A FEW WEEKS OF SUMMER:
POST-SUMMER SCHOOL ACHIEVEMENT AMONG STATE-FUNDED STUDENTS WHO DO NOT INITIALLY PASS MINNESOTA'S HIGH SCHOOL GRADUATION TEST

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A Few Weeks of Summer: post-summer school achievement among state-funded students who do not initially pass minnesota's high school graduation test

Executive Summary

In 1993, the Minnesota State Legislature passed into law a results-oriented Graduation Rule, as part of Minnesota's educational accountability system. The Graduation Rule articulated the state's education requirements for students, schools, and districts, along with consequences for failing to satisfy the standard and rewards for satisfying the standard.

While the Graduation Rule has implications for all those involved in the education process, from students to policymakers, this report chiefly addresses the district-level requirement to provide remediation for students who have attempted, but not yet passed, one or more *Basic Standards Tests*. Under the Graduation Rule, districts' testing administration plans must include remediation for students who have not completed the *Basic Standards Test* requirement. Summer school is a key element of many district plans.

In this report, we examined the gains in *Basic Standards Test* scores among students who failed to meet the Basic Requirement in either math or reading in February 1998, enrolled in state-funded summer school in 1998, and then retook the *Basic Standards Test(s)* in July 1998. As parents, teachers, and policymakers plan remediation for students who have not yet met the *Basic Standards Test* requirement, they need data on the amount of improvement associated with summer school. The goal of this report is to inform such planning processes.

In other states that offer summer school as a remediation option or requirement, a number of issues have been identified relating to summer school attendance. Motivating students to attend is problematic, and there is no universally effective way to enforce even "required" attendance. There is little information on how effective summer school is in improving students' performance on tests such as the *Basic Standards Test*.

Various scheduling constraints result in a wide range of summer school program lengths—from only one or two weeks to seven weeks long. Compared to an academic semester, (approximately 85 days), summer school is a short intervention. In addition, summer school programs may focus on test preparation, or skills development, or some combination of the two. Given the fact that all the summer school programs ran for different lengths of time, and that it was impossible to generalize about the curriculum used in the various summer programs, this study did not distinguish between the types and length of summer school programs.

Methods

The analyses in this study required five types of data: demographic information, February 1998 test scores, summer 1998 enrollment information, summer 1998 test data, and February 1999 test data. The study included all students who took either the reading or mathematics *Basic Standards Test* in February 1998 and for whom complete data were available. The study included students who were 8^{th}, 9^{th}, or 10^{th} graders in February 1998.

If a school district uses an Area Learning Center (ALC) to offer a summer program, the summer program may receive state funding. The state database used for funding purposes contains a record of the student's enrollment during the summer months. If, however, a student enrolled in a non-state funded summer program offered by the local school district or a private vendor, the database would not contain a record of that student's enrollment. Thus, the "nonenrolled" students in our study included both students who took no summer school and students who took some non-state funded remediation during summer months.

We analyzed data from Minneapolis/St. Paul separately from data for the rest of the state. Questions specifically about Minneapolis/St. Paul students seemed inevitable, since there has been great concern about passing rates on statewide tests among urban students. Summer school is required for students in Minneapolis/St. Paul who have not previously met the *Basic Standards Test* requirement, but not for students in some other districts. In addition, it appears that many of the "nonenrolled" students in the two urban districts did not enroll in any form of summer school. Therefore, Minneapolis and St. Paul provided a sharper contrast between a treatment group (enrolled students), and a quasi-control group (students who did not enroll). However, even in these two districts, an unknown number of "nonenrolled" students will have taken some form of summer intervention.

Some districts in suburban and outstate areas have a policy of allowing students to take the July exam only if they have taken some form of summer school (either in the district, in another district, from a private tutor, or from a private learning center). This is one reason why the "nonenrolled" students are less than an ideal control group, particularly in suburban and outstate districts.

Results

Our findings are organized around four questions:

- *Do students who have yet to pass the reading and/or math* BSTs *(i.e., those students who did not pass the reading and/or math* BSTs *in February 1998) sign up for state-funded summer school programs during the summer of 1998 at a higher rate than those students who passed the February 1998 administration of the reading and/or math* BSTs?

  Students who failed to meet the Basic Standard took summer school at higher rates than those who had met the standard. However, even in Minneapolis and St. Paul, where summer school was required, only about 50% of the students who failed to meet either the reading or math standard enrolled in the state-funded summer school. This finding—less than full participation even when summer school is required—parallels the experience of other states and districts as reported in our literature review.

- *Of the students who did not pass the reading and/or math* BSTs *in February 1998, are there differences between the students who enrolled in state-funded summer school school (during the summer of 1998) versus those who did not enroll in state-funded summer school?*

  When there were significant differences in prior achievement (February 1998 score) between students who did and did not enroll in state-funded summer school, those who enrolled had the lower mean. However, these differences tended to be small. There was some tendency for students in special education to enroll at lower rates than other students, although the difference was not always significant. White students tended to enroll at lower rates than other ethnic groups.

The initial mean percentage correct (February 1998 score) for enrolled students was between 50% and 60% correct, depending on grade and subject matter. Such students would need to make a substantial improvement in their scores in order to pass the *Basic Standards Test* by the end of summer school—a score of 50–60% would require an improvement of from 10–25%. Judging by their February 1998 test results, many of these students needed substantial skill building, not just a short test preparation.

- *For students who did not pass the February 1998 administration of the reading and/or math* BSTs, *what are the score gains between the February 1998 administration and the summer 1998 administration of the* BSTs? *That is, are there differences in score gains between students who enrolled in state-funded summer school versus those who did not enroll in state-funded summer school?*

  Students who participated in summer school improved their scores. Their score gains from February to July averaged from 4 to 10 additional percentage points correct; but generally, scores did not improve by the 10 or more additional points needed by the average student to meet the state's Basic Standard.

  After controlling for the initial February score and the six demographic variables in Minneapolis and St. Paul, the post-summer school scores of enrolled students were significantly higher than the post-summer school scores of nonenrolled students. In suburban and outstate districts, however, the post-summer school scores of enrolled and nonenrolled students differed little after controlling for prior achievement and the six demographic variables. That is, in Minneapolis/St. Paul, the state-funded summer school program seemed to provide average score improvements that nonenrolled students did not attain on their own. In suburban and outstate districts, however, enrolled students improved, and nonenrolled students were able to make similar gains without the aid of state-funded summer school.

- *Are students who have not yet attained a minimum passing score on the reading and/or math BSTs as of February, 1998 and who participated in state-funded summer school programs during summer 1998 passing at higher rates on future test administrations than those students who do not avail themselves of those opportunities? That is, how likely are students to have passed the reading and/or math BSTs by the summer 1998 or February 1999 administration of the BSTs? Are there differences in these passing rates for those students who enrolled in state-funded summer school versus those who did not enroll in state-funded summer school?*

  The answer to this question was mixed. At the end of summer school, enrolled students in Minneapolis/St. Paul passed at slightly higher, but not always significantly higher, rates than their nonenrolled counterparts. For example, in July, for the *BST* in reading, 16.8% of enrolled 10^{th} graders passed, while 13.9% of nonenrolled 10^{th} graders passed. Furthermore, while enrolled students gained in summer school, for most of them the gain was not sufficient to pass. By February 1999, however, more nonenrolled students than enrolled students had passed, and these differences were significant. For example, in February 1999, 86.9% of nonenrolled 10^{th} graders had passed the reading test, as opposed to 53.4% of enrolled 10^{th} graders.

  In suburban and outstate districts, by the end of summer, enrolled and nonenrolled students had fairly similar pass rates that were, for the most part, not significantly different. For enrolled students, July pass rates ranged up to a high of 51.8% in 10^{th} grade reading. Nonenrolled students' pass rates ranged up to a high of 46.8% (10^{th} grade reading). By February 1999, more nonenrolled students than enrolled students had passed.

Conclusions and Recommendations

Even in the two districts (Minneapolis and St. Paul) that required summer school, participation rates were no more than about 50%. Other studies reviewed for this report also found less-than-universal enrollment, even when summer school is required.

Students enrolled in state-funded summer school did make progress, but 50% or less made enough progress to meet the Basic Standard by the end of July. To our surprise, students near the passing score inFebruary 1998 did not universally pass the test at the end of summer school, although they did pass almost universally by the next February testing. In order to pass the tests by the end of summer, the average student needed large improvements in a relatively short time, and these were not attained by many students. This finding leads us to the following three recommendations:

- For many students, particularly those with February scores below 65% correct (or the scale score equivalent), summer school may need to be part of a larger learning plan designed to bring basic skills up to the state standards. In districts with individual learning plans, those plans should reflect the potential need for more than just one summer session.

- Summer school instructional curricula and methods should be improved to increase the likelihood that students, particularly those near the passing score at the end of February, will pass by the end of the summer. Instructors should be well qualified in their field. When CFL releases items from past *BST* forms, the release should include information that teachers can use in the design of summer school curricula, such as the proportion of students having already mastered the various items on the test. Teachers must avoid excessive re-teaching of material already learned.

- Districts, particularly those with short summer sessions, should consider steps to lengthen the summer experience if possible. Such steps might include moving to computerized administration of summer *BSTs* to make it possible to lengthen the summer session while still returning test results to students before the fall term begins. For students with real skill deficits who need lengthier instruction, parents may want to consider some alternative to district-administered summer school if that summer school is very short.

Standards-based education is built on the assumption that all students can learn given enough time. But for students who need more time, where can that time be found? And will that extra time come at the expense of electives or other, higher level coursework? If students can overcome basic skills deficits in summer school, then remediation need not interfere with electives or other coursework during the academic year. Unfortunately, for many of the students in our study, the summer school session did not bring them up to the state standard.

Ultimately, much of the answer to this problem must come from improved instruction in the lower grades. Such improved instruction can reduce the number of students who need remediation. Furthermore, with improved instruction, more students will be close enough to the state standard that they can reach the standard through short interventions like summer school.

a Few Weeks of Summer: Post-Summer School Achievement Among State-Funded Students Who Do Not Initially Pass Minnesota's High School Graduation Test

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Purpose of the Study

In 1993, the Minnesota State Legislature passed into law a results-oriented Graduation Rule (for details, see Appendix B, p. 52). One component of the Graduation Rule focuses on basic standards, which define the proficiencies in reading, mathematics, and writing that a student must possess before graduating from a Minnesota public high school. "The Basic Standards are a 'safety net' to make sure that no student graduates without learning the basic skills needed to live and work in today's society" (http://www.cfl.state.mn.us/GRAD/BasicInfo.htm). No longer may students earn a high school diploma simply by attending classes for four years; rather, students must demonstrate a minimum level of proficiency in reading, math, and writing on statewide tests of basic skills. The reading and mathematics basic standards are measured by the administration of the *Minnesota Basic Standards Tests (BSTs)* beginning in 8th grade (for details on the *BSTs*, see Appendix B, p. 52). All students in the Class of 2000 and beyond must pass both the reading *BST* and the mathematics *BST* before they can graduate from a Minnesota public high school. Students' writing skills are measured by the *Minnesota Comprehensive Assessment* in Writing, which is administered to students beginning in 10th grade. All students in the Class of 2001 and beyond must pass the writing test in addition to the reading and math *BSTs* in order to graduate from a Minnesota public high school.

However, many students do not pass the *BSTs* on their first attempt. Policymakers state that "local districts offer a variety of services to students who do not pass the tests" (http://www.educ.state.mn.us) that is, using the test score information from the *BSTs*, policymakers assume that schools and districts (i.e., the teachers and administrators within those schools and districts) will make course- and schedule changes so that students can achieve success.

Minnesota Statute 121.1113 (Subdivision 3 Part 3501.0140, subp. 2) states that all districts must file a basic requirement test administration plan that includes information about the opportunities for remediation available to students who have yet to meet the basic requirements as measured by the *BSTs*. Part 3501.0110 states:

> A school district's curriculum shall include opportunities for all students to learn the basic requirements. At least two years before the anticipated date of the student's graduation, the

> district shall develop a plan for remediation for students who have not passed one or more basic requirements tests except for exempt students under part 3501.0090, subpart 1, item A, subitem (3)… (http://www.educ.state.mn.us)

Educators at the Minnesota Department of Children, Families & Learning (CFL) state quite plainly that it is not expected that every student will meet the basic skill requirements in reading and math during the initial administration of the *BSTs* in 8th grade:

> . . . most students, working at grade level or above, will pass the tests on their first try. Other students may need extra support and time to pass these tests. The state and local school districts are working together on strategies to help as many students as possible succeed, preferably on the first try. Teachers, parents and students are working together to make sure students are prepared for these tests. Still, some students do not pass on their first attempt. The state provides local school districts with detailed information on how each student did on the tests. This information can help teachers and parents identify specific areas where students may need extra help. Schools are providing students with a variety of courses and programs to help them succeed… (http://cfl.state.mn.us/GRAD/ PgBSTreadmathresults.htm)

Requiring students to succeed on minimum competency, high-stakes testing such as the Minnesota *BSTs* implies a responsibility on the part of the district/school to offer remediation opportunities to those students who do not initially meet the basic skills requirements. Schleisman (2000; see also Schleisman, 1999; Schleisman, Peterson, & Davison, 2000) found that Minnesota schools and districts are in fact offering a variety of remediation opportunities for students who have trouble meeting the basic proficiencies in reading or math. One of the most common is summer school. In this study, we estimate participation rates in summer school programs, and we examine the association between enrolling in summer school programs and subsequent *BST* score results. Because many of the school districts in Minnesota are using Area Learning Center (ALC) funding to offer these programs, the Minnesota Automated Reporting System for Students (MARSS) and the *Basic Standards Test (BST)* state databases were used to estimate participation rates in summer school remediation opportunities in Minnesota since the introduction of the Minnesota Basic Standards for high school graduation. Before providing the specifics of the research study, however, a brief literature review on summer school programs specifically associated with remediation for proficiency testing programs is included here.

Literature Review on Remediation Programs

As part of this study, a literature review was conducted in order to find out what other states with assessment programs that use proficiency tests (or minimum competency tests) have learned about providing assistance to students who initially do not master the basic skills requirements. Unfortunately, there are few studies and reports about remediation efforts provided in conjunction with minimum competency testing programs, such as Minnesota's *BSTs*, and most of the studies found described assessment programs from the 1970s and 1980s. However, the relevant literature is summarized here.

Serow, O'Neal, and Barnes (1980) point out that the type of remediation occurring in conjunction with the proficiency test movement is directly linked to the ideas of mastery learning (Bloom, 1968). Mastery learning proponents believe all students can master a set of skills if given enough time and support. In Minnesota, the criterion of mastery is a passing score on the *BSTs*. In practice, however, mastery learning poses a dilemma: for the students who are struggling with the basic skills, where can the extra time be

scheduled, so they can use it to master basic reading and mathematics? Should remediation for these skills be provided by offering special classes during the school day, after school, or during the summer? For students who need extra time to achieve mastery, from where will the extra time come? Summer school programs take time from students' vacations. However, if the time is taken in the summer, the extra coursework does not come at the expense of electives and other coursework during the regular academic year.

In 1986–87, Marshall, Serow, and McCarthy (1987) conducted a survey of all 50 states in order to determine the number of states with proficiency testing programs and the common characteristics, if any, of those programs. Two characteristics of the proficiency testing programs concerned remediation: (1) "…tests are administered at both elementary and secondary levels for the diagnosis of student deficiencies; students failing the test are provided with remediation" (p. v); and (2) "remediation efforts and procedures differ widely, and the benefits" differ depending on a variety of student variables (p. v). The results of their survey also indicated that, of the states with proficiency testing programs, remediation of students who fail the test was required by over two-thirds of those states. This may be due, in part, to legal considerations.

According to Marshall, et al. (1987), "most courts have agreed that students are entitled to remediation and the opportunity to retake the proficiency examination to demonstrate their competency. Indeed, if a student's deficiencies are identified and appropriate remediation is not provided, the grounds for a successful instructional negligence suit may be strengthened" (pp. 23–24). Hoegl (1983) noted that when performance on a proficiency test, such as the Minnesota *BST,* is tied to a high school diploma or some other academic advancement, "legal restrictions on the use of [proficiency tests] relating to due process also include the opportunity for remediation" (p. 53). Thus, schools and districts must provide additional instructional opportunities, as well as test retake opportunities, in order to avoid potential lawsuits.

Strang (1981) identified 13 states with proficiency testing programs (Arizona, California, Delaware, Florida, Maryland, New Jersey, New Mexico, New York, North Carolina, Oregon, Utah, Vermont, and Virginia) in order to obtain information on the types of remediation being provided to students (if any). Strang found that remedial services were available for students who did not initially master the proficiencies in all of the districts included in his study. Whether providing remedial programs is required by a state or not, a common theme across all of the states was that actually designing and administering remedial services was left up to the discretion and responsibility of schools and districts. By examining the types of additional instructional opportunities offered across the 13 states, the following salient features were identified.

Strang (1981) found that remedial programs were offered during the regular school day, during after-school hours, or during summer school. Whether the remediation is taken during the regular school day has major implications for school coursework. The Florida educators interviewed by Strang in the above study stated that students prefer after school programs so that they do not have to miss out on other electives. That is, rather than taking a remedial math class during the day in place of a graphic arts class, students would prefer to stay after school for the additional assistance. However, offering this additional assistance after school or during the summer results in a longer school day or longer school year only for those students struggling to meet the minimum proficiencies tested.

Davidson (1982), a study by the Ohio State Legislative Office of Education Oversight (1993), Grant (2000), and Schleisman (2000) found that many schools and districts offer summer school classes as one of several ways in which remediation opportunities are provided to students. Using a qualitative interview methodology in eight Minnesota school districts, Schleisman found that the remediation opportunities

being offered to students by school districts (see Table 1) included basic skills classes offered during the regular school day, after school or Saturday programs, resource rooms, summer school, and so forth.

Table 1 shows that, at least in these eight school districts, one of the two most common remediation opportunities offered to students by school districts was summer school (the other was after-school/Saturday programs).

Table 1. Summary of Remediation Efforts Across the Eight Districts (Schleisman, 2000)

REMEDIATION OPPORTUNITY	READING								MATH							
	Cardinalville	Tanager Heights	Finch Falls	Dove City	Riverview	Crow Canyon	Elm City	Crane City	Cardinalville	Tanager Heights	Finch Falls	Dove City	Riverview	Crow Canyon	Elm City	Crane City
Basic Skills Classes During the Regular School Day	X	X	X	X		X	X	X			X	X		X		
Remediation Within Regular Day Classes Using Ability Grouping						X		X	X					X		
Focus on Reading and Math Across the Curriculum		X			X	X	X			X				X	X	
Summer School Programs	X	X	X	X	*	X	X	*	X	X	X	X	*	X	X	*
After-School and Saturday Programs	X	X	X	X	X	X	X		X	X	X	X	X	X	X	
Resource Rooms		X					X		X						X	
Study Packets			X				X	X	X		X	X			X	X

**School district names have been changed to ensure anonymity to the schools, districts, and respondents.*

However, although summer school was one of the most common ways of providing remediation to students, other studies have found that attendance in summer school programs can be problematic. In the face of conflicting student priorities, educators find it difficult to motivate students to attend summer school (http://www.tea.state.tx.us/student.assessment/results/studies/remedtn.htm; Merkel-Keller, 1987). A study conducted on the impact of the Ohio proficiency test concluded, "The biggest obstacle to assistance in these districts was convincing students to attend optional remediation sessions" (Ohio State Legislative Office of Education Oversight, 1993).

Educators in Minnesota are also finding it difficult to convince students to attend both optional and required remedial opportunities. For example, one Minnesota educator noted that although summer school is required in her district, there is no way to enforce this attendance policy. A report published by the Minneapolis Foundation, the Minneapolis Public Schools, and the Greater Minneapolis Chamber of Commerce (2000) about the Minneapolis Public Schools states, "Of the 8th–11th grade students who have yet to pass the required tests and so are required to attend summer school, only 34 percent actually enrolled and attended" (p. 7).

Like educators in various other states (for example, Texas, Ohio, Minnesota), New Jersey educators found student motivation, participation, and attendance to be barriers to serving students in a remedial summer school program (Merkel-Keller, 1987). However, unlike most of the other articles reviewed here, Merkel-Keller's study examined pass rates on a minimum competency test in New Jersey *after* students had completed a summer school remediation program. (Most of the other articles reviewed here did not use empirically-based methods to investigate which types of remediation programs were most effective in raising proficiency test pass rates, but rather contain suggestions on what "seems" to have worked best in remediation programs.)

The Chicago Public Schools' summer school program is probably the one most similar to Minnesota's. In an effort to end social promotion, Chicago Public Schools implemented a promotion policy based on academic performance, as measured by standardized test scores (the Iowa Test of Basic Skills is used), teacher-assigned grades, and other measures. The cornerstone of this effort, which began in 1996, is a mandate that students who fail third, sixth, or eighth grades must go to summer school. At the end of six weeks of remedial classes, the students have another chance to pass the basic skills test. Results show that students who are furthest behind make the greatest improvements and that passing rates did improve from 1997 to 1998. However, in 1998, almost half (46%) of the elementary students in mandatory summer school did not pass the basic skills test and were held back a grade. In 3rd grade, 56% of these students did not pass the test and were held back. Chicago's mandatory summer school program is only six weeks long with citywide scripts at each grade level. Teachers use identical lessons at nearly the same moments throughout the district (http://www.cps.k12.il.us).

However, in the New Jersey summer school study (Merkel-Keller, 1987), students received one hour of intensive remedial instruction in each of three subject areas (reading, writing, and mathematics) for a total of three hours each morning. Students then had lunch and spent three hours in the afternoon at a minimum wage paying job. The summer job served as an incentive to participate in the summer instruction. One hundred twenty-five 9th grade vocational students (entering 10th grade in the fall) from five urban districts in New Jersey were selected to participate in the summer program. Eighty students fulfilled the obligations of the program, one of which was attending 25 out of 30 days, and were included in the post-testing. The percentage of students who improved their scores on the *New Jersey High School Proficiency Test* ranged from 45% on the writing test, to 71% on the reading test, to 78% on the mathematics test. Thus, Merkel-Keller concluded that the program should be offered each summer; however, she did suggest some program modifications to improve both attendance and test score gains.

Although we know that Minnesota schools and districts commonly offer summer school to students who need remediation on the basic skills, we have not known very much about the effectiveness of Minnesota's state-funded summer school programs. This study was conducted in order to determine whether students who do not meet the minimum passing score on the reading and/or mathematics *BSTs* enroll in summer school programs at a higher rate than students who have met the minimum passing score on the *BSTs;* whether students who enroll in summer school are somehow different than those who do not enroll (these groups can be compared on a variety of demographic variables, such as socioeconomic status, gender, ethnicity, and so forth); and whether there are score gain differences and/or passing rate differences between those who enroll in summer school and those who do not.

Research Questions

If a school district uses an Area Learning Center (ALC) to offer a summer school program, the summer program may receive state funding. Districts report the enrollment of students in state-funded summer ALC programs to the Department of Children, Families & Learning. This information is then incorporated into the Minnesota Automated Reporting System for Students (MARSS) database. Student *BST* score information is contained in a separate database. For this study, the two state-level databases were merged and used to address the four research questions below:

1. *Do students who have yet to pass the reading and/or math* BSTs *(i.e., those students who did not pass the reading and/or math* BSTs *in February 1998) sign up for state-funded summer school programs during the summer of 1998 at a higher rate than those students who passed the February 1998 administration of the reading and/or math* BSTs?

2. *Of the students who did not pass the reading and/or math* BSTs *in February 1998, are there differences between the students who enrolled in state-funded summer school (during the summer of 1998) versus those who did not enroll in state-funded summer school?*

3. *For students who did not pass the February 1998 administration of the reading and/or math* BSTs, *what are the score gains between the February 1998 administration and the summer 1998 administration of the* BSTs? *That is, are there differences in score gains between students who enrolled in state-funded summer school versus those who did not enroll in state-funded summer school?*

4. *Are students who have not yet attained a minimum passing score on the reading and/or math* BSTs *as of February 1998 and who participated in state-funded summer school programs during summer 1998 passing at higher rates on future test administrations than those students who do not avail themselves of those opportunities? That is, how likely are students to have passed the reading and/or math* BSTs *by the summer 1998 or February 1999 administration of the* BSTs? *Are there differences in these passing rates for those students who enrolled in state-funded summer school versus those who did not enroll in state-funded summer school?*

The MARSS enrollment database has several limitations for the purposes of this study. First, it identifies the students enrolled in state-funded summer school, but not whether they enrolled for the purpose of improving their basic skills. For instance, some students may have enrolled in courses to complete credits needed for high school graduation, rather than in courses to improve their basic skills. Second, the database identifies only students enrolled in a summer program that is eligible for *state* funding. The students identified as "nonenrolled" in this paper are students who were not enrolled in a state-funded summer program. Some of these "nonenrolled" students may nevertheless have attended a summer program. Such non-state-funded summer programs may be offered through the students' local school district or by a private learning corporation such as Sylvan or Huntington.

When considering the summer school programs investigated here, readers need to be aware of two scheduling constraints. First, generally speaking, summer school cannot begin until the end of the regular academic year. Most Minnesota school districts end around Memorial Day, but some end earlier or later. Schools whose academic year ends earlier can start summer school earlier. Second, the summer administration of the *BSTs* must occur early enough that students can be informed of their results by the beginning of the upcoming fall term. Thus, the reading and math *BSTs* are usually administered somewhere around the third week of July. If a summer school program is designed to prepare students for the July administration, the longest the program can run is from the end of the school's academic year to the July test administration data. This period includes the July 4 holiday weekend. Thus, the **longest** summer programs are roughly seven weeks (35 working days), running from Memorial Day to the third week in July. Although summer instruction can be more intensively focused, even the longest summer programs are short compared to an academic semester. However, informal conversations with educators around the state indicate that some summer school programs are offered for a much shorter length of time (for example, some programs are billed as test preparation and test-taking skill building programs and last only one week. Other programs focus more on skill building and are generally offered for a longer length of time).

Since all the summer school programs included in this analysis ran for different lengths of time, and that it was impossible to generalize about the curriculum used in the various summer programs, this study did not distinguish between the different types and length of summer school programs.

Methods

Tests

This study examines only the relationship between summer school and passing rates on the math and reading *BSTs*. The results for the *MCA* writing test are not included here for two reasons. First, we had complete data only for the February 1998, summer 1998, and February 1999 *BSTs*. We did not have access to any retake data for the writing *MCA* writing test, since it was first administered in winter 1999. Second, most school districts had very high passing rates for the writing requirement and reported very little need to remediate students in writing.

The reading *BST* consists of English language nonfiction prose passages measuring literal and inferential comprehension. The math *BST* measures the following eight strands of applied mathematics problem solving: whole numbers and fractions, percentages and ratios, number sense, estimation, measurement, tables and graphs, chance and data, and shape and space. Both the reading and mathematics tests are composed solely of multiple choice items. Typically, the reading *BST* consists of four reading passages, and students answer ten questions for each passage. The math *BST* consists of 68 questions. Students are allowed an unlimited amount of time to finish the reading and math *BSTs*. Students are administered the reading and math *BSTs* on two separate testing days, which are the same for all schools and districts in the state of Minnesota (http//:www.educ.state.mn.us/GRAD/schedule/). The reading and the math *BSTs* are administered in February and July. There is also a special April administration for seniors who have not yet passed the *BSTs*.

Databases

As part of the accountability system in Minnesota, two state databases are maintained to provide student information. The *BST* score files contain information on each student's performance on the reading and math *BST*s, as well as other demographic information. The MARSS database contains information on student enrollment, including whether a student enrolled under state funding during the summer months, as well as other demographic information at the student, school, and district levels.

For this study, the 1998 *BST* score file database, which contains score information for the February 1998 administration of the reading and math *BSTs,* was merged with the 1999 MARSS database, which contains student-, school-, and district-level information for the period from June 30, 1998 through June 30, 1999. The 1999 MARSS database contains information about state-funded summer enrollment for the summer of 1998. Thus, these two databases were merged to provide us with one database containing February 1998 test score information, summer school enrollment information, and demographic information. This new data file was again merged with (1) the Summer 1998 *BST* file, containing scores for students taking the math or reading test in summer 1998, and (2) the February 1999 *BST* file, containing the scores for students who took either the math or reading *BSTs* at that time. This yielded a final file containing information about student test results in February 1998, summer (July) 1998, and February 1999. It also contained information about students' state-funded enrollment during summer 1998.

After some initial analyses and reflection, the database was further divided into two sets: one for the two urban districts and one for the remainder of the state. There were five reasons for doing so: (1) There has been a great deal of concern nationally about passing rates on statewide tests in urban districts. It seemed inevitable that we would be asked about the two urban districts separate from the remainder of the state. (2) At each grade, about 50% of the students enrolled in a state-funded summer school were from the two urban districts. Thus, urban students constitute a critical mass in our study. (3) After some discussion with district personnel, it became clear that the "nonenrolled" group in Minneapolis and St. Paul was, for the most part, composed of students who had actually not taken part in any type of summer school program. In the remainder of the state, it seemed likely that more of the "nonenrolled" students had taken some other form of summer school. Some of those remaining districts did not allow students to sit for the summer examination unless they had taken some form of summer school, either from a district or a private vendor. Thus, Minneapolis/St. Paul provided a sharper contrast between a treatment group (enrolled students), and a quasi-control group (nonenrolled students). Because the two cities provided a cleaner contrast, it seemed wise to separate them. (4) Minneapolis and St. Paul require participation in summer school for students who have not passed the *BSTs.* Thus, their data would reflect the impact of such a requirement. (5) As will be seen below, the pattern of results differed for Minneapolis/St. Paul, as compared to the remainder of the state. We hypothesize that this may be attributable, in part, to the sharper difference between the enrolled and nonenrolled groups in these two districts, and to the fact that the Minneapolis/St. Paul districts require summer attendance.

Thus, using the combined database and information on the February 1998 administration of the reading and math *BSTs,* students were classified according to grade level (8^{th}, 9^{th}, or 10^{th} grade) and strata (Minneapolis/St. Paul vs. suburban and outstate districts). Within each grade and strata, students were classified into one of four groups: students who passed the February 1998 administration of the reading *BST,* students who did not pass the reading *BST,* students who passed the February 1998 administration of the math *BST,* and those who did not pass the math *BST.* All analyses were run separately for the reading and math *BSTs*, for each grade level, and for the two strata. The resulting six groups were further broken down into two subgroups: (1) students enrolled in summer school programs during the summer of 1998, and (2) students not enrolled in summer school programs during the summer of 1998. Comparisons were made between the participation rates for "passers" and "nonpassers" in order to determine whether nonpassers availed themselves of summer school remediation opportunities more than students who passed the reading and/or math *BSTs* in February 1998.

Students

The students included in this study were 8th, 9th, and 10th grade Minnesota public school students who took the statewide *Minnesota Basic Standards Test* in either reading or mathematics in February 1998. All 8th grade students are required to take the test; 9th and 10th graders need only take the test if they have not previously passed it, either because they have never taken it (for example, recently moved into the state) or because they have previously taken the test without passing. Only students for whom we had complete data[1] were included in this study.

By inspecting the statewide enrollment data in the MARSS database, it was determined that some districts had no students in a state-funded summer school program. That is, the state funding database showed no student for whom funding had been requested during the summer months. All students from districts with no state-funded summer enrollment were dropped from the study.

The needed passing score varied by grade and, at the time of the test, was specified as a minimum percentage correct. Eighth and 9th graders, the graduating classes of 2001 and 2002, needed 75% correct on the math and reading *BSTs* to meet the high school graduation standard. Eleventh graders, the class of 2000, needed 70% correct. Since February 2000, the passing score has been specified as a minimum scale score.

Statistical Analyses

Two difficult statistical issues arose in the analysis of this data. First, the appropriateness of using tests of statistical significance was unclear. Tests of statistical significance are designed for use with random samples, to determine whether the sample results can reasonably be generalized to the population. Our dataset included virtually the entire population of test takers for whom there was complete data. Therefore, there is no question that the results can be generalized to the entire population of 1998 test takers, at least the population for which complete data existed.

Secondly, the students who did and did not enroll in summer school differed on various demographic characteristics and, at times, on their academic achievement scores (i.e., their February 1998 reading and math *BST* scores) prior to entering summer school. In comparing those who did and did not enroll, it was not entirely clear whether it was necessary to adjust for those demographic and prior achievement differences. On one hand, demographic characteristics and prior achievement do not enter into the decision as to whether a student will pass. The score used to determine whether a student has met the minimum requirement is NOT an adjusted score. This argues in favor of reporting unadjusted scores. On the other hand, bringing a student up to the passing level is more or less difficult depending on the prior achievement and background of the student. Therefore, in evaluating how far a student has come by the end of summer school, it makes sense to consider students' prior achievement (where they began) and background. This argues for using analyses that make adjustments for prior achievement and background.

For both of these statistical issues, we attempted to strike a reasonable compromise. However, the compromise may not satisfy everyone. For the most part, we report descriptive statistics that are unadjusted. We do, however, examine achievement scores (July 1998 scores adjusted for February 1998

[1] A complete data set included the following information: gender; ethnicity; student's grade level; demographic information (special education, limited English proficiency, free/reduced-price lunch, and/or new to district status); whether or not the student took the February 1998 *BST;* whether or not the student passed the February 1998 *BST;* student's score on the February 1998 test; whether or not the student enrolled in state-funded summer school; whether or not the student took a July 1998 *BST,* and if so, the student's score; whether or not the student took a February 1999 *BST,* and if so, the student's score.

scores) that take the prior February achievement scores into account. For those interested in statistical tests, we have reported the results of significance tests for many of our comparisons. For some of our achievement comparisons, we have reported measures of effect sizes in an appendix of this report (note that these are *adjusted* effect sizes; our adjusted effect size equals the difference in the two adjusted means divided by the square root of the mean square within).

Results

The results for the Minneapolis/St. Paul data will be presented separately from those for the suburban/outstate data. Each research question will be answered in turn.

Minneapolis/St. Paul Data

RESEARCH QUESTION 1
***Do students who have yet to pass the reading and/or math* BSTs *(i.e., those students who did not pass the reading and/or math* BSTs *in February 1998) sign up for state-funded summer school programs at a higher rate than those students who passed the February 1998 administration of the reading and/or math* BSTs?**

The question of whether students were more likely to sign up for state-funded summer school during the summer of 1998 if they did not pass one or both of the February 1998 *BSTs* than if they passed seems to have quite a simple answer. Leaving aside the issue of whether students choose state-funded summer school over other options, and why (questions that are not the focus of this report), it is logical that in a high-stakes situation, where a passing score is required in order to graduate, a student who does not get a passing score will take advantage of any remediation opportunities offered by the school, while students who pass the high stakes test will see no need for remediation and thus will not enroll in summer school.

In fact, the data do support our main hypothesis: that nonpassers would enroll at a higher rate than passers. Table 2 (p. 15) shows that, across the board, students with a failing score on one or both *BSTs* enrolled in state-funded summer school at consistently higher rates than students with passing scores. For example, 54.6% of 8th grade nonpassers of the reading *BST* enrolled in summer school, whereas only 15.9% of the 8th grade passers of the reading *BST* enrolled in summer school. This trend holds for 9th grade reading (44.6% nonpassers enrolled vs. 22.4% passers), 10th grade reading (43.2% vs. 24.0%), 8th grade math (54.4% vs. 16.2%), 9th grade math (44.7% vs. 20.1%), and 10th grade math (43.5% vs. 21.5%).

Table 2. Summer School Enrollment Rates for Minneapolis/St. Paul Students Who Passed or Did Not Pass the February 1998 Administration of the Reading and/or Math BSTs

Grade Level in 1998 and *BST* Test (reading or math)	Students who DID PASS the February '98 administration of the reading and/or math *BSTs*		Students who DID NOT PASS the February '98 administration of the reading and/or Math *BSTs*		Significance
	# enrolled in summer school	% enrolled	# enrolled in summer school	% enrolled	
8th grade reading	361/2266	15.9%	1644/3012	54.6%	**
9th grade reading	291/1297	22.4%	834/1872	44.6%	**
10th grade reading	196/817	24.0%	365/844	43.2%	**
8th grade math	361/2234	16.2%	1667/3063	54.4%	**
9th grade math	172/857	20.1%	940/2103	44.7%	**
10th grade math	123/571	21.5%	438/1006	43.5%	**

NOTE: ns = not significant; * = Significant at the 0.05 level; ** = Significant at the 0.01 level

RESEARCH QUESTION 2

Of the students who did not pass the reading and/or math* BSTs *in February 1998, are there differences between the students who enrolled in state-funded summer school during the summer of 1998 versus those who did not enroll in state-funded summer school?

Since attendance at summer school is not universal among students who do not pass one or both of the *BSTs*, it would be useful to know whether there are barriers that keep nonpassers from enrolling in summer school. This question addressed possible demographic differences between nonpassers who enroll in summer school and those who do not. The nonpassing enrolled and nonenrolled students were compared on the following demographic variables:

- **socioeconomic status** (measured by whether or not a student qualifies for free/reduced lunch)
- **special education status**
- **gender**
- **ethnicity** (the following five categories are used in the Minnesota state databases: Asian, Black, Hispanic, American Indian, and White)
- **mobility** (measured by whether or not a student was new to the district as of January, 1997)
- **limited English proficiency (LEP) status**

For nonpassers of either the math or reading *BST* in February 1998, Table 3 (p. 16) shows whether there is an association between enrollment and socioeconomic status, enrollment and special education status, enrollment and gender, enrollment and ethnicity, enrollment and mobility, or enrollment and LEP status.

Table 3. Information on Minneapolis/St. Paul Students Who Did Not Pass the Reading and/or Math BST: Enrolled vs. Nonenrolled Students

Grade Level in February 1998 and BST Test	Not enrolled or enrolled in summer school in '98	Mean score on February 1998 administration	% on Free/Reduced Lunch	% in special education	% girls	% by ethnic group					% New to district	% LEP
						Asian	Black	Hispanic	American Indian	White		
Reading, 8th grade	**Not enrolled**	51.5	76.2	28.4**	46.7	21.9**	42.3**	6.1**	5.4**	24.3**	9.3	23.1**
	Enrolled	51.7	76.5	19.4	48.5	31.4	37.6	8.6	2.9	19.5	11.5	36.5
Reading, 9th grade	**Not enrolled**	54.4	77.2	25.0	46.0	31.4	38.3	7.4	2.6	20.2	13.5	34.7
	Enrolled	53.9	73.5	22.4	49.6	30.7	42.1	5.9	2.6	18.7	15.7	39.0
Reading, 10th grade	**Not enrolled**	50.8	74.3	29.9**	45.5	35.5	32.8**	6.5	0.8	24.4**	14.8	44.1
	Enrolled	51.6	76.4	17.5	49.9	29.9	48.5	7.9	1.1	12.6	18.9	50.1
Math, 8th grade	**Not enrolled**	49.4	73.7	28.2**	52.5	19.4**	45.0**	6.4*	4.5*	24.7**	9.8	21.6**
	Enrolled	49.7	76.4	19.6	50.7	29.0	39.7	8.4	3.1	19.9	11.1	33.7
Math, 9th grade	**Not enrolled**	52.4	75.1*	25.1*	52.6	25.7	42.3	7.4	2.4	22.2	14.3	29.8
	Enrolled	52.0	70.6	20.9	54.5	25.9	45.1	6.1	2.8	20.2	14.6	32.8
Math, 10th grade	**Not enrolled**	50.2	73.4	28.7**	52.5	27.1	40.8**	6.9	0.7	24.5**	12.6**	37.1
	Enrolled	50.2	71.0	17.8	55.5	24.2	53.9	6.6	1.1	14.2	19.2	42.5

NOTE: * = $p \leq 0.05$; ** = $p \leq 0.01$

There were no significant differences between the mean scores of nonpassing students who did and did not enroll in summer school. For example, the mean score on the February 1998 administration of the reading BST was 51.5 for nonpassing 8th graders who did not enroll in summer school and 51.7 for nonpassing 8th graders who did enroll. In fact, the February 1998 mean scores were similar for enrolled and nonenrolled students at each grade and subject area.

There were some statistically significant differences between the enrolled and nonenrolled groups on the various demographic variables. For example, a lower percentage of special education students were in the enrolled group. Among the nonpassers in eighth grade reading, 19.4% of the enrolled students and 28.4% of the nonenrolled students were special education students. The special education differences were largest among 10th graders in both math and reading. Students with limited English proficiency, however, were more likely to be enrolled in summer school if they did not pass a reading or math test. Among 8th graders who did not pass the reading test, LEP students constituted 36.5% of the enrolled students, but only 23.1% of the nonenrolled; in math, LEP students constituted 33.7% of the enrolled students, but only 21.6% of the nonenrolled.

In terms of ethnicity, the Asian students who did not pass the reading or math *BST* in 8th grade were significantly overrepresented in the enrolled group. For example, for 8th grade reading, 31.4% of the enrolled students were Asian, but only 21.9% of the nonenrolled students were Asian. Black students tended to show the opposite pattern; that is, they were significantly underrepresented in the enrolled group in 8th grade and significantly overrepresented by 10th grade. For example, in 8th grade math, 39.7% of enrolled students were Black while 45.0% of nonenrolled students were Black. By 10th grade, 53.9% of enrolled students were Black while only 40.8% of nonenrolled students were Black. There were significantly *more* Hispanic students in the enrolled groups for 8th grade reading and math and significantly *fewer* American Indian students in the enrolled groups for 8th grade reading and math.

For both the enrolled and nonenrolled students in Table 3, the mean percent correct on the February 1998 administration of the *BSTs* was approximately 50. If the items on the test are viewed as a representative sample of items covering reading or math, then the average student (one with a score equal to the mean of students failing the exam) has mastered only about 50% of the domain of the test in his/her prior schooling. For the average 10th grader to pass by the end of summer school, that student would have needed to master another 20% of the math achievement (or reading achievement) domain in about 7 weeks. For the average 8th or 9th grader to pass, the student would have had to master an additional 25% of the achievement domain. Given the length of many summer school programs, on average, the students in summer school must have quite a large score increase in order to pass the *BSTs*.

Although the mean percent correct in scores shown in Table 3 probably does not characterize the summer school enrollees in every school, the figures may prove to be diagnostic for summer school planning. The average enrollee seems to have mastered 50% of the material prior to enrolling. In all likelihood, the material mastered predominantly comes from the easier material in the domain of basic mathematics or reading, and the items passed were primarily easy items. Conversely, the material yet to be mastered would presumably come chiefly from the harder material represented by harder items on the test. Therefore, summer school planning would seem to require a focus on the more complex material in the domain, an understanding of what types of items and material are more difficult, and an understanding of what aspects of that material make it more challenging.

RESEARCH QUESTION 3
For students who did not pass the February 1998 administration of the reading and/or math* BSTs*, what are the score gains between the February 1998 administration and the summer 1998 administration of the* BSTs*? That is, are there differences in score gains between students who enrolled in state-funded summer school versus those who did not enroll in state-funded summer school?

In order to address the question of whether attendance at a state-funded summer school improved the scores of nonpassers, we examined differences between scores on the February 1998 administration of the reading and/or math *BSTs* and the summer 1998 administration of the reading and/or math *BSTs*. As with research question 2, we analyzed data only for students who did not pass the February 1998 *BST*, and we compared results for two groups of students: those who did enroll in summer school and those who did not.

Table 4 (p. 19) reports the mean score on the February 1998 administration of the reading and math *BSTs*, the mean score on the summer 1998 administration of the reading and math *BSTs*, the score gain between the February 1998 administration and the summer 1998 administration for those students who did enroll in summer school and for those students who did not enroll, and the standard deviation (SD) for each of these score measures. (Note that the mean scores for the February 1998 administration of the *BSTs* in Table 4 do not match those in Table 3. The mean scores reported in Table 4 are based on a smaller group of students; that is, these mean scores were calculated for students who did not pass a *BST* in February 1998 *and* who took the test again in summer 1998.)

An F-test was then computed to compare the adjusted means between these two groups (nonpassers who did and did not enroll in summer school) after controlling for differences in initial (February 1998) scores and six demographic covariates: socioeconomic status, special education status, gender, ethnicity, mobility status, and limited English proficiency status. In performing the significance tests reported in Table 4, we used the analysis of covariance to statistically control for differences between the enrolled and nonenrolled groups on the February 1998 score and the six demographic variables referred to in Research Question 2. Only differences that remained significant after controlling for these six variables and the initial mean February 1998 score are starred in Table 4. However, the means shown in Table 4 are the raw means unadjusted for differences on the covariates. (The *Statistical Analyses* section (p. 13) explains our reasons for using unadjusted means.)

Table 4. Average Score Gain (Increase in % Correct) for Minneapolis/St. Paul Students for February 1998 to July 1998: Enrolled vs. Nonenrolled Students Taking the July 1998 Test

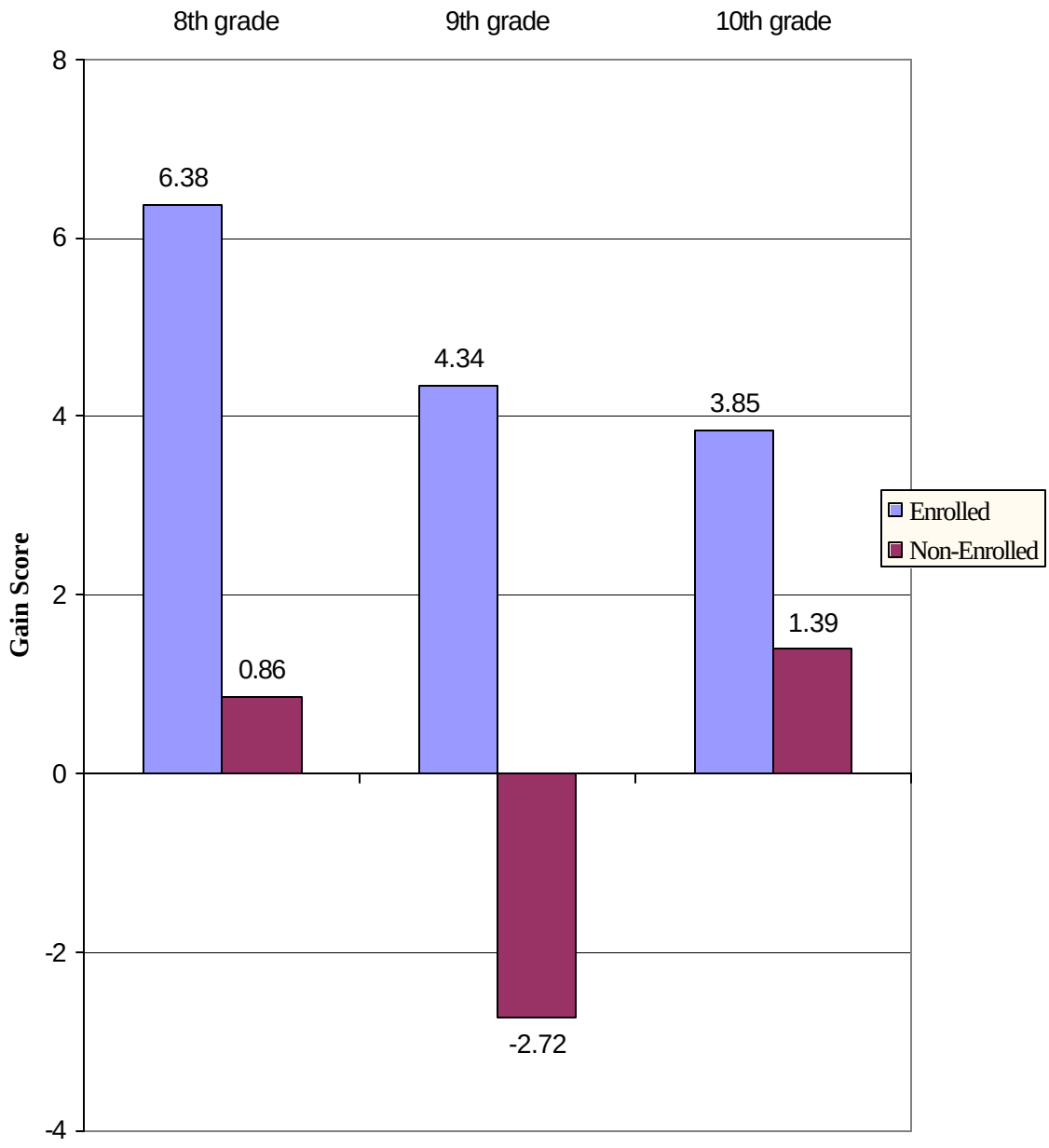
BST TEST	GRADE LEVEL	SCORE	NONPASSERS who ENROLLED in summer school			NONPASSERS who DID NOT ENROLL in summer school			F- value	SIGNIFICANCE
			# of students who failed in February 1998 and took summer school in summer 1998	Mean score of the students who failed in February 1998 and enrolled in summer school in summer 1998	SD of the students who failed in February 1998 and enrolled in summer school summer 1998	# of students who failed in February 1998 and did not enroll in summer school in summer 1998	Mean score of the students who failed in February 1998 and who did not enroll in summer school in summer 1998	S.D. of the students who failed in February 1998 and who did not enroll in summer school in summer 1998		
READING	**8th GRADE**	Feb '98 score	996	53.1	13.74	137	55.1	13.01		
		Summer '98 score	996	59.5	17.78	137	55.9	18.82		
		Gain score	996	6.4	12.94	137	.9	14.60	25.81	**
	9th GRADE	Feb '98 score	433	54.2	13.97	80	59.8	10.50		
		Summer '98 score	433	58.6	17.32	80	57.0	17.71		
		Gain score	433	4.3	13.75	80	-2.7	16.39	13.40	**
	10th GRADE	Feb '98 score	179	51.6	11.73	36	53.6	10.36		
		Summer '98 score	179	55.4	14.67	36	55.0	13.63		
		Gain score	179	3.9	12.25	36	1.4	11.38	1.79	ns
MATH	**8th GRADE**	Feb '98 score	941	51.5	15.22	122	55.1	14.85		
		Summer '98 score	941	60.2	17.51	122	58.2	16.02		
		Gain score	941	8.7	10.21	122	3.2	9.86	26.01	**
	9th GRADE	Feb '98 score	510	52.6	14.59	78	52.6	16.37		
		Summer '98 score	510	60.3	16.07	78	54.5	16.45		
		Gain score	510	7.7	10.38	78	1.8	10.07	21.11	**
	10th GRADE	Feb '98 score	192	49.4	14.13	35	54.3	12.18		
		Summer '98 score	192	57.1	14.47	35	55.9	13.35		
		Gain score	192	7.7	10.27	35	1.6	8.97	6.49	*

NOTE: ns = not significant; * = Significant at the 0.05 level; ** = Significant at the 0.01 level

Table 4 (and Figures 1 and 2, on pp. 20 and 21) show that, on average, the students who enrolled in summer school gained approximately 5 percentage points on the reading *BST* and approximately 8 percentage points on the math *BST*. For example, 8th grade students who enrolled in summer school gained 8.7 percentage points on the math *BSTs* from the February 1998 administration to the summer

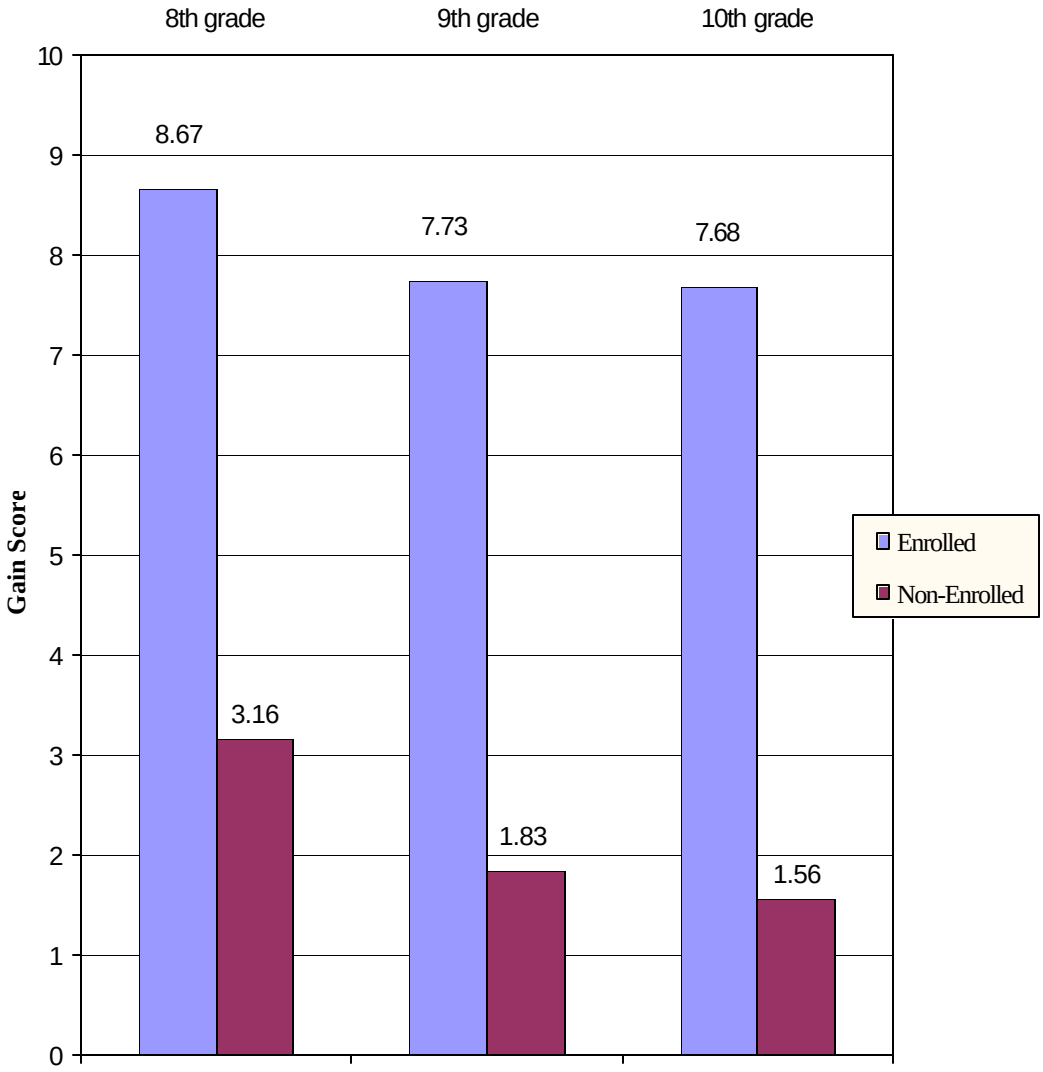
1998 administration. However, the changes for students who did not enroll ranged from losing approximately 3 percentage points (-2.7 in reading for 9th graders who did not enroll in summer school) to a maximum gain of approximately 3 percentage points (3.2 in math for 8th graders who did not enroll in summer school). Except for 10th graders in reading, there are significant positive effects of enrolling in summer school after controlling for differences between the enrolled and nonenrolled students on their

Figure 1. Gains in Reading from February 1998 through Summer 1998 for Enrolled and Non-enrolled Students: Minneapolis/St. Paul



initial February scores and the six demographic covariates. Appendix A (p. 46) shows the summer means for the enrolled and nonenrolled students after adjusting for differences in February scores and the six demographic covariates. The effect size for the adjusted means is also provided in Appendix A (note that the adjusted effect size equals the difference in the two adjusted means divided by the square root of the mean square within).

Figure 2. Gains in Math from February 1998 through Summer 1998 for Enrolled and Non-enrolled Students: Minneapolis/St.Paul



This data demonstrates that students are making score gains; however, while summer school seems to be helping students improve their basic skills in reading and math, the improvements are not providing enough of a "jolt" to enable most students to actually pass the reading and/or math *BSTs*. As Table 4 (p. 19) shows, the average initial scores (February 1998) are only around 50% correct, and the average gain for enrolled students is about 8 percentage points for math and 5 percentage points for reading. This falls short of the 20 to 25 percentage points that would have been needed to meet the Basic Standard. Most of these students needed further remediation in the next academic year. In turn, remediation taken during the regular academic year may have displaced other coursework in the students' intended academic programs.

RESEARCH QUESTION 4

Are students who have not yet attained a minimum passing score on the reading and/or math* BSTs *(as of February 1998) and who participated in state-funded summer school programs during summer 1998 passing at higher rates on future test administrations than those students who do not avail themselves of those opportunities? That is, how likely are students to have passed the reading and/or math* BSTs *by the summer 1998 or February 1999 administration of the* BSTs*? Are there differences in these passing rates for students who enrolled in state-funded summer school versus those who did not enroll in state-funded summer school?

Whereas research question 3 dealt with summer school's effect on individual student scores, the issue addressed in research question 4 is whether or not participating in summer school results in higher passing rates on future retakes of the *BSTs.* That is, did the students, *as a group,* tend to be more likely to pass the test(s) if they enrolled in summer school, and were there differences in passing rates between enrolled students and nonenrolled students? This analysis, like the prior two, is based on students who *did not pass* the February 1998 reading and/or math *BST.*

Table 5 (p. 23) shows that whether students had enrolled in summer school or not, very few passed the *BSTs* at the summer 1998 administration (ranging from 9% of 9th graders who did not attend summer school before retaking the math test, to 25.1% of 8th graders who enrolled in summer school before retaking the reading test). As detailed above, in the section on research question 3, on average, these students' February scores were 20–25 percentage points below the passing score. Their typical post-summer school score gains of from 3.9 to 8.7 percentage points were not enough to bridge the gap and enable them to pass the test.

Except for 10th grade math, students who enrolled in summer school passed the summer test at higher rates than students who did not enroll (see Table 5, under "% Who Passed"). However, only two of the differences are statistically significant. Specifically, significantly more enrolled than nonenrolled 8th graders passed the reading *BST* (25.1% vs. 16.1%), and significantly more enrolled than nonenrolled 9th graders passed the math *BST* (19.6% vs. 9.0%). Enrolled students taking the summer test had lower initial (February) scores than did nonenrolled students (see the February scores in Table 4, p. 19), but the enrolled students gained enough that their pass rates at the end of summer generally exceeded those of the initially higher-scoring nonenrolled students. However, summer pass rates for the enrolled students were not always significantly higher.

Table 5. Pass Rates for Minneapolis/St. Paul Students Who Did Not Pass the February 1998 Administration of the Reading and/or Math *BSTs* and Who Participated in the Summer 1998 Administration of the *BSTs:* Enrolled vs. Nonenrolled Students

Grade Level in 1998 and *BST* Test (reading or math)	Students who DID NOT PASS the February '98 administration of the reading and/or math *BSTs*; ENROLLED			Students who DID NOT PASS the February '98 administration of the reading and/or Math *BSTs*; NONENROLLED			c^2 value / Significance
	# who passed	% who passed	Initial February '98 mean score of passers	# who passed	% who passed	Initial February '98 mean score of passers	
8th grade reading	250	25.1%	64.5	22	16.1%	65.7	5.40*
9th grade reading	89	20.6%	64.1	16	20.0%	65.0	.01^{ns}
10th grade reading	30	16.8%	60.1	5	13.9%	65.5	.18^{ns}
8th grade math	219	23.3%	65.6	21	17.2%	70.5	2.27^{ns}
9th grade math	100	19.6%	65.5	7	9.0%	69.1	5.14*
10th grade math	43	22.4%	60.3	8	22.9%	63.2	.004^{ns}

NOTE: ns = not significant; * = Significant at the 0.05 level; ** = Significant at the 0.01 level

Table 6 shows the percentage of students who did not pass the February 1998 administration of the reading and/or math *BSTs*, but who went on to pass the *BSTs* by summer 1998 *or* February 1999. There are significant differences at all grade levels and both subject areas between enrolled and nonenrolled students. In all cases, the passing rates are *higher* for nonenrolled students by February 1999. For example, for 8th grade nonpassers who enrolled in summer school, 53.7% had passed the reading *BST* by February 1999, while 83.6% of those who did not enroll in summer school had passed the reading *BST* by February 1999. For 8th grade nonpassers who enrolled in summer school, 45.0% had passed the math *BST* by February 1999, while 71.3% of those who did not enroll had passed the math *BST* by February 1999.

Table 6. Pass Rates for Minneapolis/St. Paul Students Who Did Not Pass the February 1998 Administration of the Reading and/or Math *BSTs* and Who Enrolled in Summer School or Participated in the Summer 1998 and/or February 1999 Administration of the *BSTs:* Enrolled vs. Nonenrolled Students

Grade Level in 1998 and *BST* Test (reading or math)	Students who DID NOT PASS the February '98 administration of the reading and/or math *BSTs*, ENROLLED in summer school in 1998, and PASSED the *BSTs* in summer 1998 or February 1999			Students who DID NOT PASS the February '98 administration of the reading and/or Math *BSTs*, DID NOT ENROLL in summer school, and PASSED the *BSTs* in summer 1998 or February 1999			c^2 value / Significance
	# who passed	% who passed	Initial February '98 mean score of passers	# who passed	% who passed	Initial February '98 mean score of passers	
8th grade reading	560	53.7%	61.8	352	83.6%	63.2	113.93**
9th grade reading	230	48.6%	62.5	228	85.4%	64.5	97.82**
10th grade reading	110	53.4%	58.2	119	86.9%	58.1	41.52**
8th grade math	415	45.0%	63.4	201	71.3%	65.9	59.63**
9th grade math	213	40.4%	64.1	170	78.7%	66.0	89.92**
10th grade math	104	50.7%	58.5	78	80.4%	60.6	24.22**

NOTE: ns = not significant; * = Significant at the 0.05 level; ** = Significant at the 0.01 level

One goal of summer school is to provide students with more instructional time on the basic skills without disrupting their regular academic schedule. The idea is that students will then not need to take remedial courses during the regular academic year in place of electives or other coursework. Because the majority of students who did not pass in February 1998 did not meet the minimum standard in summer, it is clear that many needed more instructional time on basic skills during the regular academic year. This instructional time may have come in place of electives or other coursework that would otherwise be taken, or in the form of after-school/extended-day programs. For many students, summer school by itself was not the solution; rather, summer school may be part of a larger instructional effort to provide the additional instructional time needed for basic skills.

Summary for the Minneapolis/St. Paul Data

The information presented above represents only data for two selected school districts in the state of Minnesota. These two school districts are using state funds to offer summer school programs. As Table 1 (p. 8) suggests, these summer school programs are being used to provide remedial intervention for students who have not passed the reading and/or math *BSTs*. It is also interesting to note that for students who did not pass the February 1998 administration of the *BSTs*, there are few significant differences, at least in prior achievement and the six demographic variables identified for this study, between the group of students who enrolled and those who did not enroll in summer school (see Table 3, p. 16).

Table 4 (p. 19) suggests that summer school is effective in helping students improve their skills, as evidenced by the score gains from the February 1998 to the summer 1998 test administration. However, summer school does not seem to be the only intervention needed by many of these students; that is, summer school boosted scores approximately 3–9 percentage points, but these students were on average 20–25 percentage points below the passing score. One limitation of this study is that we did not observe summer school classes to learn about the types of summer school programs being offered. However, we do have informal evidence, based on discussions with district personnel, that the Minneapolis and St. Paul districts offer summer school programs that last several weeks and include both a skill-building and a test-preparation focus. Summer school programs may not be enough to help most students pass the *BSTs* (see Table 5, p. 23), but they can help students make gains and improve their skills (see Table 4, p. 19). However, most of the students in this study needed more than just a summer school program to pass the test; in addition, they needed follow-up programming during the year to sustain and continue the gains made in summer school.

Suburban/Outstate Data

In the previous section, we reported data for Minneapolis and St. Paul students, who constitute 50% or more of the students in state-funded summer school. In this section, we report information on the remaining students, from the suburban and outstate districts offering state-funded summer school. The suburban and outstate districts vary substantially in the kinds, and duration, of summer school programs offered (e.g., some of these summer school programs last only one to two weeks and emphasize test preparation skills as opposed to a more skill-building focus). Furthermore, we strongly suspect that many of the "nonenrolled" students have received remedial instruction supported by non-state funds (largely from parental sources), either in the public school system or in private educational learning centers. In this section, the comparison of enrolled and "nonenrolled" students is a comparison of students who did and did not enroll in state-funded summer school *in addition to (or in place of)* other remedial instruction they might have received.

RESEARCH QUESTION 1:
Do students who have yet to pass the reading and/or math* BSTs *(i.e., those students who did not pass the reading and/or math* BSTs *in February 1998) sign up for state-funded summer school programs at a higher rate than those students who passed the February 1998 administration of the reading and/or math* BSTs*?

As with the Minneapolis and St. Paul districts, our main hypothesis was that students who did not pass the February 1998 *BSTs* would enroll in summer school at a higher rate than students who had passed the test. And, as with the Minneapolis and St. Paul districts, the data supported this hypothesis. Table 7 shows that nonpassers of the February 1998 administration of the *BSTs* were more likely to enroll in summer school than passers of the February 1998 administration of the *BSTs*. For example, 9.4% of 8th grade nonpassers of the reading *BST* enrolled in summer school, while only 1.8% of the 8th grade passers of the reading *BST* enrolled. This trend holds for 9th grade reading (11.6% of nonpassers enrolled vs. 5.8% of passers), 10th grade reading (14.6% of nonpassers enrolled vs. 9.5% of passers), 8th grade math (10.0% of nonpassers enrolled vs. 2.0% of passers), 9th grade math (12.4% of nonpassers enrolled vs. 5.7% of passers), and 10th grade math (14.9% of nonpassers enrolled vs. 9.0% of passers). These results were significant at the 0.01 level for all three grade levels and both the reading and the math *BSTs*.

Table 7. Summer School Enrollment Rates For Suburban and Outstate Students Who Passed or Did Not Pass the February 1998 Administration of the Math *BSTs*

Grade Level in 1998 and *BST* test (reading or math)	Students who DID PASS the February '98 administration of the reading and/or math *BSTs*		Students who DID NOT PASS the February '98 administration of the reading and/or math *BSTs*		Significance
	# enrolled in summer school	% enrolled	# enrolled in summer school	% enrolled	
8th grade reading	352/19053	1.8%	1091/11637	9.4%	**
9th grade reading	361/6220	5.8%	710/6099	11.6%	**
10th grade reading	267/2815	9.5%	332/2270	14.6%	**
8th grade math	404/20256	2.0%	1046/10422	10.0%	**
9th grade math	222/3918	5.7%	713/5741	12.4%	**
10th grade math	155/1715	9.0%	340/2286	14.9%	**

NOTE: ns = not significant; * = Significant at the 0.05 level; ** = Significant at the 0.01 level

A final note regarding Table 7 is that, for students in suburban and outstate schools, the participation levels in state-funded summer school are less than 15% for all three grade levels and for both the reading and the math *BSTs*, as opposed to the participation rates in the two urban districts (see Table 2, p. 15).

This could be explained, in part, by the fact that summer school is not necessarily required for these students if they do not pass the reading and/or math *BSTs*. Also, while the "nonenrolled" suburban and outstate students were not enrolled in state-funded summer programs, it is possible that many of them did attend a summer program not funded by the state—instead, their parents or local district may have paid for the summer school. Some private corporations (i.e., Sylvan, Huntington), as well as local districts, offer such non-state-funded programs.

RESEARCH QUESTION 2:
Of the students who did not pass the reading and/or math* BSTs *in February 1998, are there differences between the students who enrolled in state-funded summer school during the summer of 1998 versus those who did not enroll in state-funded summer school?

As with the analysis of Minneapolis and St. Paul data, only students who did not pass the February 1998 *BSTs* were included in this analysis. This question addressed demographic variables that could potentially affect summer school program attendance for students who did not pass the test(s). The following demographic variables were used to compare enrolled and nonenrolled students:

- **socioeconomic status** (measured by whether or not a student qualifies for free/reduced lunch)
- **special education status**
- **gender**
- **ethnicity** (the following five categories are used in the Minnesota state databases: Asian, Black, Hispanic, American Indian, and White)
- **mobility** (measured by whether or not a student was new to the district as of January, 1997)
- **limited English proficiency (LEP) status**

Table 8 (p. 28) shows whether there is an association between enrollment and socioeconomic status, enrollment and special education status, enrollment and gender, enrollment and ethnicity, enrollment and mobility, or enrollment and LEP status. Few significant differences exist between the mean scores of nonpassing students who did and did not enroll in state-funded summer school for any grade level or in either subject area. The largest difference was only 1.8 points (between enrolled and nonenrolled students in the 10th grade math test). The mean scores for nonpassing students who enrolled in summer school and students who did not enroll in summer school were similar at each grade level for both reading and math.

There are a number of statistically significant differences between the enrolled and nonenrolled groups on the various demographic variables. For example, fewer enrolled than nonenrolled 10th graders (for both math and reading) qualified for free/reduced lunch. Specifically, for the 10th grade reading test, 28.5% of the nonenrolled students and 20.2% of the enrolled students qualified for free/reduced lunch. Special education students were also less often enrolled in summer school, both for 9th and 10th grade reading as well as for 9th and 10th grade math, with the most significant differences occurring at the tenth grade level. For example, among students who did not pass the 10th grade math test, 49.9% of the nonenrolled students were special education students, while only 31.6% of enrolled students were in special education.

For students who did not pass the math *BSTs*, there were significant differences between enrolled and nonenrolled students according to gender, at all three grade levels. There were significantly fewer girls in the enrolled groups for 8th and 9th grade, and significantly more girls in the enrolled group at the 10th grade level. Specifically, 53.2% of the nonenrolled students and 49.7% of the enrolled students for 8th grade math were girls, 54.6% of the nonenrolled students and 48.7% of the enrolled students for 9th grade

Table 8. Information on Suburban and Outstate Students Who Did Not Pass in February 1998 and Who Did and Did Not Enroll in Summer School

Grade Level in February 1998 and BST Test	Not enrolled or enrolled in summer school in '98	Mean score on February 1998 administration	% on Free/Reduced Lunch	% in special education	% girls	% by ethnic group					% New to district	% LEP	Strata		
						Asian	Black	Hispanic	American Indian	White			Suburban	Outstate 2000+	Outstate 2000-
Reading, 8th grade	**Not enrolled**	58.1*	26.7	27.1	46.3	3.8	3.4**	2.3**	2.9	87.5**	9.5	2.6*	48.4**	27.6	23.8**
	Enrolled	57.3	26.4	26.8	44.0	4.1	6.7	3.8	2.5	83.0	9.5	3.7	55.1	28.2	16.2
Reading, 9th grade	**Not enrolled**	58.7	26.8	34.9**	45.6	4.2	4.4**	2.6**	2.8	86.1**	13.0	3.0	47.9**	27.1	24.8**
	Enrolled	58.6	23.7	29.8	42.5	5.5	7.6	4.6	2.0	80.3	15.0	4.1	57.7	26.8	15.1
Reading, 10th grade	**Not enrolled**	54.2	28.5**	49.8**	42.8*	5.9	5.1*	2.8	2.8	83.4	11.5	4.8	54.6**	22.1	23.3**
	Enrolled	55.2	20.2	34.5	48.5	4.2	8.4	4.8	3.0	79.5	12.5	5.8	62.3	24.1	13.6
Math, 8th grade	**Not enrolled**	58.1	27.8	29.3	53.2*	3.6	4.4**	2.7*	3.1	86.2**	10.0*	2.4**	49.1**	26.3	24.5**
	Enrolled	58.2	27.3	28.5	49.7	3.7	7.9	4.1	2.5	81.7	12.2	3.9	55.2	27.4	16.9
Math, 9th grade	**Not enrolled**	58.2	27.5	37.2**	54.6**	3.6	5.9**	3.2	2.8	84.5**	12.9	2.8	49.9**	27.2	22.8**
	Enrolled	59.1	27.7	29.0	48.7	4.8	10.2	3.9	1.5	79.5	14.9	4.0	58.9	26.8	14.0
Math, 10th grade	**Not enrolled**	54.0**	29.1**	49.9**	54.4*	4.7	6.4**	3.4	2.7	82.7*	12.5	3.9	58.1	20.7*	21.2**
	Enrolled	55.8	20.2	31.6	61.0	5.0	11.2	4.4	2.1	77.4	13.9	4.8	62.9	25.9	11.2

NOTE: * = $p \leq 0.05$; ** = $p \leq 0.01$

math were girls, while 54.4% of the nonenrolled students and 61.0% of the enrolled students for 10th grade math were girls. Gender differences for the reading test at all three grade levels were much smaller.

In terms of ethnicity, Black students were overrepresented in the enrolled group for all grade levels and for both subject areas. For 8th grade reading, Blacks constituted 6.7% of the enrolled students, but only 3.4% of the nonenrolled students. For White students, however, the opposite is true. Nonpassing White students were consistently underrepresented in the enrolled group. This underrepresentation of Whites in the enrolled groups also occurred in the Minneapolis/St. Paul data. Nonpassing Hispanic students were overrepresented in the enrolled group for 8th and 9th grade reading. For example, in 8th grade reading, 3.8% of enrolled students were Hispanic while only 2.3% of the nonenrolled group were Hispanic.

For both enrolled and nonenrolled students in Table 8, the mean percentage correct in February 1998 was approximately 55. If the items on the test are viewed as a representative sample of items covering reading or math, then the average student (one with a score equal to the mean of students failing the exam) has mastered only about 55% of the domain of what is covered on the test in his/her prior schooling. For the average 10th grader to pass by the end of summer school, that student would have needed to master another 15% of the math achievement (or reading achievement) domain in about 7 weeks (or less). For the average 8th or 9th grader to pass, the student would have needed to master another 20% of the achievement domain. Given the length of summer school, the average student enrolling seems to have a long way to go.

As in Minneapolis/St. Paul, while the mean percentage correct in Table 8 probably does not characterize the summer school enrollees in every district, the figures may offer some insight with regard to summer school planning. The average enrollee seems to have mastered 55% of the material prior to enrolling. It is likely that the material mastered is predominantly the easier material in the domain of basic mathematics or reading, and the items passed were primarily easy items. Conversely, the material yet to be mastered would presumably comprise the harder material, represented by more difficult items on the test. Therefore, summer school planning would seem to require a focus on the more difficult and complex material in the domain, an understanding of what types of items and material are more difficult, and an understanding of what aspects of that material make it more challenging.

RESEARCH QUESTION 3:
For students who did not pass the February 1998 administration of the reading and/or math* BSTs, *what are the score gains between the February 1998 administration and the summer 1998 administration of the* BSTs*? That is, are there differences in score gains between students who enrolled in state-funded summer school versus those who did not enroll in state-funded summer school?

In order to address this question, we examined differences between scores on the February 1998 administration and the summer 1998 administration of the reading and/or math *BSTs* for the groups of students who did and did not enroll in summer school. As with research question 2, we analyzed data only for students who did not pass the February 1998 *BST*.

Table 9 (p. 30) reports the mean score on the February 1998 administration of the reading and math *BSTs*, the mean score on the summer 1998 tests, the score gain between the February 1998 and summer 1998 *BSTs*, and the standard deviation (SD) for each of these score measures. An F-test was then computed to compare the adjusted means between these two groups, after controlling for differences in initial (February 1998) scores and six demographic covariates: socioeconomic status, special education status, gender, ethnicity, new-to-district status, and limited English proficiency status. (Note that the mean scores for the February 1998 administration of the *BSTs* in Table 9 do not match those in Table 8 (p. 28).

The mean scores reported in Table 9 represent a smaller group of students; that is, these mean scores were calculated for students who did not pass a *BST* in February 1998 *and* who took the test again in summer 1998.)

Table 9. Average Score Gain (Increase in % Correct) for Suburban and Outstate Students for February 1998 to July 1998: Enrolled vs. Nonenrolled Students

BST TEST	GRADE LEVEL	SCORE	NONPASSERS who ENROLLED in summer school			NONPASSERS who DID NOT ENROLL in summer school			F-value	SIGNIFICANCE
			# of students who failed in winter '98 and took summer school in summer '98	Mean score of the students who failed in winter '98 and enrolled in summer school in summer '98	SD of the students who failed in winter '98 and enrolled in summer school in summer '98	# of students who failed in winter '98 and did not enroll in summer school in summer '98	Mean score of the students who failed in winter '98 and who did not enroll in summer school in summer '98	S.D. of the students who failed in winter '98 and did not enroll in summer school in summer '98		
READING	**8th GRADE**	Feb '98 score	583	59.3	11.41	2104	60.8	10.93		
		Summer '98 score	583	68.4	14.72	2104	70.1	14.59		
		Gain score	583	9.1	12.59	2104	9.3	12.31	0.00	ns
	9th GRADE	Feb '98 score	336	60.7	10.76	1049	62.1	10.74		
		Summer '98 score	336	69.9	14.48	1049	71.6	14.04		
		Gain score	336	9.2	12.88	1049	9.4	11.86	0.01	ns
	10th GRADE	Feb '98 score	137	57.5	8.74	393	57.6	10.25		
		Summer '98 score	137	66.2	14.55	393	66.1	14.44		
		Gain score	137	8.8	11.58	393	8.4	12.46	0.00	ns
MATH	**8th GRADE**	Feb '98 score	513	60.2	10.93	1725	61.5	11.41		
		Summer '98 score	513	67.4	13.74	1725	68.2	13.62		
		Gain score	513	7.2	9.62	1725	6.7	9.53	1.88	ns
	9th GRADE	Feb '98 score	316	60.9	10.91	891	62.1	11.04		
		Summer '98 score	316	67.7	14.01	891	68.4	13.25		
		Gain score	316	6.8	10.46	891	6.3	9.30	0.57	ns
	10th GRADE	Feb '98 score	151	56.8	10.40	372	58.8	10.13		
		Summer '98 score	151	66.1	12.44	372	64.5	13.22		
		Gain score	151	9.2	9.11	372	5.7	9.87	11.29	**

NOTE: ns = not significant; * = Significant at the 0.05 level; ** = Significant at the 0.01 level

In performing the significance tests reported in Table 9, we used the analysis of covariance to statistically control for differences between the enrolled and nonenrolled groups on initial (February 1998) scores and six demographic variables: socioeconomic status (measured by whether a student qualifies for free/reduced lunch), special education status, gender, ethnicity, whether a student was new to the district as of January 1997, and limited English proficiency (LEP) status. Only differences that remained significant after controlling for these six variables and the initial mean February 1998 score are starred in Table 9. However, the means shown in Table 9 are the raw means unadjusted for differences on the six covariates. Reasons for doing this were explained in the *Statistical Analyses* section (see p. 13).

Table 9 (and Figures 3 and 4, pp. 32 and 33) show that the students who enrolled in summer school gained an average of approximately 9 percentage points on the reading *BST* and an average of approximately 8 percentage points on the math *BST*. For example, 8th grade students who enrolled in summer school gained an average of 9.1 percentage points on the reading *BST* and an average of 7.2 percentage points on the math *BST*. For those students who did not enroll in state-funded summer school, the results are similar. On average, students who did not enroll in state-funded summer school gained an average of approximately 9 percentage points on the reading *BST* and an average of approximately 6 percentage points on the math *BST*. For example, 8th grade students who were not enrolled in summer school gained an average of 9.3 percentage points on the reading *BST* and an average of 6.7 percentage points on the math *BST*. Since the results are similar for enrolled and nonenrolled students, this implies that the nonenrolled students may have been doing something else to improve their skills and, subsequently, their test scores.

Perhaps the most important feature of the data in Table 9 is that the average initial scores (February 1998) for students enrolled in state-funded summer school are only around 60% correct, and the average gain is about 9 percentage points for reading and 8 percentage points for math. The average student enrolled in summer school did not increase his/her percent correct by the 10 to 15 points that were needed to meet the Basic Standard. Thus, summer school seems to be helping students improve their basic skills in reading and math, as shown by score gains. However, the improvements are not providing enough of a "boost" to enable most students to actually pass the reading and/or math *BSTs*. Most of these students needed further remediation in the coming academic year. As with the students from Minneapolis and St. Paul, this remediation may have taken the place of other coursework, such as advanced classes or electives.

Figure 3. Gains in Reading from February 1998 through Summer 1998 for Enrolled and Nonenrolled Students: Statewide

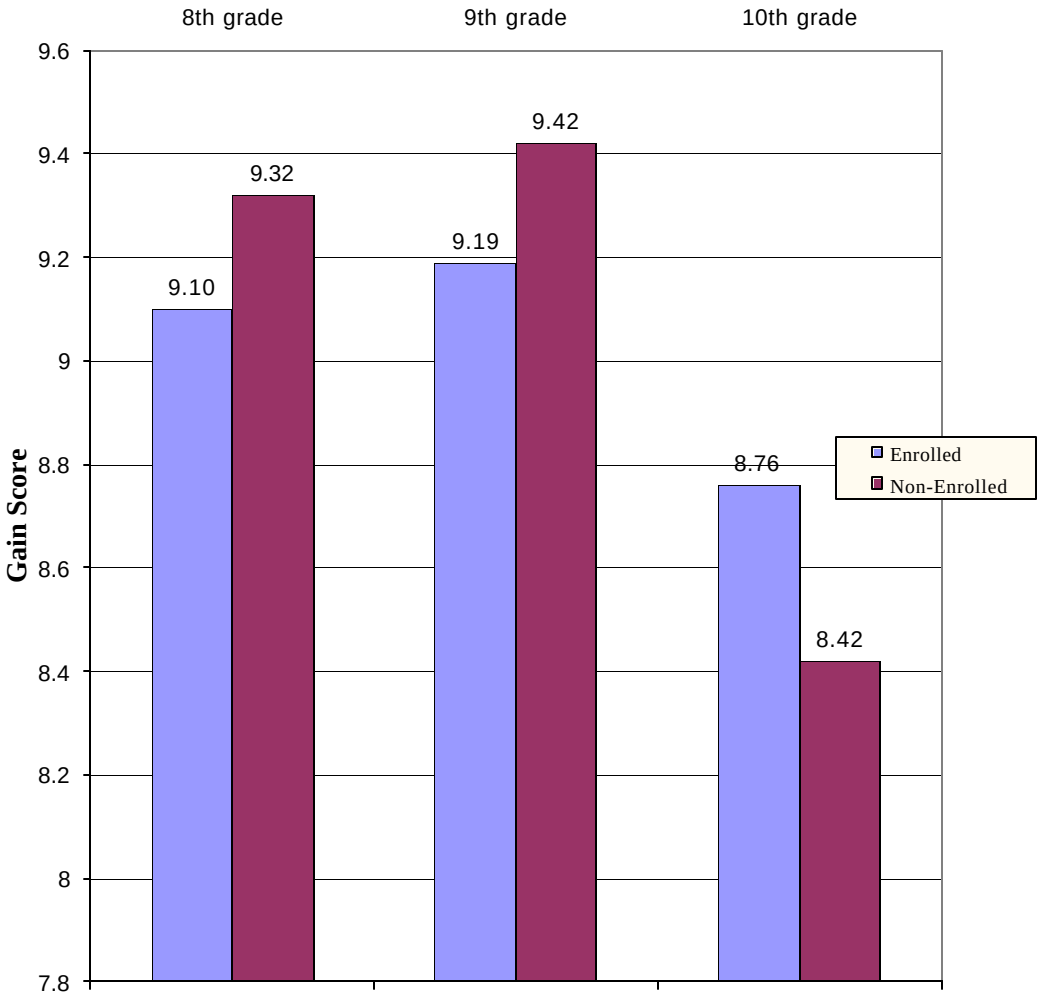
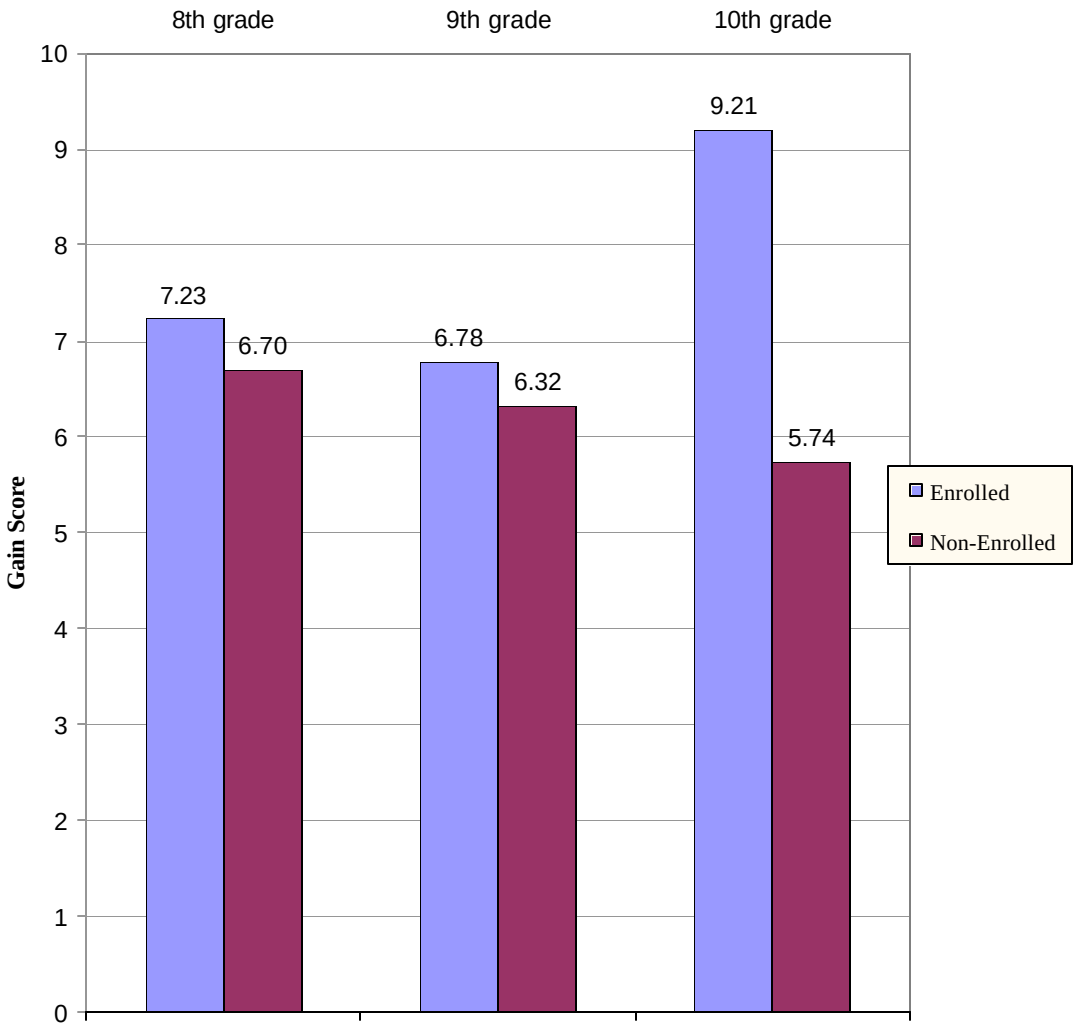


Figure 4. Gains in Math from February 1998 through Summer 1998 for Enrolled and Nonenrolled Students: Statewide



RESEARCH QUESTION 4:
Are students who have not yet attained a minimum passing score on the reading and/or math* BSTs *and who participated in state-funded summer school programs during the summer of 1998 passing at higher rates on future test administrations than those students who do not avail themselves of those opportunities? That is, how likely are students to have passed the reading and/or math* BSTs *by the summer 1998 or February 1999 administrations of the* BSTs*? Are there differences in these passing rates for students who enrolled in state-funded summer school versus those who did not enroll in state-funded summer school?

Research question 4 addresses the effects of summer school on the passing rates among students who did not pass the February 1998 reading and/or math *BST*. Table 10 shows that, on average, less than 50% of the students who did not pass the *BSTs* in February 1998 went on to pass during the summer 1998 administration, whether they enrolled in summer school or not. As stated earlier, this is likely because, on average, these students' February scores were 10–15 percentage points below the passing score. Summer pass rates for students who did not pass the reading and/or math *BSTs* during the February 1998 administration ranged from a low of 35.8% (for 9th grade nonpassers of the math *BST* in February 1998 who enrolled in summer school) to a high of 51.8% (for 10th grade nonpassers of the reading *BST* in February 1998 who enrolled in summer school).

Table 10. Pass Rates for Suburban and Outstate Students Who Did Not Pass the February 1998 Administration of the Reading and/or Math *BSTs* and Who Participated in the Summer 1998 Administration of the *BSTs*: Enrolled vs. Nonenrolled Students

Grade Level in 1998 and *BST* Test (reading or math)	Students who DID NOT PASS the February '98 administration of the reading and/or math *BSTs*: ENROLLED			Students who DID NOT PASS the February '98 administration of the reading and/or Math *BSTs*: NONENROLLED			c^2 value / Significance
	# who passed	% who passed	Initial February '98 mean score of passers	# who passed	% who passed	Initial February '98 mean score of passers	
8th grade reading	238	40.8%	64.6	952	45.2%	65.8	3.62*
9th grade reading	150	44.6%	64.9	535	51.0%	66.5	4.12*
10th grade reading	71	51.8%	61.1	184	46.8%	61.9	1.02^{ns}
8th grade math	184	35.9%	67.3	626	36.3%	68.6	$.03^{ns}$
9th grade math	113	35.8%	67.3	336	37.7%	68.1	$.38^{ns}$
10th grade math	69	45.7%	62.8	137	36.8%	64.7	3.54^{ns}

NOTE: ns = not significant; * = Significant at the 0.05 level; ** = Significant at the 0.01 level

In Table 10, nonenrolled students passed at essentially the same rates as enrolled students. One explanation for this could be that those students who are not enrolling in summer school are likely doing

something else to improve their *BST* scores, such as enrolling in public school or private learning centers on non-state funds. Also, as was stated earlier, the enrolled students had slightly lower scores initially, so they had more to make up than the students who were not enrolled did. Further, in suburban and outstate districts, some programs are quite short, lasting one or two weeks.

Table 11 shows the passing rates of students who did not pass the February 1998 administration of the reading and/or math *BSTs* who went on to pass the *BSTs* by summer 1998 *or* February 1999 (both enrolled and nonenrolled students). There are significant differences at nearly all grade levels and both subject areas between enrolled and nonenrolled students. In all cases, the passing rates are higher for

Table 11. Pass Rates for Suburban and Outstate Students Who Did Not Pass the February 1998 Administration of the Reading and/or Math *BSTs* and Who Enrolled in Summer School or Participated in the Summer 1998 and/or February 1999 Administration of the *BSTs:* Enrolled vs. Nonenrolled Students

Grade Level in 1998 and *BST* Test (reading or math)	Students who DID NOT PASS the February '98 administration of the reading and/or math *BSTs*, ENROLLED in summer school in 1998, and PASSED the *BSTs* in summer 1998 or February 1999			Students who DID NOT PASS the February '98 administration of the reading and/or Math *BSTs*, DID NOT ENROLL in summer school, and PASSED the *BSTs* in summer 1998 or February 1999			c^2 value / Significance
	# who passed	% who passed	Initial February '98 mean score of passers	# who passed	% who passed	Initial February '98 mean score of passers	
8th grade reading	611	79.1%	62.6	5803	91.6%	63.9	122.19**
9th grade reading	414	84.0%	63.3	2928	92.4%	64.8	37.92**
10th grade reading	214	91.5%	57.9	1053	92.6%	59.6	.37^{ns}
8th grade math	403	63.7%	66.6	3277	81.8%	67.3	109.34**
9th grade math	247	64.2%	66.7	1588	81.1%	67.4	54.10**
10th grade math	128	68.8%	62.3	609	82.2%	62.7	16.31**

NOTE: ns = not significant; * = Significant at the 0.05 level; ** = Significant at the 0.01 level

nonenrolled students by February 1999. For example, for 8th grade nonpassers who enrolled in summer school, 79.1% had passed the reading *BST* by February 1999, while 91.6% of 8th grade nonpassers who did not enroll had passed the reading *BST* by February, 1999. Also, for 8th grade nonpassers who enrolled in summer school, 63.7% had passed the math *BST* by February 1999, while 81.8% of 8th grade nonpassers who did not enroll had passed the math *BST* by February 1999.

One goal of summer school is to provide students with more basic skills instructional time without disrupting their regular academic schedule by having remedial courses in conflict with the regular academic elective or other course offerings. Since most students who did not pass the reading and/or math *BSTs* in February 1998 did not meet the minimum standard in the summer, it is clear that they needed more instructional time on basic skills, either during the regular academic year or in a subsequent summer school. Additional basic skills instruction during the regular academic year may have had to take the place of electives or other coursework or be part of an after-school/extended-day program. For many students, one summer school session is not a complete solution; rather, it is part of a larger effort to provide additional instructional time for basic skills.

Summary for the Suburban/Outstate Data

The information presented in this section of the report represents only the data for the suburban and outstate school districts. These school districts are using state funds to offer summer school programs. As Table 1 (p. 8) suggests, these summer school programs are being used to provide remedial intervention for students who have not passed the reading and/or math *BSTs*. It is interesting to note that for students who did not pass the February 1998 administration of the *BSTs*, there are several significant differences, at least on the six demographic variables identified for this study, between the group of students who enrolled and those who did not enroll in summer school (see Table 8, p. 37).

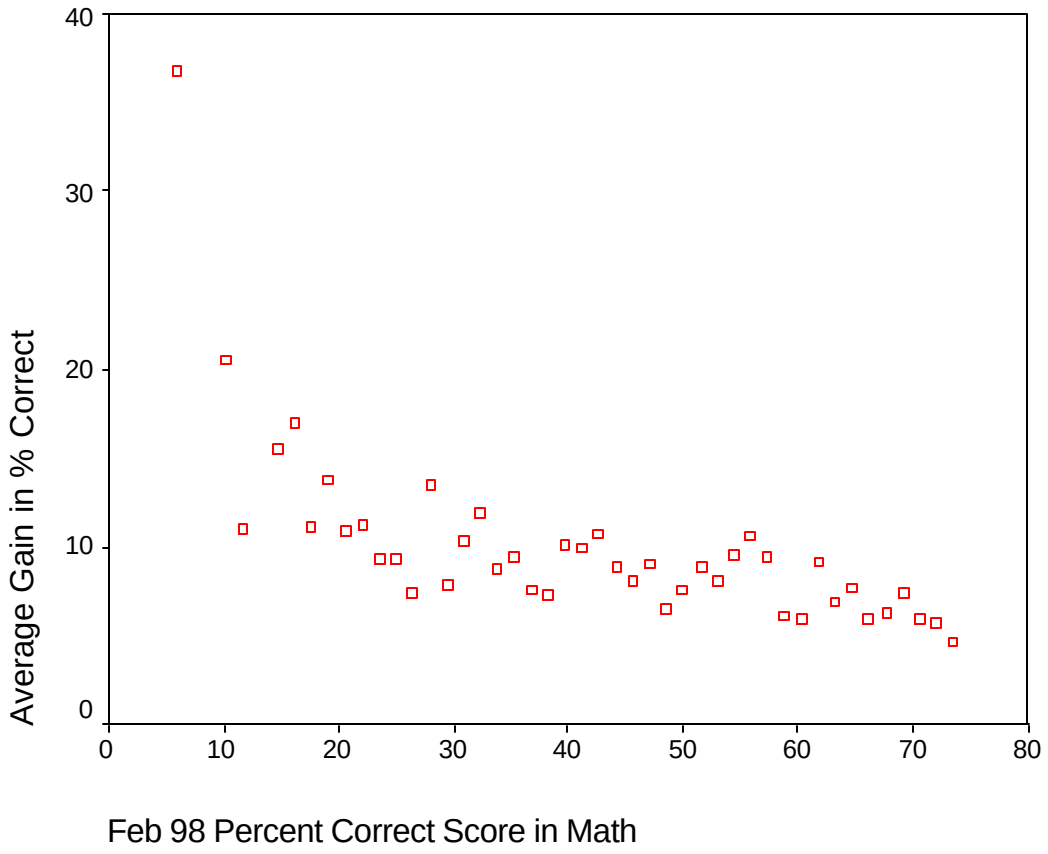
Table 9 (p. 30) provides data suggesting that summer school is effective in helping students improve their skills, as evidenced by the score gains between the tests in February 1998 and summer 1998. However, summer school does not seem to give many of these students the skills they need in order to pass the *BSTs*; that is, summer school boosts scores approximately 6–9 percentage points, but these students are on average 10–15 percentage points below the passing score. One limitation of this study is that we did not observe summer school classes to learn about the types of summer school programs being offered; that is, these summer school programs may last one week or several weeks, may run for any number of days/hours, and may be focused more on test-prep than on skill-building. Because many students are so far below the cut score and lack fundamental skills, it is evident that a one-shot, test-prep summer school program will not be enough for them to overcome these skill deficits. Most of these students needed more than just a summer school program; they also need follow-up programming during the year to sustain and continue the gains made in summer school.

Combined Data: Prior Achievement and Summer School Success

Figures 5 through 10 (pp. 37–42) are based on both the Minneapolis/St. Paul data and the suburban and outstate data for 8th and 9th graders. For students with various February 1998 scores, they show the proportion of students enrolled in state-funded summer school and who passed the subsequent reading and/or math *BSTs*. For various initial February 1998 scores, they also show the average score gains for students enrolled in state-funded summer school. Only 8th and 9th grade student data were used in these graphs, because their passing score was 75% and all of the cohorts following them will need to achieve a scale score approximately equal to 75% correct (scale score = 600).

For 8th and 9th graders, Figures 5 and 6 (below and p. 38) show the average increase (February to July) in scores for enrolled students with varying scores on the February 1998 test. In reading these graphs, it must be remembered that higher February scores occurred more frequently, and so the average gain for some of the lowest February scores is based on very few students. Furthermore, some of the lowest February scores may be artificially low as a result of such things as students starting, but not completing, the February test. Nevertheless, lower scoring students tend to have larger gains, some of which is due to a phenomenon that statisticians call regression to the mean.[2] For the majority of students, with February scores between 50% to 74% correct, the increase is about the same for all students, somewhere between 5% to 10% correct.

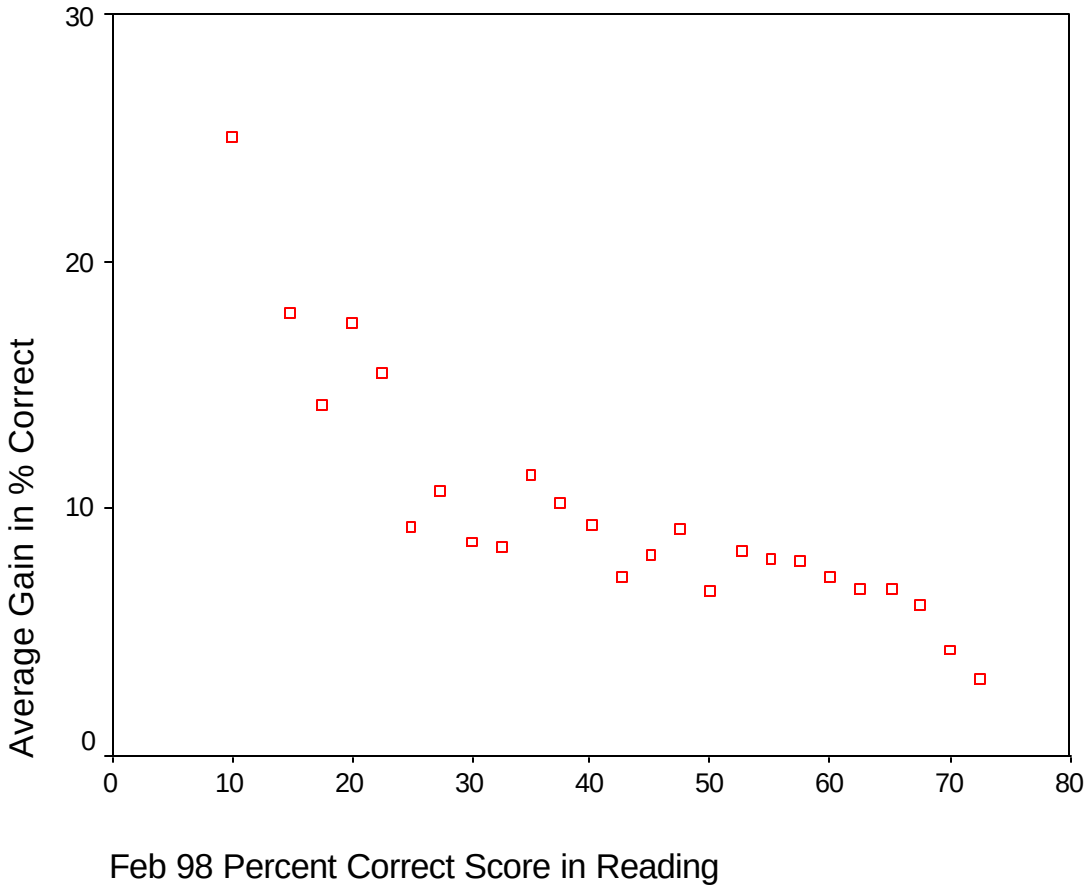
Figure 5. Average Gain in Percentage Correct Between February 1998 and Summer 1998 in Math for Enrolled Students: 8th and 9th Graders Who Did Not Pass in February 1998



*The graph above shows the average gain score for those students who did not pass the **Math** BST in February 1998, who enrolled in summer school, and took the BST again in Summer 1998. For example, students who scored fifty percent correct in February 1998 had an average gain score of less than ten percent, not enough to get them to the passing mark. For those students close to the passing mark (from 70 to 74%), the average gain score was between four and eight percent, barely enough to get them to the passing mark.*

[2] Regression toward the mean is the principle that those people at the end of a continuum (in terms of test scores) will move closer to the mean in subsequent tests (Howell, 1992, p. 261)

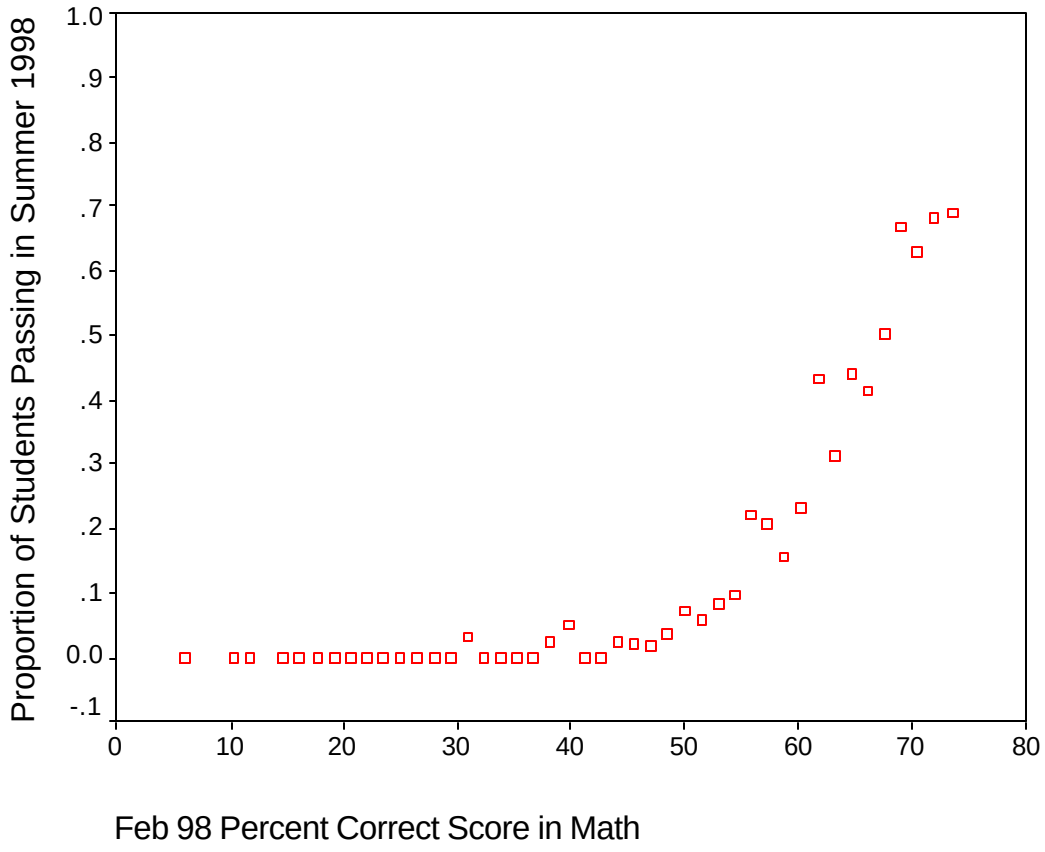
Figure 6. Average Gain in Percentage Correct Between February 1998 and Summer 1998 in Reading for Enrolled Students: 8th and 9th Graders Who Did Not Pass in February 1998



The graph above shows the average gain score for those students who did not pass the ***Reading*** BST *in February 1998, who enrolled in summer school, and took the* BST*again in summer 1998. For example, students who scored fifty percent correct in February 1998 had an average gain score of approximately eight percent, not enough to get them to the passing mark. For those students close to the passing mark (from 70 to 74%), the average gain score was between three and five percent, barely enough to get them to the passing mark.*

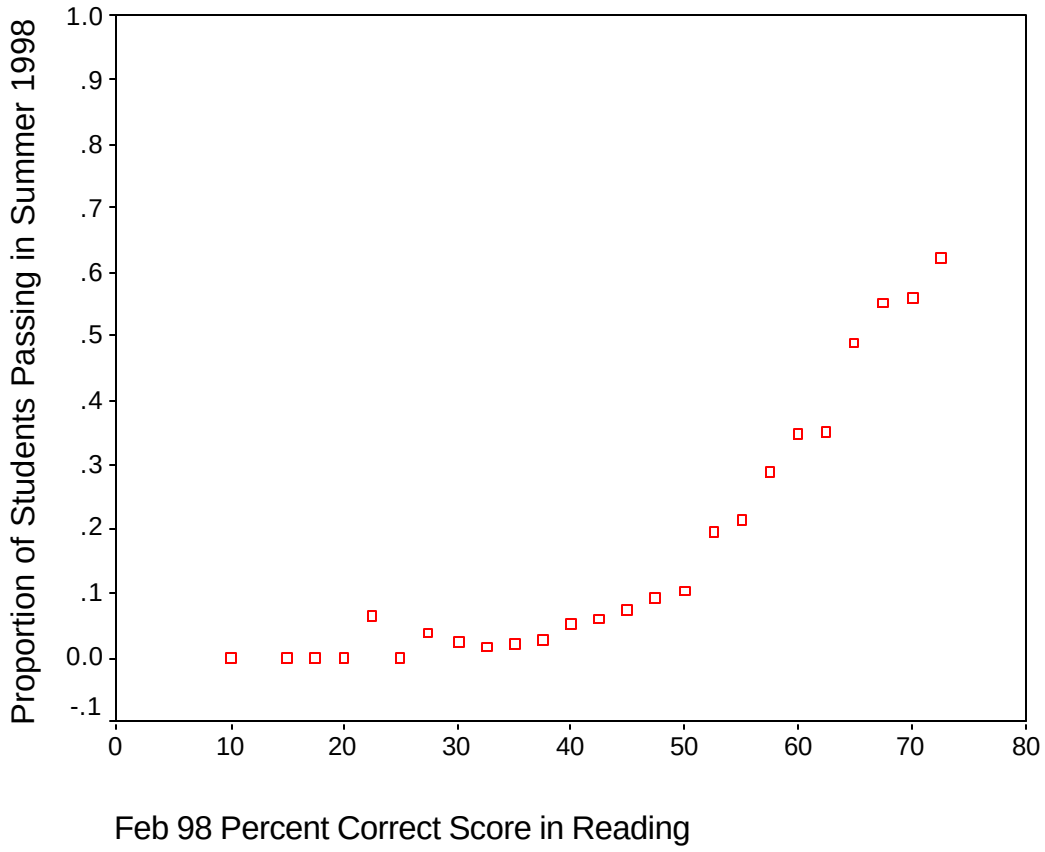
Combining the data from 8th and 9th graders, Figures 7 and 8 (below and p. 40) show the percentage of enrolled students who passed the reading and mathematics tests at the end of the summer, as a function of their initial February score. Only students not passing in February 1998 are included in this chart, so it is based only on students scoring less than 75% correct on that test. The higher February scores occurred far more frequently, and the pass rates for some of the lower February scores are based on very few students. Not surprisingly, the percentage of students passing is far higher among students who were near the pass score (75% correct) in February. Somewhat surprisingly, however, students who scored over 70% correct in February, and hence were close to passing, did not universally pass the test in summer.

Figure 7. Percentage of Enrolled Students Passing the Math Test in Summer 1998 at Each Initial (February 1998) Score Level: 8th and 9th Graders Who Did Not Pass in February 1998



The graph above shows the percentage of items answered correctly on the February 1998 ***Math*** BST, *and the proportion of students with that score who took summer school and passed the math* BST *in summer 1998. For example, of those students who scored 50% correct on the February administration of the math* BST, *less than ten percent passed in the summer 1998 administration of the test. Notice that for students who are close to the passing mark (75% for 8th and 9th graders) in February 1998, the chances are better that they passed in summer 1998.*

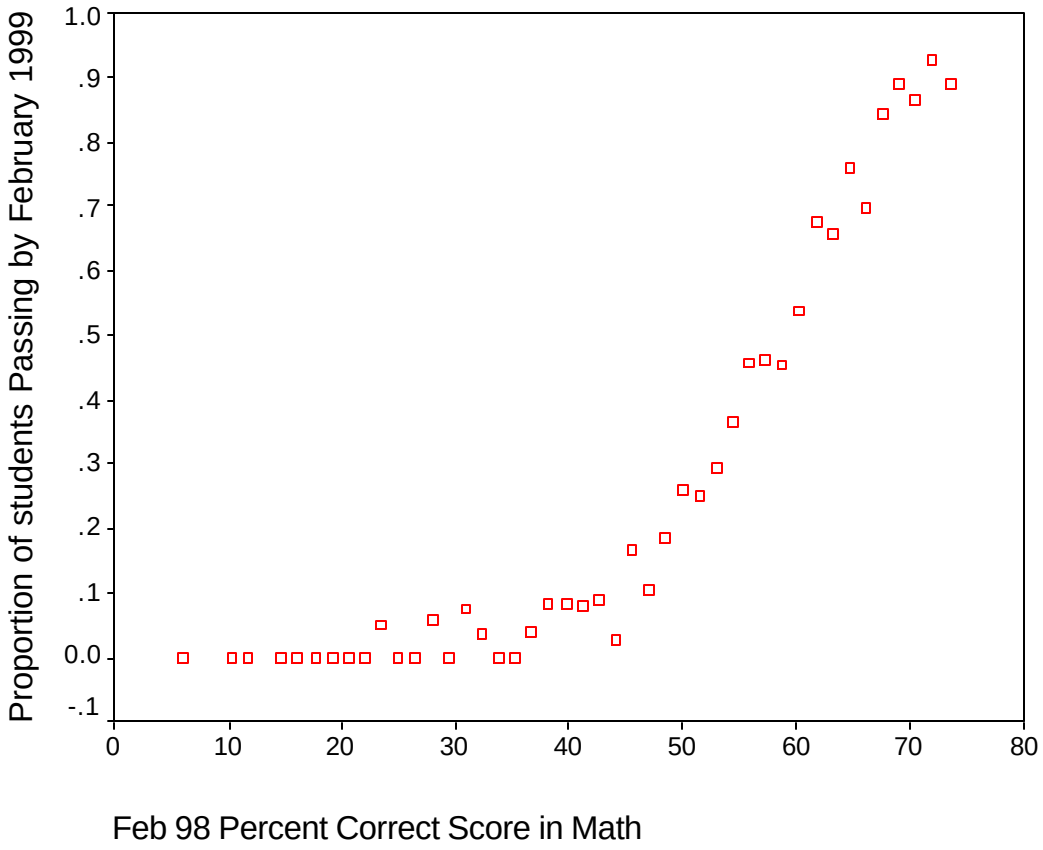
Figure 8. Percentage of Enrolled Students Passing the Reading Test in Summer 1998 at Each Initial (February 1998) Score Level: 8th and 9th Grade Students Who Did Not Pass in February 1998



The graph above shows the percentage of items answered correctly on the February 1998 ***Reading*** BST, *and the proportion of students with that score who pass the reading* BST *in summer 1998. For example, of those students who scored 50% correct on the February 1998 administration of the reading* BST, *approximately ten percent passed in the summer 1998 test. Note that of those students who were close to the passing mark (75% for 8th and 9th graders) in February 1998, the majority had passed by summer 1998 (more than 50%).*

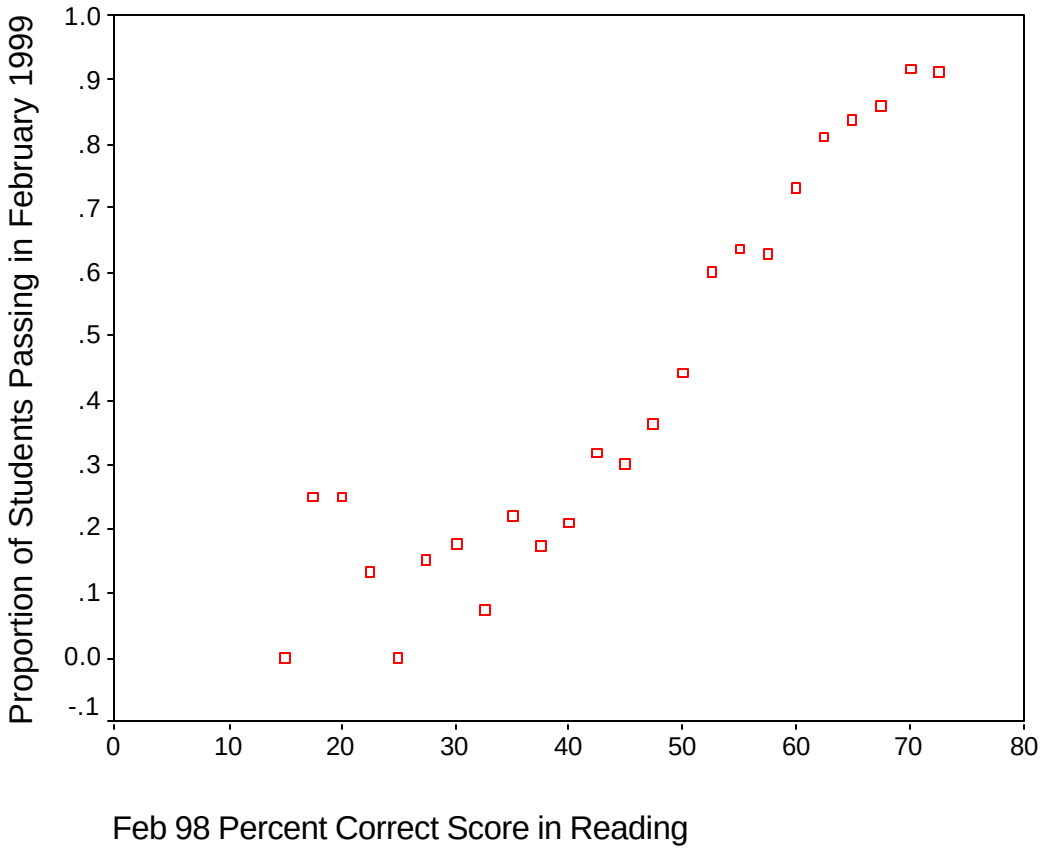
Figures 9 and 10 (below and p. 42) show the percentage of enrolled 8th and 9th graders who passed the reading and math tests by the end of the following February (1999), either by passing in summer 1998 or by passing in February 1999. Pass rates increase as a function of initial score; students with higher initial (February 1998) scores were more likely to pass by February 1999 than were students with lower initial scores. Those enrolled students who scored over 70% correct in February 1998, and hence were very close to passing, passed almost universally by February 1999.

Figure 9. Percentage of Enrolled Students Passing the Math Test by February 1999 at Each Initial (February 1998) Score Level: 8th and 9th Graders Who Did Not Pass in February 1998



The graph above shows the percentage of items answered correctly on the February 1998 ***Math*** BST, *and the proportion of students with that score who pass the math* BST *in summer 1998 and February 1999. For example, of those students who scored 50% correct on the February 1998 administration of the math* BST, *less than thirty percent had passed the summer 1998 and February 1999 tests. Note that of those students who were close to the passing mark (75% for 8th and 9th graders) in February 1998, the majority had passed by February 1999 (at least 80%).*

Figure 10. Percentage of Enrolled Students Passing the Reading Test by February 1999 at Each Initial (February 1998) Score Level: 8th and 9th Graders Who Did Not Pass in February 1998



The graph above shows the percentage of items answered correctly on the February 1998 ***Reading*** BST, *and the proportion of students with that score who passed the reading* BST *in summer 1998 and February 1999. For example, of those students who scored 50% correct on the February 1998 administration of the reading* BST, *more than forty percent had passed by the summer 1998 and February 1999 tests. Note that of those students who were close to the passing mark (75% for 8th and 9th graders) in February 1998, the majority had passed by summer 1998 (more than 80%).*

Final Conclusions and Recommendations

Students who enroll in state-funded summer school are making progress. On average, students' scores (percentage correct) increased by five to seven points in reading and approximately eight points in mathematics. Students' skills are increasing and their *BST* scores are, on average, higher at the end of summer school than they were before.

Even in the districts that require summer school (Minneapolis and St. Paul), little more than half of the students who did not pass the *BST* in February subsequently enrolled in summer school. In outstate suburban districts, far less than 50% of students enrolled in state-funded summer school. For many students, even when it is required, summer school seems not to be the remedial intervention of choice. This finding is highly consistent with reports from other states and districts, as cited in our literature review. With these considerations in mind, we have the following recommendations:

RECOMMENDATION 1. For many students, particularly those with February scores below 65% correct (or the scale score equivalent), summer school must be part of a larger learning plan designed to bring basic skills up to the state standard. In districts with individual learning plans, those plans should reflect the potential need for more than just one summer school session.

For future high school graduating classes, the minimum passing score is a scale score of 600 in reading and mathematics. This roughly corresponds to a percentage correct score of 75%. Since the average student enrolled in summer school had a February 1998 test score of approximately 50–60%, the average score gain from summer school did not bring the average summer student up to the state standard. If the gains from summer continue at the levels observed in this study, many students will need more than just one summer session to reach the state standard. The necessary additional instruction may come from coursework during the regular year, after school programs, or additional summer sessions in later years. Consequently, the learning plans of individual students and districts must accommodate the need for additional study. Learning plans cannot count too heavily on a single summer session.

One goal of summer school is to provide students with more instructional time without disrupting their regular academic schedule. If a student can reach the state standard by the end of summer, they need not take remedial work during the regular academic year in place of electives or other desired coursework. Regrettably, for many students, a single summer session will not eliminate the need for additional instruction.

RECOMMENDATION 2. Summer school instructional curricula and methods should be improved to increase the likelihood that all students, but particularly students near the passing score at the end of February will pass by the end of summer. Instructors should be well qualified in their field. If CFL begins releasing items from past *BST* test forms, the release should include information that teachers can use in the design of summer school curricula. Teachers must avoid excessive reteaching of material already mastered.

Figures 7 and 8 in this report contain some of the most disappointing results. These figures show that even students closest to the passing score in February did not universally pass at the end of summer. Among students who were within *one test item of passing* in February, only about 70% passed after enrolling in summer school (although almost all of them passed by the end of the following February). This may mean the material covered in summer is too basic for students near the state standard. Or it may result from a "laid-back" rather than "intensive" approach to summer instruction.

Even the average summer student has mastered only about 50–60% of the material by the end of February. In all likelihood, the content already mastered comes primarily from the easier material in the

domain of basic mathematics or reading. Conversely, the content yet to be mastered would presumably come chiefly from the harder material. Therefore, despite the name "remedial," summer school should seemingly focus on the more complex types of problems in basic mathematics and the more complex types of questions arising in basic reading. Obtaining this focus requires an understanding of what types of items are more difficult and what aspects make items more challenging. If CFL begins releasing items from past *BST* test forms, the release should include information about the difficulty of various items. This would enable teachers to better understand the kinds of items that are particularly difficult, and to focus summer school on such more challenging material within the domains of basic mathematics and reading.

Schools should use the guidelines published by the state, including practice tests and specifics on what topics are addressed in each question. These can be used to determine students' strengths and weaknesses and provide guidelines for what students need to master in order to meet the state graduation requirement. In some cases, however, students may need work with the most challenging material, rather than focus on a particular topic area. In some cases, students may need practice and instruction on reasoning with content, rather than instruction on content per se.

For students, it must be a frustrating experience to just miss meeting the state standard in February and then fail to meet it again after summer school. We encourage a redesign of the summer experience to lessen the likelihood of such frustrations. We do not claim to have all (or even many) of the answers as to how such a redesign should occur. But such a redesign seems needed. In designing the summer curriculum, teachers would do well to remember that most students have already demonstrated mastery of over 50% of the domain—far short of what is needed to meet the state standard, but far beyond the starting point in developing basic skills.

RECOMMENDATION 3. CFL and districts should consider steps to lengthen the summer experience if possible. Such steps might include moving to computerized administration of the summer *Basic Standards Test* to make it possible to lengthen the summe r session while still returning test results to students before the fall term begins.

In some districts, the summer school session is short, little more than a week or two. Such short sessions can provide preparation in test taking skills, but such short sessions cannot provide the genuine skill building that many students need. Indeed, when viewed against the large gains needed by many of the students in this study, one to two weeks of summer school would be little more than symbolic.

Other districts provide a lengthier summer experience extending from the end of the spring school term to the administration of the summer *Basic Standards Test.* The summer *Basic Standards Test* administration usually comes in the third or fourth week of July. If the test were given in the third week of July, then for a district whose spring term ends May 30, summer school would last at most seven weeks, including the July 4 holiday—even if it began immediately after the end of the spring term. Such a seven-week session would be less than half the length of a typical school semester.

Districts, particularly those with short summer sessions, may want to consider lengthening their sessions. In districts with short sessions, parents should consider alternatives outside their local district if their child needs intensive skill building to reach the state standard.

CFL may wish to move administration of the summer *BST* to a slightly later date in July or early August so districts can run a longer summer session. At present, the test is administered somewhere around the third week of July to allow time to return results to students by the beginning of the fall term. To move the summer testing date back, it may be necessary to change the test administration procedure. Computerized test administration can make it possible to return results instantaneously.

Concluding Remarks

Standards-based education is built on the premise that all students can learn given enough time. As applied to basic skills, this philosophy poses a difficult question. For students who need more time to master basic skills, where will that additional time be found? If students take additional instruction on basic skills during the regular academic year, such coursework can prevent the student from taking electives or other desired course offerings.

Summer school potentially offers a solution to this difficult dilemma. If students can reach the state standard by taking additional instruction during the summer, then basic skills coursework need not interfere with their regular academic plans. Unfortunately, for many of the students in our study, the summer school session was too short to bring them up to the state standard. A single summer session did not fully meet their need for additional instruction in basic skills.

While improved remediation is needed, ultimately the best answer is improved basic skill instruction in the lower grades. Improved instruction in the lower grades both reduces the need for remedial instruction and, in a certain sense, increases the effectiveness of short remedial interventions. Improved basic skill instruction will mean that fewer students need remedial work, and more students needing remedial work will be sufficiently close to the state standard that short remedial efforts, like summer school, will enable them to reach the required standard. For the past several years, initial pass rates on the *Basic Standards Test* have been rising in reading and in writing (but not in mathematics), thus reducing the need for remedial instruction in these areas. Both improved instruction in the lower grades, and improved remedial instruction in grades 9–12 will contribute to the goal of universal competency in basic skills.

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APPENDIX A

The Graduation Rule is defined as a "State level rule that states that the following three criteria must be met for high school graduation: 1) Student must meet course requirements of their local school district; 2) Student must pass *Basic Standards Tests* in mathematics, reading, and writing; 3) Student must demonstrate mastery of the *High Standards* by completing performance assessments in ten areas" (Office of Educational Accountability, 1999, p. 82).

The Basic Standards Tests (BSTs) are externally-mandated, high-stakes tests administered as part of the Minnesota Graduation Rule. The basic standards "represent *one* of the two components of the Minnesota Graduation Rule established in 1992. The Basic Standards represent the minimum skills required for a high school diploma in Minnesota" (Office of Educational Accountability, 1998, p. 78). Externally-mandated testing programs are defined as testing programs that are controlled by, and/or mandated by, outside authorities, such as state legislatures or state departments of education (Madaus, 1988). If parents, students, teachers, or administrators perceive that performance on a test will trigger important decisions or actions, then the test can be defined as a high-stakes test. Stakes are "often described as the positive and/or negative consequences that are placed on students, schools or districts as the result of student achievement data. The terms 'low stakes' and 'high stakes' express the varying levels of risk being placed on those responsible for the expected results" (Office of Educational Accountability, 1998, p. 84).

Minnesota's Accountability Policy: For more information about Minnesota's accountability policy, see College of Education and Human Development (1996) or Davison, et al. (1998, 1999). For information accountability policies in general, see Education Commission of the States (1998), which may be found online at http://www.ecs.org/ via links to Publications: Accountability.

APPENDIX B

Table A.1 Effect Sizes for Adjusted Mean Difference in Minneapolis/St. Paul

Grade level and BST (math or reading)	Adjusted Mean for students enrolled in summer school	Adjusted Mean for students not enrolled in summer school	Mean Square Within	Mean Square Between	Adjusted Effect Size	F-value	Significance
8th grade reading	59.85	53.98	156.15	4030.11	0.47	25.81	**
9th grade reading	59.26	53.01	188.46	2525.31	0.46	13.40	**
10th grade reading	55.79	52.89	128.60	230.55	0.26	1.79	ns
8th grade math	60.54	55.57	99.95	2599.17	0.50	26.01	**
9th grade math	60.25	54.64	99.41	2098.36	0.56	21.11	**
10th grade math	57.48	52.90	89.57	580.81	0.48	6.49	*

NOTE: ns = not significant; * = Significant at the 0.05 level; ** = Significant at the 0.01 level.

The adjusted effect size equals the difference in the two adjusted means divided by the square root of the mean square within.

Table A.2 Effect Sizes for Adjusted Mean Difference for Suburban and Outstate

Grade level and BST (math or reading)	Adjusted Mean for students enrolled in summer school	Adjusted Mean for students not enrolled in summer school	Mean Square Within	Mean Square Between	Adjusted Effect Size	F-value	Significance
8th grade reading	69.78	69.77	135.73	0.11	0.00	0.00	ns
9th grade reading	71.17	71.24	124.70	1.10	-0.01	0.01	ns
10th grade reading	66.25	66.18	140.08	0.49	0.01	0.00	ns
8th grade math	68.54	67.89	85.67	160.64	0.07	1.88	ns
9th grade math	68.56	68.09	87.79	49.84	0.05	0.57	ns
10th grade math	67.25	64.10	87.66	989.85	0.34	11.29	**

NOTE: ns = not significant; * = Significant at the 0.05 level; ** = Significant at the 0.01 level.

The adjusted effect size equals the difference in the two adjusted means divided by the square root of the mean square within.