asterisk(s) assigned] indicates dependence between class membership of the schools and their "focus on science" status (Yes/No).

* $p < .05$. ** $p < .01$. *** $p < .001$.

Relationship Between Targeted Teacher Participation in MSP-related Activities and Student Proficiency in Math and Science

The results in this section relate to the fourth research question, RQ4: "What is the relationship between schools' targeted teacher participation in MSP-related activities over the four-year time period (2004/05–2007/08) and the schools' success in math and science proficiency at the end year of this time period (2007/08)?" Specifically, provided are results about the relationship between the targeted teacher participation in MSP-related activities over the span of four years (2004/05-2007/08) and the student proficiency in math and science at the end year (2007/08). The Pearson product-moment correlation coefficients for this relationship at the elementary, middle, and high school levels are provided in Table 13. The results indicate that the relationship between the targeted teacher participation in MSP-related activities and student proficiency is statistically significant and positive (yet, relatively small) (a) at the elementary and high school levels for math (r = .148 and r = .273, respectively), and (b) at the elementary and high school levels for science (r = .013 and r = .376, respectively). Clearly, the relationship of interest is relatively more substantial for science at the high school level (r = .376).

Table 13

Correlations Between Teacher Participation in MSP Activities Across Four Years (2004/05, 2005/06, 2006/07, 2007/08) and Student Proficiency at the End Year (2007/08)

Subject/ School level	*r*	*N*	*n*
Mathematics			
Elementary	.148**	424	97892
Middle	.031	327	170677
High	.273**	243	78491
Science			
Elementary	.013*	287	22922
Middle	.011	222	58844
High	.376**	180	51482

Note: N = number of schools (used for the calculation of the correlation coefficient, r); n = number of students who have taken the state assessment in these schools.
*$p < .05$. ** $p < .01$.

Relationship Between Student Proficiency in Math (or Science) and Successful Completion of Math (or Science) Courses at the High School Level

The results in this section relate to the fifth research question, RQ5:" What is the relationship between the schools' success in math (or science) at any year of the time period 2004/05-2007/08 and the ratio indicating what proportion of the students who took the state examination in math (or science) have successfully completed a regular or advanced course in math (or a particular subject area in science—Biology, Chemistry, Physics, Earth and Science, or Integrated Science) that year?"

Table 14

Correlation Between Student Success in Mathematics (or Science) Courses and Proficiency on State Assessment in Mathematics (or Science) Across Four Years (2004/05, 2005/06, 2006/07, and 2007/08)

	2004/05	**2005/06**	**2006/07**	**2007/08**
MATHEMATICS				
Regular course	**.493**** (*n* = 196)	.038 (*n* = 181)	.042 (*n* = 160)	**.417**** (*n* = 219)
Advanced course	.158 (*n* = 114)	**.179*** (*n* = 140)	.005 (*n* = 136)	.173 (*n* = 112)
SCIENCE				
Biology	**.477**** (*n* = 136)	**.205*** (*n* = 152)	**.299**** (*n* = 180)	**.290**** (*n* = 146)
Chemistry	**.266**** (*n* = 131)	**.190*** (*n* = 149)	**.230**** (*n* = 172)	.193 (*n* = 141)
Physics	**.320**** (*n* = 125)	.224 (*n* = 62)	**.223**** (*n* = 160)	.072 (*n* = 126)
Earth and Science	**.228*** (*n* = 88)	.085 (*n* = 96)	.013 (*n* = 80)	.172 (*n* = 47)
Integrated Science	**.347**** (*n* = 95)	**.331**** (*n* = 93)	.165 (*n* = 129)	.141 (*n* = 82)

Note. *n* = Number of schools

* $p < .05$. ** $p < .01$.

For mathematics, the correlations in Table 14 indicate that the targeted relationship is statistically significant (at the .05 level of significance) only for high school students who

successfully completed (a) a regular math course in year 2004/05 (r = .493), (b) an advanced math course in year 2005/06 (r = .179), and (c) a regular course in math in year 2007/08 (r = .417). Thus, the relationship between the proficiency in math for high school students and their success in regular math courses is more clearly pronounced, compared to success in advanced courses, but this relationship is manifested only two years (2004/05 and 2007/08) of the four-year period of time (2004/05-2007/08).

For science, the correlations in Table 14 indicate that there is a stable relationship between proficiency in science for high school students and their success in completing a course in Biology (the correlations vary from .205 to .477). Although less pronounced, a similar trend emerges for successful completion of a course in Chemistry, Integrated Science, and Physics, yet not quite in Earth and Science. Overall, there is a promising relationship between proficiency in science and successful completion of a course in science for high students over the four-year period of time (2004/05-2007/08).

Discussion

This study examines longitudinal trends in MSP-related changes in student math and science proficiency using MSP-MIS data with the Annual K-12 District Survey for five years, 2003/04, 2004/05, 2005/06, 2006/07, and 2007/08. However, given that previous MSP-related studies (e.g., Dimitrov, 2008, 2009a, 2009b) have analyzed MSP-MIS longitudinal data that include the first year (2003/04), some descriptive analyses in this study used the 2003/04 data, but the longitudinal analyses were conducted using the MSP-MIS longitudinal data for the last four years (2004/05-2007/08) **—** i.e., only schools that have provided MSP-MIS data for each year of this four-year period of time. This led to larger samples and dependability of results from longitudinal analyses in this study. The results are summarized by the topics of the five research questions addressed in this study.

Trends of Changes in Math and Science Proficiency

Mathematics. Overall, there is an increase in math proficiency of about 18% at the elementary school level, about 11% at the middle school level, and about 7% at the high school level from the first year (2003/04) to the end year (2007/08). For the intermediate years within this time period, the increase is well sustained at the elementary school level, but there is a slight decrease at the end (from 2006/07 to 2007/08) at the middle and high school levels. The factor "MSP focus on math" was taken into account for longitudinal data over the targeted four-year period of time (2004/05-2007/08). At the elementary school level, (a) for schools *without* focus on math, there is an initial decrease in math proficiency of about 8% (from 2004/05 to 2005/06)

followed by a slight increase in math proficiency of about 2% over the next three years (from 2005/06 to 2007/08), and (b) for schools *with* focus on math, there is a sustained increase in math proficiency of about 6% over the four years (2004/05-2007/08). At the middle school level, (a) for schools *without* focus on math, there is an initial decrease in math proficiency of about 2% (from 2004/05 to 2005/06) and an increase in math proficiency of about 2% over the next three years (from 2005/06 to 2007/08), and (b) for schools *with* focus on math, there is an increase in math proficiency of about 5% over the first three years (from 2004/05 to 2006/07) and a decrease in math proficiency of about 4% at the end (from 2006/07 to 2007/08).

At the high school level, (a) for schools *without* focus on math, there is an overall increase in math proficiency of about 5%, with slight intermediate fluctuations, and (b) for schools *with* focus on math, there is an increase in math proficiency of about 2% over the first three years (2004/05-2006/07) followed by a decrease of about 5% at the end (from 2006/07 to 2007/08). This decrease can be partially (if not entirely) explained by simultaneous effects produced by a decline in math proficiency at the end year (2007/08) for (a) a latent class of nine high schools *with* focus on math (see Class 4 in Figure 22 and Table 11) and (b) a couple of ethnic groups — specifically, a decline for White students and even stronger decline for students from the ethnic group Other (different from White, African-American, Hispanic, and Asian) in high schools *with* focus on math (see Table 4). Aside from this "bump" in math proficiency changes for high schools *with* focus on math, the largest "first year-end year" (2004/05-2007/08) increase in student math proficiency is for schools *with* MSP focus on math at the elementary school level.

Overall, the trend in mathematics proficiency for schools across this four-year period of time is the same for both males and females. Regardless of gender, the largest gap in math proficiency trends between schools *with* and *without* focus on math is at the elementary school level, where the largest increase in math proficiency is for schools with focus on math, whereas the largest decrease is for schools *without* focus on math.

By ethnicity, the largest increase in math proficiency over the four years (2004/05-2007/08) at the elementary school level is for Asian students followed (in this order) by African-American students and Hispanic students — all in schools *with* focus on math. At the middle school level, the largest increase in math proficiency is for African-American students followed (in this order), at much lower level, by Hispanic students and Asian students — all in schools *with* focus on math. At the high school level, the largest increase in math proficiency is for African-American students followed (in this order), at much lower level, by Asian students and Hispanic students — all in schools *with* focus on math. At all school levels, for schools *with*

focus on math, White students demonstrate an increase in math proficiency over the first three years (2004/05-2006/07) followed by a decrease at the end year (2007/08) of the four-year period of time. For schools *without* focus on math, White students have a sustained decrease in math proficiency at the elementary and middle school level and a sustained increase at the high school level. The ethnic group *Other* exhibits a relatively large sustained decrease at all school levels for both schools *with* and *without* focus on math, with the largest decrease at the high school level for schools *with* focus on math.

For special education students, the largest increase in math proficiency over the four years (2004/05-2007/08) is for elementary schools *with* focus on math followed by a smaller increase for middle schools *with* focus on math. For elementary and middle schools *without* focus on math, there is a decrease in math proficiency. For high schools with focus on *math*, there is an increase over the first three years (2004/05-2006/07) followed by a decrease at the end year (2007/08). For high schools *without* focus on math, there is a sustained increase in math proficiency over the four-year period of time (2004/05-2007/08).

For students with limited English proficiency, there is a sustained increase in math proficiency over the four years (2004/05-2007/08) for schools *with* focus on math at all school levels (elementary, middle, and high). For schools *without* focus on math, there is relatively large decrease in math proficiency at the elementary school level, a very small decrease at the middle school level, and a small increase at the high school level.

Science. Overall, there is an increase of about 17% in science proficiency at the elementary school level, an increase of about 11% at the middle school level, and about 4% at the high school level from the first year (2003/04) to the end year (2007/08). For the intermediate years within this time period, the increase is well sustained at the elementary school level, but there are fluctuations at the middle and high school levels. The factor "MSP focus on science" was taken into account for longitudinal data over the targeted four-year period of time (2004/05-2007/08). At the elementary school level, (a) for schools *without* focus on science, there is an overall increase of about 7% in science proficiency, with some intermediate fluctuations, and (b) for schools *with* focus on science, there is an overall increase of about 3% in science proficiency, also with some intermediate fluctuations. At the middle school level, (a) for schools *without* focus on science, there is a large decrease of 27% in science proficiency, with some intermediate fluctuations, and (b) for schools *with* focus on science, there is a sustained increase in science proficiency of about 7%. At the high school level, (a) for schools *without* focus on science, there is a sustained increase in science proficiency of about 8%, and (b) for schools *with* focus on

science, there is an overall decrease of 3% in science proficiency, with an increase over the first three years (2004/05-2006/07) followed by a decrease at the end year (2007/08). As can be seen from Table 8, this decrease seems to come primarily from an unexpected decrease in science proficiency for high schools *with* focus on science at the end year (2007/08) for two ethnic groups — White and *Other* (different from White, African-American, Hispanic, and Asian).

By gender, there is an increase in science proficiency of about the same magnitude for both males and females over the four-years (2004/05-2007/08) for schools *with* focus on science at all school levels. For schools *without* focus on science, regardless of gender, there is a decrease in science proficiency at the middle school levels and an increase at the elementary and high school level. For both males and females, the largest increase in science proficiency over the four-years (2004/05-2007/08) is for the elementary schools *with* focus on science, whereas the largest decrease is for the middle schools *without* focus on science.

By ethnicity, the largest increase in science proficiency over the four years (2004/05-2007/08) is for African-American students in the high and elementary schools *with* focus on science followed (in this order) by Asian students in the elementary schools *with* focus on science and Hispanic students in the elementary schools *with* focus on science. Conversely, the largest decrease is for White students in the middle schools *without* focus on science and the ethnic group *Other* in the high and elementary schools *with* focus on science. Noteworthy is the sharp decrease in science proficiency for White students in the high schools *with* focus on science — from a strong increase over the first three years (2004/05-2006/07) to an overall decrease over the four-year period of time (2004/05-2007/08) due to a sharp decrease at the end year of this time period (2007/08).

For special education students, there is an overall increase in science proficiency for the elementary, middle, and high schools *with* focus on science across the four years (2004/05-2007/08). The largest decrease in science proficiency over this period of time is for the middle schools *without* focus on science.

For students with limited English proficiency (LEP), there is a sustained increase in science proficiency over the four years (2004/05-2007/08) for the elementary and middle schools *with* focus on science. For the high schools *with* focus on science, there is a shift from a slight increase over the first three years (2004/05-2006/07) to a slight decrease over the four-year period of time (2004/05-2007/08). There is an increase in science proficiency over the four years (2004/05-2007/08) for schools *without* focus on science at all school levels (elementary, middle, and high).

Schools by Direction of Change in Math and Science Proficiency

For **math proficiency**, the percentage of schools with an increase over the four-year period of time (2004/05-2007/08) is much higher than the percentage of schools with a decrease at all (elementary, middle, and high) school levels. For schools that fall into the "increase" category, the percentage of schools *with* MSP focus on math is much higher than the percentage of schools *without* MSP focus on math for the elementary schools and middle. At the high school level, the increase in math proficiency is at higher rate for schools *without* MSP focus on math compared to schools *with* MSP focus on math.

For **science proficiency**, the percentage of schools with an increase over the four-year period of time (2004/05-2007/08) is much higher than the percentage of schools with a decrease at all (elementary, middle, and high) school levels. For the schools that fall into the "increase" category, the percentage of schools *with* MSP focus on science is much higher than the percentage of schools *without* MSP focus on science for the elementary and middle schools, but at the high school level the schools *without* MSP focus on science increase in science proficiency at higher rate compared to schools *with* MSP focus on science.

Longitudinal Growth Trajectories in School Math and Science Proficiency

Mathematics. The results from the growth mixture modeling of changes in math proficiency over the four-year period of time (2004/05-2007/08) indicate that there are different numbers of latent classes and different trends of increase (or decrease) in math proficiency within these classes across different school levels (elementary, middle, and high). At the elementary school level, there is a single class of linear growth trajectories that indicate a sustained increase in math proficiency.

At the middle school level, there are two latent classes of nonlinear growth trajectories in math proficiency over the four-year period of time (2004/05-2007/08). The trends of changes in math proficiency delineated by the two classes of growth trajectories are different. Specifically, while the class consisting of the lower performing schools delineates a sustained increase in math proficiency, the better performing schools in the other class exhibits a quadratic trend of a slight initial increase followed by a slight decrease in math proficiency across the four years (2004/05-2007/08).

At the high school level, there are four latent classes of quadratic growth trajectories in math proficiency across the four years (2004/05-2007/08). Three latent classes contain schools with relatively stable performance and almost negligible change across the four years, but they also differ consistently in level of proficiency across the four years. A fourth latent class, that

contains the smallest percent of high schools, demonstrates a quadratic trend of initial increase (2004/05-2005/06) followed by a sharp decrease (2005/06-2007/08) in trajectories of math proficiency over the four-year period of time (2004/05-2007/08). As noted earlier, this latent class of unexpected decline in math proficiency consists of nine high schools *with* focus on math and they all come from a single MSP project.

The results from the growth analyses of math proficiency for the elementary, middle, and high schools also indicated that the elementary and middle schools *with* focus on math increase at higher rate in math proficiency compared to their counterparts *without* focus on math, but the rate of change in math proficiency for the high schools does not depend on whether the schools are *with* or *without* focus on math for the identified latent classes across the four-year period of time. Also, regardless of focus on math, schools with lower initial status (lower percent of students at or above proficient in math) tend to increase at a higher rate in math proficiency over the four-year period of time. From a different angle, based on chi-square tests for association, the dependence between membership to latent classes of growth trajectories in math *and* school focus on math (Yes/No) is statistically significant at the high school level (see Table 11).

Science. The results from the growth mixture modeling of changes in science proficiency over the four-year period of time (2004/05-2007/08) indicate that there are two latent classes of linear growth trajectories at all school levels (elementary, middle, and high). For the elementary schools, while the higher perfoming class exhibits a negligible increase in science proficiency, the lower performing class provides a more pronounced trend of sustained increase across the four years (2004/05-2007/08). For the middle schools, the lower performing class provides a trend of sustained increase, whereas the higher performing class provides a trend of sustained decrease, across the four years (2004/05-2007/08). For the high schools, one of the two classes performs consistently better than the other class, but for both classes there is a trend of *no change* in science proficiency across the four years (2004/05-2007/08).

The results from the growth analyses of science proficiency also indicate that the schools *with* focus on science tend to have lower initial status (in year 2004/05) in science proficiency at all school levels (elementary, middle, and high) compared to schools *without* focus on science. On the other hand, (a) there is no significant difference in rate of growth between schools *with* and *without* focus on science at the elementary school level, (b) middle schools *with* focus on science increase at higher rate compared to middle schools *without* focus on science, and (c) high schools *without* focus on science start higher (in 2004/05) and tend to increase at higher rate compared to high schools *with* focus on science across the four-year period of time (2004/05-

2007/08). From a different angle, based on chi-square tests for association, the dependence between membership to latent classes of growth trajectories in science *and* school focus on science (Yes/No) is statistically significant at the elementary, middle, and high school levels (see Table 12).

Relationship Between Targeted Teacher Participation in MSP-related Activities and Student Proficiency in Math and Science

The Pearson product-moment correlation coefficients for the relationship between targeted teacher participation in MSP-related activities and student proficiency in math and science show that, for both math and science, this relationship is positive, yet relatively weak at the elementary school level, somewhat stronger at the high school level, but *not* manifested at the middle school level (see Table 13). One can expect that this relationship could be even more pronounced at the high school level if there was not a relatively large decrease in math (or science) proficiency at the end year (2007/08) for high schools *with* focus on math (or science).

Relationship Between Student Proficiency in Math (or Science) and the Proportion of Students Assessed in Math (or Science) Who Successfully Completed a Math (or Science) Course at the High School Level

MSP-MIS data for examination of the targeted relationship is available only at the high school level for math and science. For **mathematics**, this relationship is demonstrated for high school students who successfully completed a regular math course in year 2004/05, an advanced math course in year 2005/06, or a regular course in math in year 2007/08. The relationship between the proficiency in math for high school students and their success in regular math courses (manifested in two years) is more clearly pronounced compared to advanced courses, where this relationship is manifested only one year over the four-year period of time (2004/05-2007/08).

For **science**, there is a stable relationship between proficiency in science for high school students and their success in completing a course in Biology. Although less pronounced, a similar trend emerges for successful completion of a course in Chemistry, Integrated Science, and Physics, yet not quite in Earth and Science. Overall, there is a promising relationship between proficiency in science and successful completion of a course in science for high school students over the four-year period of time (2004/05-2007/08).

Limitations and Upcoming Analyses

The results in this study must be interpreted with understanding of limitations that stem from restricted MIS data with the Annual K-12 District Survey. One potential limitation stems from the lack of MIS data that can be used to equate school proficiency measures in math and science across states. It should be noted, however, that mapping state performance standards on to a common scale (e.g., using *NAEP* data) is a difficult task still challenging the research on large-scale performance analyses (e.g., Braun & Qian, 2007; McLaughlin & Bandeira de Mello, 2003). The purpose of such equating is to take into account differences (in content and passing standards) among state assessments in math and science for the comparison of states on a common scale. Such comparisons, however, are not targeted in this study. Instead, the focus here is on changes and growth trajectories in student math and science proficiency and its relationship with school's targeted teacher participation in MSP-related activities.

One limitation, for example, is the lack of matching data from "control" schools (not involved in MSP) to evaluate the degree to which the changes in students' proficiency in math and science can be attributed to school participation in MSP. That is why this study does not engage in testing hypothesis about the degree to which the delineated trends in math and science performance of MSP-related schools are different from trends that may exist in non-MSP related schools. However, while the preferred design of random assignment to groups is not applicable in this study of MSP-MIS data, we can argue that the employed design of comparing schools *with* and *without* MSP focus on math (or science) is a sound alternative (and probably better that any other two-group design) because it examines the effect of “MSP focus” within the pool of MSP schools.

Additional evidence about explanatory effects of MSP-related activities in schools on student proficiency in math and science is sought through the fourth research question by analyzing the correlation between the targeted teacher participation in MSP-related activities and student proficiency. Triangulations with findings in other MSP-PE substudies that control for MSP participation of schools (e.g., Wong & Socha, 2008) may provide more evidence on the role of MSP factors in the math and science proficiency of MSP-related schools.

Further, to maintain statistical correctness and validity of the results in this study, the aggregation of schools (e.g., by elementary, middle, and high school level) was done NOT by averaging the proportions of students at or above proficient across schools, but by aggregating the number of students assessed and the number of those who "pass" (at or above proficient) thus producing a "clean" measure of student proficiency at the aggregated school level. Likewise, the

measure of school proficiency by direction of change (decrease, no change, increase) in math or science proficiency, used with RQ2, is based on testing for statistical significance of the change for each school, and not on aggregated proportions across schools. When averaging of proportions was necessary with the growth modeling in RQ3, it was done after adjusting the proportions for school size and variability in math and science proficiency by using the *arcsin-root transformation* of the proportions.

Additional analyses over following years that can counteract the limitations with this study are next steps in the MSP-PE agenda. Such analyses can further expand our understanding of (a) the nature of MSP characteristics of schools that fall in different latent classes of longitudinal growth trajectories for math (or science) proficiency, (b) whether certain unexpected changes, such as the decrease in math (or science) proficiency at the end year (2007/08) for high schools *with* focus on math (or science), tend to persist or simply represent intermediate fluctuations due to latent effects in MSP practices for some limited groups of schools (e.g., the case of nine high schools with focus on math in a single MSP project that exhibit an unexpected decline in math proficiency at the end year, 2007/08).

In conclusion, despite limitations in scope and depth of the analysis in this study, due primarily to data restrictions with the MIS Annual K-12 District Survey, the results indicate promising trends and relationships between student proficiency in mathematics and science and MSP-related variables.

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APPENDIX A

Number of Students Assessed (N) on a State Proficiency Test in Math (or Science) and Number of Students At or Above Proficient (P) for Schools with MSP-MIS Data on Student Achievement for Any of the Five Years 2003/04, 2004/05, 2005/06, 2006/07, and 2007/08)

	MATHEMATICS			**SCIENCE**		
	***Elementary* Schools**	***Middle* Schools**	***High* Schools**	***Elementary* Schools**	***Middle* Schools**	***High* Schools**
All students						
2003/04	N = 52926 P = 25119 317 Schools	N = 71380 P = 31599 178 Schools	N = 78849 P = 37188 176 Schools	N = 10838 P = 3511 134 Schools	N = 14458 P = 6389 66 Schools	N = 39647 P = 22628 107 Schools
2004/05	N = 91338 P = 57685 560 Schools	N = 135845 P = 69984 289 Schools	N = 110004 P = 52670 264 Schools	N = 16876 P = 8073 197 Schools	N = 46037 P = 28833 151 Schools	N = 65675 P = 32939 181 Schools
2005/06	N = 158044 P = 105408 733 Schools	N = 260274 P = 140065 457 Schools	N = 140575 P = 64273 330 Schools	N = 32817 P = 20187 301 Schools	N = 78812 P = 43288 235 Schools	N = 78994 P = 41388 227 Schools
2006/07	N = 199853 P = 139222 801 Schools	N = 276193 P = 165903 481 Schools	N = 134755 P = 69623 343 Schools	N = 57647 P = 34642 450 Schools	N = 90216 P = 53558 302 Schools	N = 84687 P = 45290 268 Schools
2007/08	N = 201500 P = 128130 828 Schools	N = 236747 P = 139282 458 Schools	N = 115496 P = 55123 344 Schools	N = 63427 P = 32503 516 Schools	N = 82276 P = 42659 286 Schools	N = 76211 P = 36518 259 Schools

	MATHEMATICS			**SCIENCE**		
	***Elementary* Schools**	***Middle* Schools**	***High* Schools**	***Elementary* Schools**	***Middle* Schools**	***High* Schools**
Males						
2003/04	N = 26746 P = 12507 317 Schools	N = 36017 P = 15708 178 Schools	N = 39389 P = 18795 172 Schools	N = 5300 P = 1684 130 Schools	N = 7344 P = 3285 66 Schools	N = 19749 P = 11574 104 Schools
2004/05	N = 41009 P = 25177 463 Schools	N = 51393 P = 25013 230 Schools	N = 50546 P = 23689 220 Schools	N = 7440 P = 3181 186 Schools	N = 12137 P = 6561 109 Schools	N = 29416 P = 14991 144 Schools
2005/06	N = 75687 P = 48790 673 Schools	N = 115441 P = 63179 401 Schools	N = 59071 P = 30344 287 Schools	N = 15863 P = 9733 278 Schools	N = 37676 P = 21320 215 Schools	N = 36469 P = 20443 201 Schools
2006/07	N = 94847 P = 64876 726 Schools	N = 123804 P = 71874 423 Schools	N = 60130 P = 32362 288 Schools	N = 28270 P = 16746 424 Schools	N = 42652 P = 24607 275 Schools	N = 36806 P = 21041 217 Schools
2007/08	N = 99773 P = 62571 768 Schools	N = 111662 P = 64383 406 Schools	N = 48541 P = 23268 285 Schools	N = 29994 P = 14709 457 Schools	N = 37088 P = 18637 240 Schools	N = 30710 P = 15390 208 Schools

APPENDIX A (continued)

Female						
2003/04	N = 25856 P = 12479 317 Schools	N = 35332 P = 15873 178 Schools	N = 39074 P = 18144 172 Schools	N = 5294 P = 1718 131 Schools	N = 7101 P = 3098 66 Schools	N = 19740 P = 10950 104 Schools
2004/05	N = 39214 P = 24652 463 Schools	N = 50240 P = 24796 230 Schools	N = 50023 P = 23274 220 Schools	N = 7231 P = 3057 186 Schools	N = 11625 P = 6163 109 Schools	N = 29182 P = 14139 143 Schools
2005/06	N = 72753 P = 47681 673 Schools	N = 112590 P = 63790 401 Schools	N = 59570 P = 30326 289 Schools	N = 15437 P = 9666 278 Schools	N = 37094 P = 20606 215 Schools	N = 37194 P = 19382 201 Schools
2006/07	N = 90952 P = 63692 727 Schools	N = 119357 P = 71206 423 Schools	N = 60782 P = 32469 289 Schools	N = 27662 P = 16490 424 Schools	N = 41564 P = 23913 275 Schools	N = 37536 P = 20785 218 Schools
2007/08	N = 95542 P = 61205 767 Schools	N = 106955 P = 62901 407 Schools	N = 48937 P = 23566 286 Schools	N = 29092 P = 14720 456 Schools	N = 36072 P = 17773 241 Schools	N = 31702 P = 15838 208 Schools
	MATHEMATICS			**SCIENCE**		
	***Elementary* Schools**	***Middle* Schools**	***High* Schools**	***Elementary* Schools**	***Middle* Schools**	***High* Schools**
White						
2003/04	N = 12329 P = 9318 182 Schools	N = 22627 P = 15074 118 Schools	N = 17620 P = 11432 121 Schools	N = 4475 P = 1997 99 Schools	N = 6858 P = 4160 52 Schools	N = 11941 P = 8661 79 Schools
2004/05	N = 26969 P = 21435 347 Schools	N = 41589 P = 29479 196 Schools	N = 27289 P = 18638 188 Schools	N = 5965 P = 3598 162 Schools	N = 13092 P = 9121 107 Schools	N = 17902 P = 13619 134 Schools
2005/06	N = 62046 P = 46353 534 Schools	N = 94398 P = 65234 334 Schools	N = 32499 P = 22149 204 Schools	N = 10136 P = 7187 217 Schools	N = 21020 P = 15430 178 Schools	N = 18731 P = 14511 143 Schools
2006/07	N = 77724 P = 61898 587 Schools	N = 110258 P = 79201 366 Schools	N = 38640 P = 27978 238 Schools	N = 19938 P = 15365 270 Schools	N = 31841 P = 22639 210 Schools	N = 22255 P = 17217 165 Schools
2007/08	N = 82809 P = 56823 620 Schools	N = 100487 P = 69792 336 Schools	N = 25837 P = 16311 244 Schools	N = 22636 P = 11438 322 Schools	N = 29168 P = 16324 188 Schools	N = 21632 P = 14716 163 Schools
African American						
2003/04	N = 6571 P = 2357 176 Schools	N = 10001 P = 2612 107 Schools	N = 6170 P = 2126 105 Schools	N = 1290 P = 229 87 Schools	N = 3634 P = 618 54 Schools	N = 4952 P = 2357 71 Schools
2004/05	N = 13421 P = 6747 278 Schools	N = 15595 P = 5733 161 Schools	N = 10455 P = 3483 152 Schools	N = 2178 P = 722 103 Schools	N = 5287 P = 1626 72 Schools	N = 8036 P = 3074 105 Schools
2005/06	N = 37561 P = 23972 452 Schools	N = 39987 P = 17636 277 Schools	N = 12839 P = 5283 159 Schools	N = 12478 P = 8752 174 Schools	N = 19237 P = 7915 132 Schools	N = 9567 P = 4410 103 Schools
2006/07	N = 53619 P = 34832 540 Schools	N = 47079 P = 23239 312 Schools	N = 17284 P = 8939 197 Schools	N = 21603 P = 10270 253 Schools	N = 23116 P = 10189 169 Schools	N = 12409 P = 6355 142 Schools
2007/08	N = 53734 P = 31778 566 Schools	N = 45941 P = 22569 297 Schools	N = 18297 P = 8872 232 Schools	N = 22837 P = 12215 340 Schools	N = 24166 P = 10580 186 Schools	N = 14540 P = 7754 173 Schools
Hispanic/Latino						
2003/04	N = 30254 P = 11373 271 Schools	N = 29013 P = 8186 155 Schools	N = 48342 P = 20143 134 Schools	N = 3763 P = 800 117 Schools	N = 1846 P = 726 54 Schools	N = 18513 P = 9023 83 Schools
2004/05	N = 37458 P = 20189 360 Schools	N = 41270 P = 12143 227 Schools	N = 59203 P = 22808 193 Schools	N = 5634 P = 1626 133 Schools	N = 4925 P = 1923 109 Schools	N = 29152 P = 10373 124 Schools
2005/06	N = 40411 P = 20968 475 Schools	N = 72099 P = 29034 342 Schools	N = 58645 P = 22413 217 Schools	N = 6147 P = 1899 187 Schools	N = 19087 P = 8040 187 Schools	N = 29736 P = 10701 147 Schools
2006/07	N = 44159 P = 25077 574 Schools	N = 71342 P = 31281 336 Schools	N = 61011 P = 25054 233 Schools	N = 11389 P = 5831 333 Schools	N = 23366 P = 11815 231 Schools	N = 36393 P = 15588 187 Schools
2007/08	N = 44496 P = 25696 586 Schools	N = 50484 P = 19329 288 Schools	N = 34941 P = 9705 215 Schools	N = 11765 P = 4846 412 Schools	N = 15231 P = 6126 206 Schools	N = 23023 P = 6627 176 Schools

APPENDIX A (continued)

Asian						
2003/04	N = 394 P = 288 97 Schools	N = 4665 P = 3614 82 Schools	N = 2969 P = 1885 75 Schools	N = 248 P = 119 72 Schools	N = 313 P = 148 38 Schools	N = 1854 P = 1457 56 Schools
2004/05	N = 932 P = 735 183 Schools	N = 5700 P = 4432 130 Schools	N = 2856 P = 1576 119 Schools	N = 242 P = 155 65 Schools	N = 478 P = 286 65 Schools	N = 2530 P = 1732 80 Schools
2005/06	N = 1654 P = 1322 271 Schools	N = 9210 P = 7315 225 Schools	N = 3553 P = 2132 126 Schools	N = 469 P = 345 100 Schools	N = 2696 P = 2114 110 Schools	N = 2619 P = 1898 83 Schools
2006/07	N = 2308 P = 1925 305 Schools	N = 9392 P = 7557 213 Schools	N = 3291 P = 2190 135 Schools	N = 782 P = 601 139 Schools	N = 2695 P = 2140 119 Schools	N = 1216 P = 650 84 Schools
2007/08	N = 2850 P = 2079 359 Schools	N = 10121 P = 8242 237 Schools	N = 3904 P = 2405 176 Schools	N = 1001 P = 617 224 Schools	N = 2919 P = 2312 157 Schools	N = 2949 P = 2195 135 Schools

Others						
2003/04	N = 3378 P = 1783 202 Schools	N = 5074 P = 2113 121 Schools	N = 3748 P = 1602 118 Schools	N = 1062 P = 366 103 Schools	N = 1807 P = 737 58 Schools	N = 2387 P = 1130 85 Schools
2004/05	N = 4787 P = 3754 192 Schools	N = 21944 P = 14247 147 Schools	N = 5049 P = 4034 117 Schools	N = 1892 P = 1644 51 Schools	N = 19043 P = 14463 75 Schools	N = 4401 P = 2724 73 Schools
2005/06	N = 4451 P = 3000 363 Schools	N = 16309 P = 11022 244 Schools	N = 11030 P =7785 138 Schools	N = 1235 P = 970 104 Schools	N = 11937 P = 8018 114 Schools	N = 8839 P = 5765 104 Schools
2006/07	N = 6273 P = 4194 436 Schools	N = 10201 P = 4769 267 Schools	N = 1894 P = 746 129 Schools	N = 1156 P = 792 163 Schools	N = 2611 P = 1605 114 Schools	N = 480 P = 228 73 Schools
2007/08	N = 7223 P = 4358 532 Schools	N = 7361 P = 4023 262 Schools	N = 2405 P = 1010 172 Schools	N = 1868 P = 922 163 Schools	N = 2883 P = 1588 167 Schools	N = 1137 P = 386 128 Schools

	MATHEMATICS			**SCIENCE**		
	***Elementary* Schools**	***Middle* Schools**	***High* Schools**	***Elementary* Schools**	***Middle* Schools**	***High* Schools**
Special Education Students						
2003/04	N = 4719 P = 1448 263 Schools	N = 6779 P = 1181 153 Schools	N = 5516 P = 936 133 Schools	N = 980 P = 157 94 Schools	N = 1763 P = 341 57 Schools	N = 2181 P = 599 76 Schools
2004/05	N = 8140 P = 3059 392 Schools	N = 10109 P = 2032 204 Schools	N = 7062 P = 1240 184 Schools	N = 1392 P = 411 130 Schools	N = 3033 P = 735 98 Schools	N = 4236 P = 917 120 Schools
2005/06	N = 15748 P = 6549 599 Schools	N = 17598 P = 3761 322 Schools	N = 6517 P = 1391 189 Schools	N = 3044 P = 1554 211 Schools	N = 6051 P = 1459 174 Schools	N = 4243 P = 986 131 Schools
2006/07	N = 18005 P = 7719 618 Schools	N = 23588 P = 6006 366 Schools	N = 9296 P = 1932 238 Schools	N = 4394 P = 1885 306 Schools	N = 5766 P = 1676 193 Schools	N = 5038 P = 1313 166 Schools
2007/08	N = 13209 P = 5008 493 Schools	N = 19953 P = 5692 279 Schools	N = 10241 P = 2076 215 Schools	N = 1737 P = 450 184 Schools	N = 3314 P = 781 117 Schools	N = 5306 P = 1422 137 Schools

APPENDIX A (continued)

	MATHEMATICS			**SCIENCE**		
	***Elementary* Schools**	***Middle* Schools**	***High* Schools**	***Elementary* Schools**	***Middle* Schools**	***High* Schools**
Limited English Proficiency Students						
2003/04	N = 21616 P = 7232 212 Schools	N = 19862 P = 4632 127 Schools	N = 17344 P = 3854 115 Schools	N = 1717 P = 133 80 Schools	N = 406 P = 61 34 Schools	N = 3474 P = 669 62 Schools
2004/05	N = 26949 P = 13358 303 Schools	N = 24182 P = 5267 165 Schools	N = 21119 P = 4881 148 Schools	N = 2763 P = 303 100 Schools	N = 1185 P = 106 58 Schools	N = 9006 P = 960 84 Schools
2005/06	N = 29799 P = 14366 423 Schools	N = 31686 P = 7917 269 Schools	N = 21288 P = 4620 152 Schools	N = 3106 P = 544 139 Schools	N = 6063 P = 832 136 Schools	N = 9083 P = 905 87 Schools
2006/07	N = 30310 P = 15793 451 Schools	N = 31232 P = 9133 272 Schools	N = 23704 P = 6248 167 Schools	N = 6943 P = 3719 220 Schools	N = 9731 P = 4545 169 Schools	N = 14121 P = 4718 131 Schools
2007/08	N = 28973 P = 15834 415 Schools	N = 25840 P = 7614 218 Schools	N = 17286 P = 4299 153 Schools	N = 6590 P = 2425 218 Schools	N = 7844 P = 2548 132 Schools	N = 13226 P = 3223 118 Schools

APPENDIX B

MSP-MIS Longitudinal Data for Number of Students Assessed and Number of Students at or Above Proficient at State Assessments in Mathematics and Science — Same Schools Across Years 2003/04, 2004/05, 2005/06, 2006/07, and 2007/08

	MATHEMATICS			SCIENCE		
	***Elementary* Schools**	***Middle* Schools**	***High* Schools**	***Elementary* Schools**	***Middle* Schools**	***High* Schools**
All students						
2003/04	N = 42342 P =19381 225 Schools	N = 61137 P = 26460 140 Schools	N = 45015 P = 18274 120 Schools	N = 8630 P = 2268 102 Schools	N = 6744 P = 3017 37 Schools	N = 20097 P = 10866 61 Schools
2004/05	N = 43293 P = 25023 225 Schools	N = 58878 P = 29231 140 Schools	N = 40917 P = 18067 120 Schools	N = 8553 P = 2781 102 Schools	N = 7027 P = 3109 37 Schools	N = 21242 P = 10893 61 Schools
2005/06	N = 53627 P = 31201 225 Schools	N = 67533 P = 33900 140Schools	N = 40567 P = 18483 120 Schools	N = 8323 P = 2984 102 Schools	N = 6997 P = 3345 37 Schools	N = 20109 P = 11220 61 Schools
2006/07	N = 53154 P = 32449 225 Schools	N = 67875 P = 35909 140 Schools	N = 41555 P = 19398 120 Schools	N = 8101 P = 2945 102 Schools	N = 6596 P = 3360 37 Schools	N = 18620 P = 11671 61 Schools
2007/08	N = 52215 P = 33387 225 Schools	N = 64872 P = 34982 140 Schools	N = 41064 P = 19540 120 Schools	N = 7862 P = 3414 102 Schools	N = 6017 P = 3340 37 Schools	N = 22614 P = 13237 61 Schools

	MATHEMATICS			SCIENCE		
	***Elementary* Schools**	***Middle* Schools**	***High* Schools**	***Elementary* Schools**	***Middle* Schools**	***High* Schools**
Males						
2003/04	N = 21542 P = 9709	N = 30775 P = 13122	N = 22485 P = 9161	N = 4355 P = 1130	N = 3423 P = 1560	N = 10070 P = 5405
2004/05	N = 21916 P = 12492	N = 28944 P = 14346	N = 19489 P = 8575	N = 4274 P = 1385	N = 2968 P = 1378	N = 10202 P = 5179
2005/06	N = 27074 P = 14982	N = 33336 P = 14953	N = 19128 P = 8787	N = 4170 P = 1477	N = 2919 P = 1459	N = 9554 P = 5369
2006/07	N = 26029 P = 15474	N = 30040 P = 15410	N = 19590 P = 9256	N = 4046 P = 1439	N = 2765 P = 1383	N = 8868 P = 5534
2007/08	N = 26746 P = 16674	N = 32429 P = 17278	N = 19370 P = 9229	N = 3953 P = 1643	N = 2532 P = 1401	N = 10799 P = 6353
Females						
2003/04	N = 20790 P = 9666	N = 30342 P = 13324	N = 22340 P = 8982	N = 4268 P = 1138	N = 3316 P = 1456	N = 10005 P = 5452
2004/05	N = 21119 P = 12405	N = 28452 P = 14332	N = 19275 P = 8701	N = 4261 P = 1382	N = 2890 P = 1321	N = 9998 P = 5312
2005/06	N = 26059 P = 14775	N = 32643 P = 15216	N = 19207 P = 8866	N = 4126 P = 1487	N = 2968 P = 1458	N = 9458 P = 5416
2006/07	N = 24960 P = 15516	N = 29122 P = 15357	N = 19458 P = 9214	N = 4037 P = 1489	N = 2752 P = 1393	N = 8541 P = 5614
2007/08	N = 25302 P = 16608	N = 30983 P = 16974	N = 10628 P = 6323	N = 3884 P = 1755	N = 2457 P = 1315	N = 10628 P = 6323

	MATHEMATICS			SCIENCE		
	***Elementary* Schools**	***Middle* Schools**	***High* Schools**	***Elementary* Schools**	***Middle* Schools**	***High* Schools**
White						
2003/04	N = 9575 P = 7242	N = 19186 P = 12524	N = 13205 P = 8301	N = 3869 P = 1561	N = 3298 P = 1755	N = 9279 P = 6524
2004/05	N = 10352 P = 8035	N = 21192 P = 15099	N = 12840 P = 8622	N = 3705 P = 1840	N = 3489 P = 1860	N = 9289 P = 6638
2005/06	N = 18152 P = 12149	N = 26952 P = 16271	N = 12789 P = 8861	N = 3633 P = 1860	N = 3343 P = 1963	N = 8939 P = 6492
2006/07	N = 17066 P = 12379	N = 23108 P = 16212	N = 12326 P = 8867	N = 3468 P = 1782	N = 3275 P = 1928	N = 8969 P = 6606
2007/08	N = 17184 P = 12451	N = 22741 P = 16198	N = 11930 P = 8499	N = 3411 P = 1960	N = 2925 P = 1812	N = 8561 P = 6750
African American						
2003/04	N = 4787 P = 1652	N = 7101 P = 1900	N = 4509 P = 1226	N = 1075 P = 135	N = 639 P = 177	N = 3841 P = 1586
2004/05	N = 4941 P = 2146	N = 7548 P = 2420	N = 4305 P = 1052	N = 973 P = 194	N = 734 P = 271	N = 4126 P = 1430
2005/06	N = 4596 P = 1894	N = 8344 P = 1762	N = 4383 P = 1413	N = 845 P = 238	N = 853 P = 309	N = 3890 P = 1720
2006/07	N = 4197 P = 1955	N = 6692 P = 2542	N = 4600 P = 1588	N = 819 P = 233	N = 737 P = 287	N = 3236 P = 1679
2007/08	N = 4224 P = 2147	N = 6474 P = 2000	N = 4626 P = 1680	N = 806 P = 295	N = 763 P = 305	N = 4558 P = 2251
Hispanic/Latino						
2003/04	N = 26518 P = 9746	N = 26558 P = 7186	N = 21704 P = 5965	N = 3050 P = 386	N = 1000 P = 356	N = 3906 P = 913
2004/05	N = 26068 P = 13801	N = 22321 P = 6836	N = 18834 P = 6148	N = 3099 P = 495	N = 1095 P = 377	N = 4657 P = 960
2005/06	N = 27331 P = 14280	N = 23249 P = 7289	N = 18339 P = 5817	N = 3017 P = 595	N = 1237 P = 471	N = 4135 P = 1093
2006/07	N = 26244 P = 14827	N = 21875 P = 7253	N = 19036 P = 6254	N = 2790 P = 556	N = 444 P = 111	N = 3008 P = 1220
2007/08	N = 25945 P = 15734	N = 21929 P = 7766	N = 19141 P = 6667	N = 2842 P = 751	N = 431 P = 124	N = 6084 P = 1937
Asian						
2003/04	N = 366 P = 264	N = 4628 P = 3587	N = 2848 P = 1801	N = 225 P = 99	N = 205 P = 105	N = 1769 P = 1395
2004/05	N = 217 P = 161	N = 4287 P = 3532	N = 1801 P = 1031	N = 84 P = 52	N = 123 P = 78	N = 1678 P = 1351
2005/06	N = 404 P = 295	N = 4944 P = 3955	N = 1984 P = 1190	N = 72 P = 51	N = 127 P = 74	N = 1620 P = 1366
2006/07	N = 372 P = 291	N = 4349 P = 3482	N = 1564 P = 978	N = 105 P = 67	N = 119 P = 64	N = 167 P = 56
2007/08	N = 896 P = 668	N = 4543 P = 3698	N = 1985 P = 1237	N = 245 P = 146	N = 169 P = 101	N = 1838 P = 1612
Others						
2003/04	N = 1096 P = 477	N = 3664 P = 1263	N = 2749 P = 981	N = 411 P = 87	N = 1602 P = 624	N = 1302 P = 448
2004/05	N = 927 P = 566	N = 1628 P = 597	N = 612 P = 264	N = 40 P = 7	N = 12 P = 7	N = 98 P = 9
2005/06	N = 671 P = 316	N = 1190 P = 384	N = 333 P = 87	N = 39 P = 12	N = 6 P = 3	N = 129 P = 29
2006/07	N = 1288 P = 575	N = 1944 P = 761	N = 623 P = 243	N = 259 P = 119	N = 615 P = 284	N = 67 P = 11
2007/08	N = 1927 P = 951	N = 2162 P = 924	N = 970 P = 419	N = 534 P = 246	N = 701 P = 374	N = 389 P = 127

APPENDIX B (continued)

	MATHEMATICS			SCIENCE		
	***Elementary* Schools**	***Middle* Schools**	***High* Schools**	***Elementary* Schools**	***Middle* Schools**	***High* Schools**
Special Education Students						
2003/04	N = 3564 P = 1075	N = 5588 P = 936	N = 4058 P = 609	N = 791 P = 123	N = 619 P = 118	N = 1452 P = 390
2004/05	N = 3609 P = 1197	N = 4505 P = 894	N = 2783 P = 574	N = 509 P = 84	N = 654 P = 83	N = 1490 P = 341
2005/06	N = 4824 P = 1665	N = 5315 P = 869	N = 2351 P = 621	N = 544 P = 120	N = 546 P = 88	N = 1366 P = 392
2006/07	N = 5232 P = 1991	N = 5808 P = 1135	N = 3529 P = 798	N = 538 P = 111	N = 581 P = 88	N = 1444 P = 511
2007/08	N = 3923 P = 1231	N = 4680 P = 886	N = 3588 P = 883	N = 798 P = 189	N = 559 P = 104	N = 1789 P = 635

	MATHEMATICS			SCIENCE		
	***Elementary* Schools**	***Middle* Schools**	***High* Schools**	***Elementary* Schools**	***Middle* Schools**	***High* Schools**
Limited English Proficiency Students						
2003/04	N = 19792 P = 6737	N = 18357 P = 4154	N = 13248 P = 2792	N = 1576 P = 96	N = 178 P = 25	N = 1669 P = 238
2004/05	N = 21784 P = 11324	N = 15393 P = 4058	N = 11753 P = 3544	N = 1920 P = 130	N = 179 P = 17	N = 2623 P = 285
2005/06	N = 22288 P = 11291	N = 15413 P = 4265	N = 11420 P = 3244	N = 1747 P = 203	N = 300 P = 71	N = 2180 P = 297
2006/07	N = 21485 P = 11735	N = 16034 P = 5206	N = 14441 P = 4759	N = 1870 P = 236	N = 304 P = 74	N = 1196 P = 279
2007/08	N = 20539 P = 12136	N = 14619 P = 4661	N = 11178 P = 3633	N = 1847 P = 322	N = 330 P = 93	N = 2866 P = 482

APPENDIX C

MSP-MIS Longitudinal Data for Number of Students Assessed and Number of Students at or Above Proficient at State Assessments in Mathematics and Science — Same Schools Across Years 2004/05, 2005/06, 2006/07, and 2007/08

	MATHEMATICS			SCIENCE		
	***Elementary* Schools**	***Middle* Schools**	***High* Schools**	***Elementary* Schools**	***Middle* Schools**	***High* Schools**
All students						
2004/05	N = 70238 P = 42942 393 Schools	N = 117879 P = 60996 233 Schools	N = 65831 P = 28718 190 Schools	N = 12895 P = 5334 136 Schools	N = 32440 P = 21034 89 Schools	N = 42410 P = 19708 125 Schools
2005/06	N = 85788 P = 52107 393 Schools	N = 128535 P = 67613 233 Schools	N = 65943 P = 30077 190 Schools	N = 12705 P = 5648 136 Schools	N = 32333 P = 17883 89 Schools	N = 41560 P = 20188 125 Schools
2006/07	N = 85144 P = 53776 393 Schools	N = 129692 P = 70478 233 Schools	N = 66519 P = 30774 190 Schools	N = 12332 P = 5320 136 Schools	N = 31817 P = 18374 89 Schools	N = 40848 P = 21150 125 Schools
2007/08	N = 85173 P = 54243 393 Schools	N = 123175 P = 65109 233 Schools	N = 65130 P = 28708 190 Schools	N = 12127 P = 5503 136 Schools	N = 30017 P = 14332 89 Schools	N = 44067 P = 21458 125 Schools

	MATHEMATICS			SCIENCE		
	***Elementary* Schools**	***Middle* Schools**	***High* Schools**	***Elementary* Schools**	***Middle* Schools**	***High* Schools**
Male						
2004/05	N = 30908 P = 18153	N = 43598 P = 20600	N = 28591 P = 11592	N = 5463 P = 1823	N = 5407 P = 2695	N = 17914 P = 8071
2005/06	N = 42877 P = 24983	N = 60025 P = 29025	N = 30191 P = 13680	N = 6381 P = 2848	N = 14996 P = 8403	N = 19288 P = 9528
2006/07	N = 41191 P = 25382	N = 56132 P = 29407	N = 30300 P = 14061	N = 6193 P = 2662	N = 14627 P = 8303	N = 18724 P = 9914
2007/08	N = 42503 P = 26656	N = 57993 P = 29770	N = 29864 P = 13060	N = 6090 P = 2670	N = 14135 P = 6659	N = 20616 P = 10180
Females						
2004/05	N = 29486 P = 17750	N = 42673 P = 20437	N = 28326 P = 11596	N = 5337 P = 1744	N = 5181 P = 2597	N = 17636 P = 7895
2005/06	N = 41011 P = 24336	N = 58847 P = 29794	N = 30466 P = 14019	N = 6179 P = 2721	N = 14992 P = 8496	N = 19366 P = 9470
2006/07	N = 39237 P = 24866	N = 54422 P = 29609	N = 30276 P = 14186	N = 6013 P = 2568	N = 14366 P = 8405	N = 18567 P = 9834
2007/08	N = 40516 P = 26193	N = 55869 P = 29347	N = 29843 P = 13111	N = 5910 P = 2746	N = 13870 P = 6450	N = 20420 P = 9980

APPENDIX C (continued)

	MATHEMATICS			SCIENCE		
	***Elementary* Schools**	***Middle* Schools**	***High* Schools**	***Elementary* Schools**	***Middle* Schools**	***High* Schools**
White						
2004/05	N = 17902 P = 14004	N = 33623 P = 23727	N = 17944 P = 11986	N = 4184 P = 2086	N = 5446 P = 3348	N = 13433 P = 9979
2005/06	N = 31564 P = 22342	N = 44065 P = 28989	N = 18984 P = 13156	N = 4964 P = 2923	N = 8770 P = 6235	N = 13143 P = 9928
2006/07	N = 29614 P = 22249	N = 43518 P = 31625	N = 14362 P = 8008	N = 4723 P = 2755	N = 11840 P = 8856	N = 15008 P = 11480
2007/08	N = 29763 P = 21872	N = 42796 P = 27541	N = 18930 P = 12601	N = 4627 P = 2651	N = 11382 P = 5251	N = 14486 P = 10491
African American						
2004/05	N = 9648 P = 4719	N = 11923 P = 4405	N = 6882 P = 2031	N = 1574 P = 410	N = 1898 P = 831	N = 6040 P = 2083
2005/06	N = 14259 P = 7249	N = 24982 P = 10809	N = 6952 P = 2478	N = 2381 P = 1189	N = 11829 P = 5433	N = 5817 P = 2367
2006/07	N = 13447 P = 7225	N = 23498 P = 11847	N = 9797 P = 4802	N = 2335 P = 983	N = 12162 P = 5802	N = 7760 P = 3955
2007/08	N = 14018 P = 7430	N = 22766 P = 11059	N = 9351 P = 4295	N = 2345 P = 983	N = 11916 P = 5777	N = 8901 P = 4613
Hispanic/Latino						
2004/05	N = 30990 P = 16208	N = 38394 P = 11071	N = 28844 P = 7544	N = 4260 P = 857	N = 3209 P = 1281	N = 12978 P = 2149
2005/06	N = 33751 P = 17446	N = 40076 P = 12182	N = 27769 P = 7073	N = 4114 P = 982	N = 4133 P = 1458	N = 12698 P = 2178
2006/07	N = 32914 P = 18368	N = 38215 P = 12061	N = 28391 P = 7421	N = 3824 P = 931	N = 2936 P = 920	N = 12114 P = 2444
2007/08	N = 32983 P = 19465	N = 37498 P = 13298	N = 28380 P = 7776	N = 3939 P = 1212	N = 2629 P = 865	N = 28380 P = 7776
Asian						
2004/05	N = 2531 P = 558	N = 5521 P = 4319	N = 2406 P = 1273	N = 160 P = 89	N = 250 P = 167	N = 2246 P = 1551
2005/06	N = 929 P = 733	N = 6500 P = 5060	N = 2460 P = 1403	N = 197 P = 147	N = 390 P = 273	N = 2099 P = 1567
2006/07	N = 880 P = 720	N = 5919 P = 4596	N = 2024 P = 1222	N = 216 P = 154	N = 430 P = 311	N = 644 P = 253
2007/08	N = 1489 P = 1130	N = 6186 P = 4846	N = 2406 P = 1388	N = 390 P = 239	N = 490 P = 306	N = 2281 P = 1766
Others						
2004/05	N = 4399 P = 3449	N = 21214 P = 13742	N = 4826 P = 3930	N = 1856 P = 1617	N = 18924 P = 14415	N = 4305 P = 2689
2005/06	N = 1596 P = 937	N = 6222 P = 4156	N = 5052 P = 3896	N = 148 P = 103	N = 4482 P = 3369	N = 4725 P = 2881
2006/07	N = 2429 P = 1400	N = 3121 P = 1439	N = 822 P = 319	N = 358 P = 196	N = 1154 P = 678	N = 273 P = 98
2007/08	N = 3022 P = 1587	N = 3976 P = 1963	N = 1404 P = 507	N = 650 P = 300	N = 1588 P = 910	N = 789 P = 209

APPENDIX C (continued)

	MATHEMATICS			SCIENCE		
	***Elementary* Schools**	***Middle* Schools**	***High* Schools**	***Elementary* Schools**	***Middle* Schools**	***High* Schools**
Special Education Students						
2004/05	N = 5480 P = 1828	N = 8328 P = 1682	N = 4449 P = 786	N = 835 P = 154	N = 1292 P = 261	N = 2926 P = 607
2005/06	N = 8792 P = 3149	N = 10884 P = 2114	N = 4123 P = 878	N = 1148 P = 425	N = 2971 P = 774	N = 2816 P = 623
2006/07	N = 8999 P = 3503	N = 10880 P = 2280	N = 5340 P = 1081	N = 1119 P = 359	N = 2586 P = 670	N = 3086 P = 787
2007/08	N = 7368 P = 2537	N = 8499 P = 1845	N = 5487 P = 1154	N = 1129 P = 286	N = 1236 P = 322	N = 3506 P = 1002

	MATHEMATICS			SCIENCE		
	***Elementary* Schools**	***Middle* Schools**	***High* Schools**	***Elementary* Schools**	***Middle* Schools**	***High* Schools**
Limited English Proficiency Students						
2004/05	N = 24303 P = 12202	N = 23406 P = 5068	N = 16760 P = 3909	N = 2397 P = 215	N = 743 P = 44	N = 6977 P = 505
2005/06	N = 25672 P = 12562	N = 24241 P = 5508	N = 16339 P = 3589	N = 2237 P = 310	N = 1738 P = 242	N = 6984 P = 567
2006/07	N = 24532 P = 13075	N = 23983 P = 6465	N = 19188 P = 5090	N = 2318 P = 337	N = 1441 P = 197	N = 5865 P = 468
2007/08	N = 23867 P = 13604	N = 21649 P = 5982	N = 15498 P = 3889	N = 2291 P = 447	N = 1084 P = 181	N = 7097 P = 610