Students' home and learning environments have changed over time. Students have greater access to computers and are taking more upper-level mathematics classes. Students are also reading more in school and for homework.

Chapter 4
Trends in Students' School and Home Experiences

In examining trends in students' academic achievement, it is important also to consider the context of their learning. The context of learning today has changed since the assessment was first administered in the early 1970s. For example, computer technology plays a greater role in education as schools improve their infrastructure, use multimedia in their classrooms, and encourage students to explore research topics on the Internet. Calculators are used more often in the classroom, and algebra is being taught in earlier grades than it was three decades ago (Braswell et al. 2005).

Home environments have changed as well. Contextual variables such as availability of computers in the home or parental involvement may affect student learning (Cai, Moyer, and Wang 1997; Downes and Reddacliff 1997; Rathburn, West, and Hausken 2003). As part of NAEP's long-term trend assessments, students have responded to a variety of questions about their school and home experiences. The information gained from these responses provides insight into the activities and experiences that form the contexts in which students learn. This chapter highlights students' responses to NAEP background questions about several key factors associated with student achievement.

In the following sections, data are presented to show each variable's relationship to scores on the 2004 NAEP reading and mathematics long-term trend assessment. Different background questions were asked for reading and for mathematics, so the two sections highlight different variables. Trends associated with contextual factors are presented two ways. First, the relationship between the variable and the average NAEP score is examined. It should be noted, however, that a relationship between NAEP scores and students' responses to certain questions does not establish a causal relationship between a particular factor and student achievement. The relationship may be influenced by a number of other variables not accounted for in this report, such as family income or students' attitudes. In addition, the information examined here is based solely on student self-reports, which may vary in accuracy across ages and students.

Second, the contextual variable is shown on its own to clarify how students' responses to the background questions have changed over time. That is, the percentages of students selecting each response option in 2004 are compared with those from the first assessment year in which the question was asked. (The comparison year varies by question.) These comparisons, even without the associated performance scores, demonstrate how the context of education has changed over time.

Contextual Factors Associated With Reading

Students responded to several questions relating to reading as they took the long-term trend assessment. This chapter reports on three variables associated with reading: the amount of time spent on homework, the number of pages read per day for both school and homework, and the amount of time spent reading for fun.

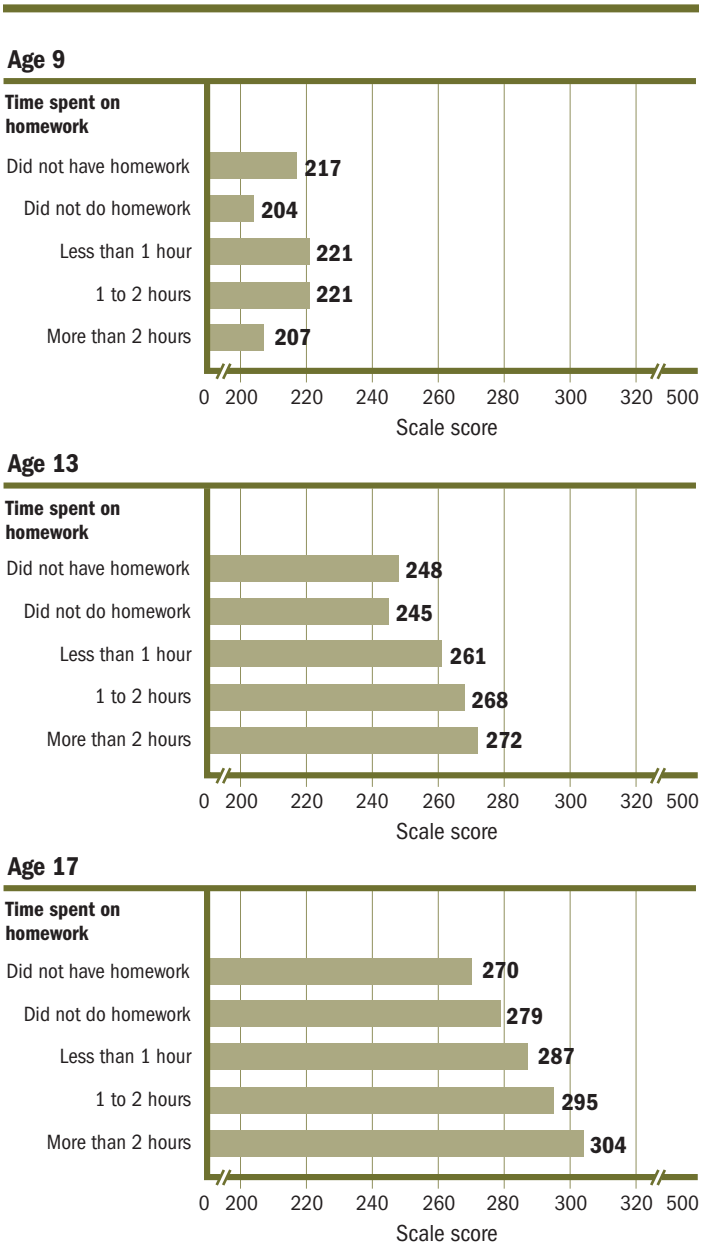
Amount of Homework

The first of two background questions pertaining to homework on the reading assessment is discussed in this section. Specifically, the question relating to time spent on homework asked, "How much time did you spend on homework yesterday?" The possible responses included the following:

- No homework was assigned.
- I had homework but didn't do it.
- Less than 1 hour
- 1 to 2 hours
- More than 2 hours

This question was asked at age 9 in assessment years 1984 through 2004 and at ages 13 and 17 in assessment years 1980 through 2004. Figure 4-1 shows the average reading scores in 2004 by the amount of time spent on homework for all three age groups, and figure 4-2 shows the trend in the percentages of students across the three age groups reporting they spent varying amounts of time on homework.

Figure 4-1. Average reading scale scores for students ages 9, 13, and 17, by amount of time spent on homework: 2004



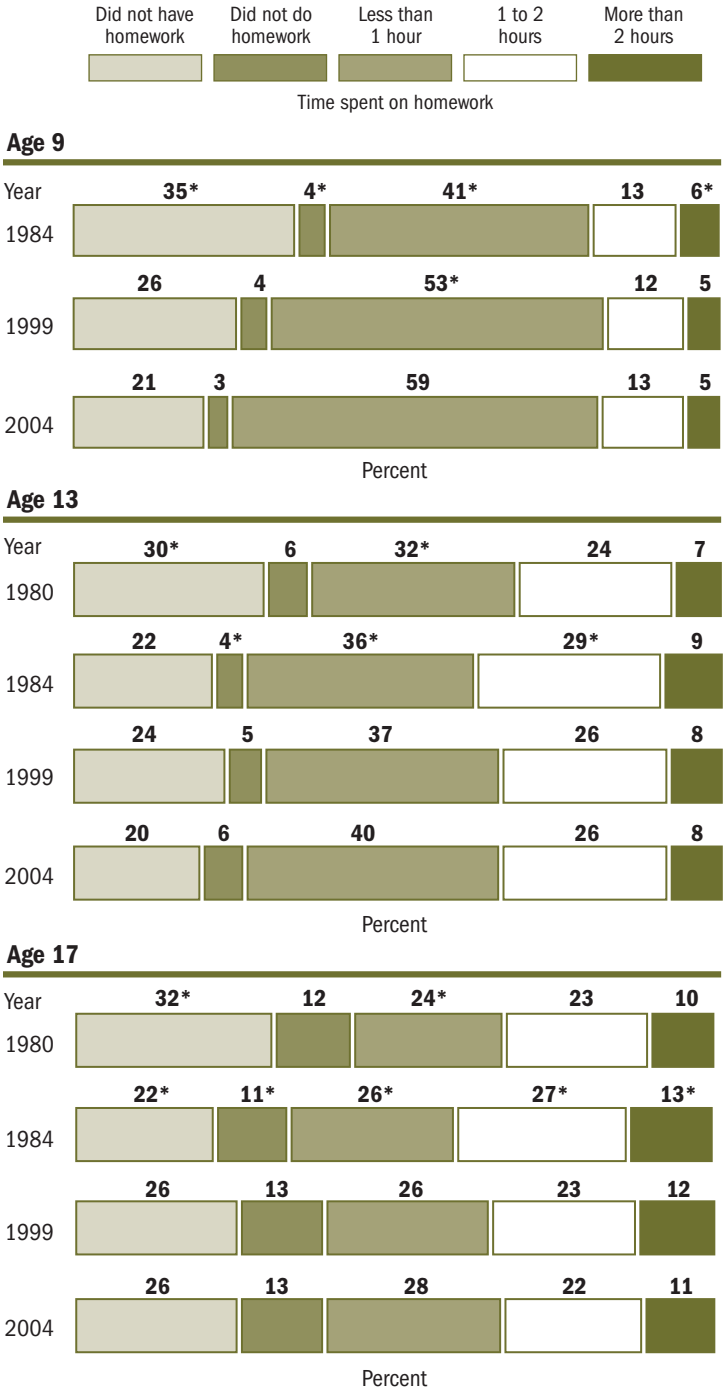
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2004 Long-Term Trend Reading Assessment.

How to interpret this graphic . . .

The graphics in this chapter differ from those in previous chapters in that the scale scores have been placed on the horizontal axis rather than on the vertical axis. The categories of the contextual variable analyzed are on the vertical axis. Thus, in figure 4-1, the five categories of "time spent on homework" are shown in order of amounts of time on the vertical axis, with the horizontal bar showing the average score for each category. For example, at age 17, students who did not have any homework had an average score of 270, and the average scores increased with each category of homework, up to 304 for the "more than two hours" category.

At all three ages less than one hour was the most commonly reported amount of time spent on homework the previous day (figure 4-2). However, the relationship between the amount of time spent on homework and average score on the NAEP reading assessment differed across the ages. In 2004, the average score of 9-year-olds who spent less than one hour on homework was higher than the average scores of students who did not do the assigned homework or who spent more than two hours on homework. The relationship between homework and achievement was more straightforward at age 13. In 2004, the average scores for 13-year-olds who spent either one to two hours or more than two hours on homework were higher than the average scores for their peers who spent less than one hour on homework, did not do their homework, or did not have any homework to do. At age 17, higher average scores on the long-term trend reading assessment were associated with more time spent on homework. That is, in 2004, those students who spent more than two hours on homework had higher average scores than those who spent one to two hours, whose scores were higher in turn than those of students who spent less than one hour, whose scores were higher than those of students who did not do any homework.

Figure 4-2. Percentages of students ages 9, 13, and 17, by amount of time spent on homework: 1980, 1984, 1999, and 2004



*Significantly different from 2004.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1980, 1984, 1999, and 2004 Long-Term Trend Reading Assessments.

How to interpret this graphic . . .

The other type of graphic used in this chapter is a percentage distribution bar. Figure 4-2 shows the percentage of students who chose each category of a question, and the percentages add up to 100 percent of the assessed students. The years shown include the first years the question was asked (1980 and 1984), 1999, and 2004. So, figure 4-2 shows that at age 9 the percentage of students who reported that they spent less than one hour on homework was 41 percent in 1984 and 53 percent in 1999, both of which were lower than the 59 percent reported in 2004. At the same time, the percentage of students who reported they did not have any homework decreased from 35 percent in 1984 to 21 percent in 2004.

In 2004, a greater percentage of 9-year-olds indicated that they spent less than one hour on homework than in any other year in which the question was asked. Simultaneously, the percentage of students indicating either that no homework was assigned or that they did not do any homework decreased between 1984 and 2004. The percentage of 13-year-old students spending less than one hour on homework has increased, from 32 percent in 1980 to 40 percent in 2004. At the same time, the percentage of students reporting that they did not have any homework decreased from 30 percent in 1980 to 20 percent in 2004. At age 17, the percentage of students indicating they spent less than one hour on homework the previous day increased from 24 to 28 percent between 1980 and 2004. At the same time, the percentage of 17-year-olds reporting that they were not assigned homework decreased from 32 to 26 percent.

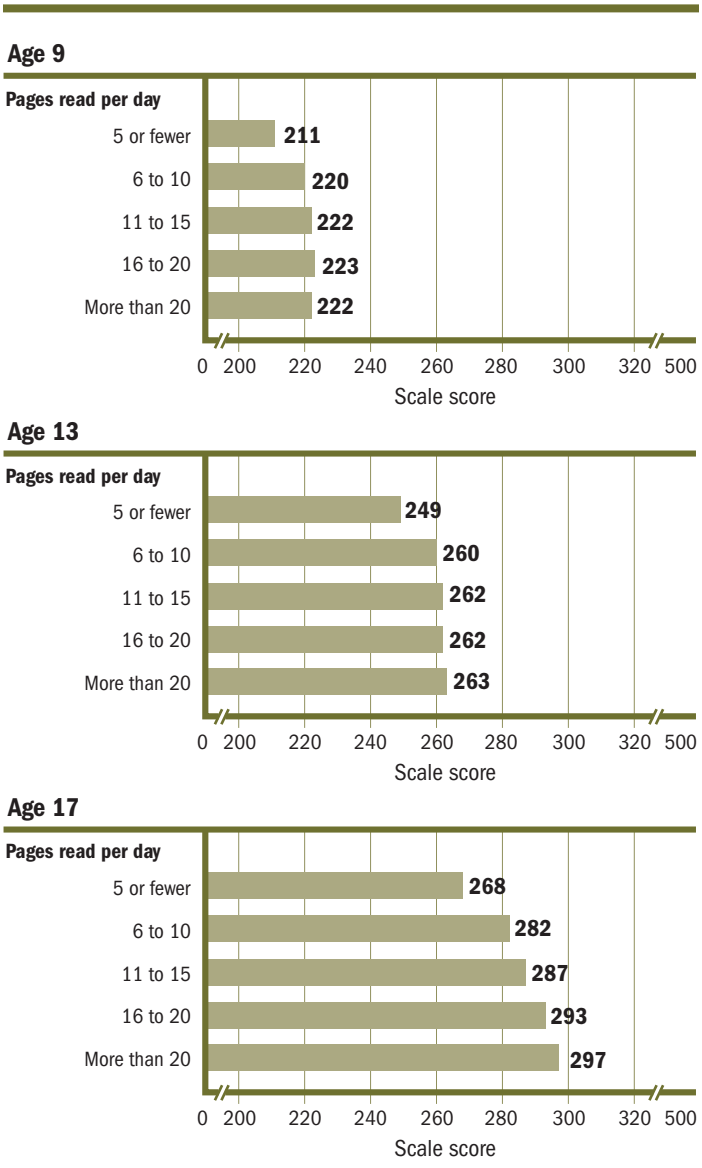
Pages Read Per Day

As part of the reading background questionnaire, students at all three ages were asked about the number of pages they read in school and for homework each day. The response options included the following:

- 5 or fewer
- 6 to 10
- 11 to 15
- 16 to 20
- More than 20

This question was first presented to students at ages 9, 13, and 17 in 1984. Figure 4-3 shows the average reading scores in 2004 by the number of pages read per day for all three ages, and figure 4-4 shows the trend in the percentage of students reporting reading various numbers of pages per day across the three ages.

Figure 4-3. Average reading scale scores for students ages 9, 13, and 17, by pages read per day in school and for homework: 2004

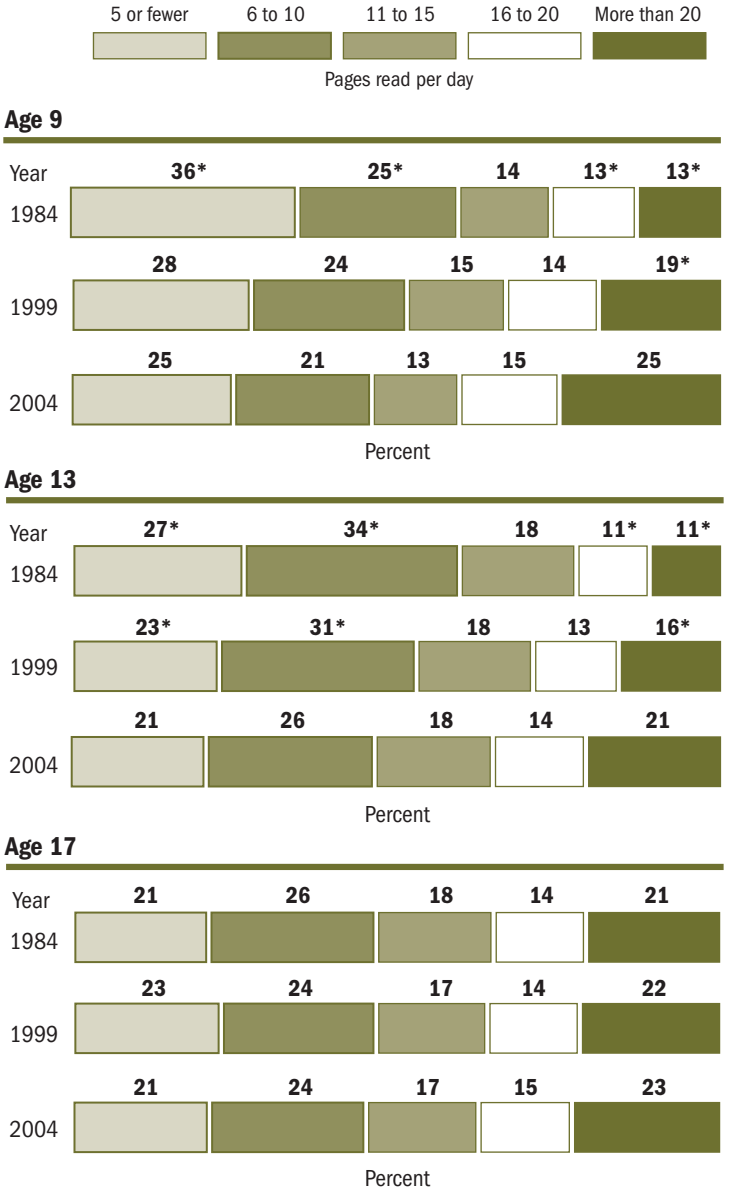


SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2004 Long-Term Trend Reading Assessment.

In 2004, at ages 9, 13 and 17 students who indicated that they read 5 or fewer pages a day had lower reading scores than students in any other category; however, for students at ages 9 and 13, there were no differences in the average reading scores among students who read at least 6 pages a day. That is, students who indicated that they read more than 20 pages a day did not have reading scores that were measurably different from students who indicated they read 6–10, 11–15, or 16–20 pages per day. At age 17, there is a more linear relationship between the number of pages read per day and average reading scores. For example, students who read more than 20 pages a day had higher average reading scores than students who read 11–15, 6–10, or 5 or fewer pages a day. Students who selected any one of the four options indicating they read at least 6 pages a day had higher average scores than students who read 5 or fewer pages.

At age 9, the trend over the past 20 years has shown an increase in the number of pages students read for school and homework. Specifically, fewer students indicated that they read 5 or fewer pages in 2004 than in 1984. Likewise, the percentage of students indicating that they read more than 20 pages a day increased from 13 percent in 1984 to 25 percent in 2004. Similarly, a greater percentage of students at age 13 indicated that they read at least 16 pages per day in 2004 than in 1984. The percentage of 13-year-olds indicating they read either fewer than 5 pages or 6–10 pages decreased between 1984 and 2004. At age 17, there were no measurable changes in the percentage of students indicating various numbers of pages read per day over the 20-year period. In 1984, 1999, and 2004, between 21 and 23 percent of 17-year-olds indicated that they read more than 20 pages per day, and another 21 to 23 percent said they read 5 or fewer pages per day.

Figure 4-4. Percentages of students ages 9, 13, and 17, by pages read per day in school and for homework: 1984, 1999, and 2004



*Significantly different from 2004.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1984, 1999, and 2004 Long-Term Trend Reading Assessments.

Reading for Fun

Students at all three age levels were asked, "How often do you…read for fun on your own time?" The possible responses included the following:

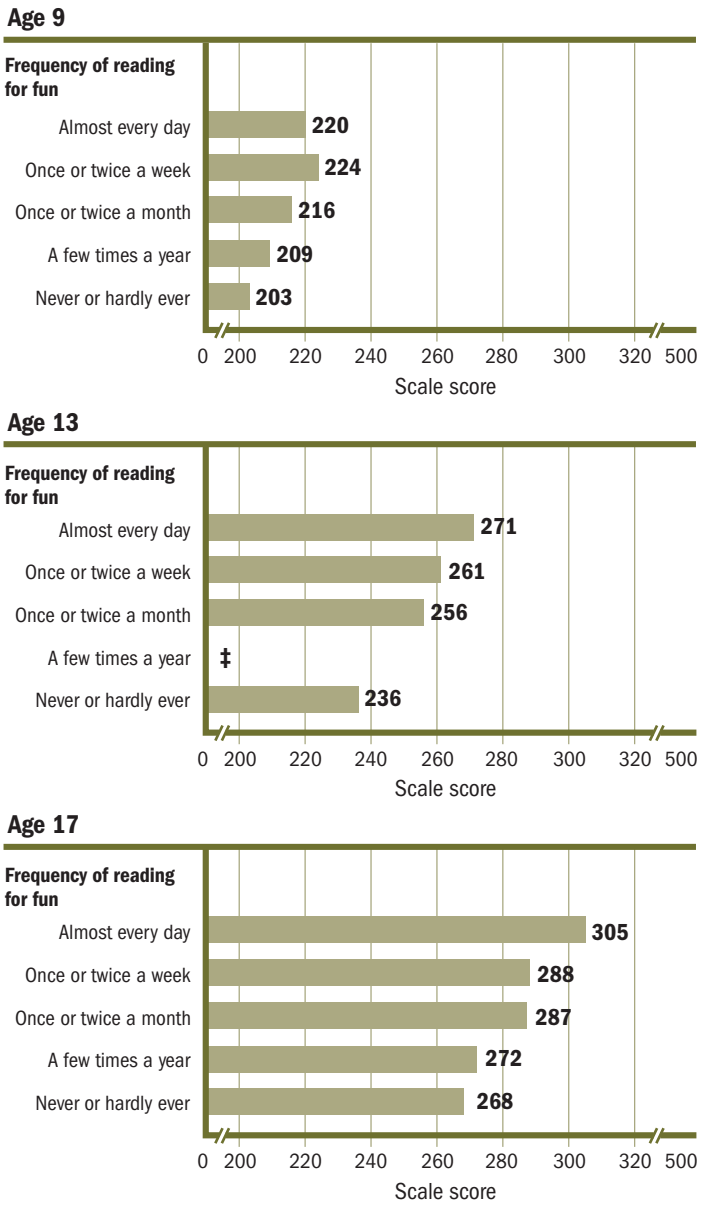
- Almost every day
- Once or twice a week
- Once or twice a month
- A few times a year
- Never or hardly ever

Responses are available for reporting from 1984 through 2004 at all three ages. Figure 4-5 shows the relationship between the amount of time spent reading for fun and average reading scores.

At all three ages, students who indicated that they read for fun almost every day had higher average scores in 2004 than those who said that they never or hardly ever read for fun. Students at all three ages who said that they read for fun once or twice a week also had higher average scores than those who never or hardly ever read for fun. At ages 13 and 17, those who read for fun almost every day had higher average scores than those who read for fun once or twice a week.

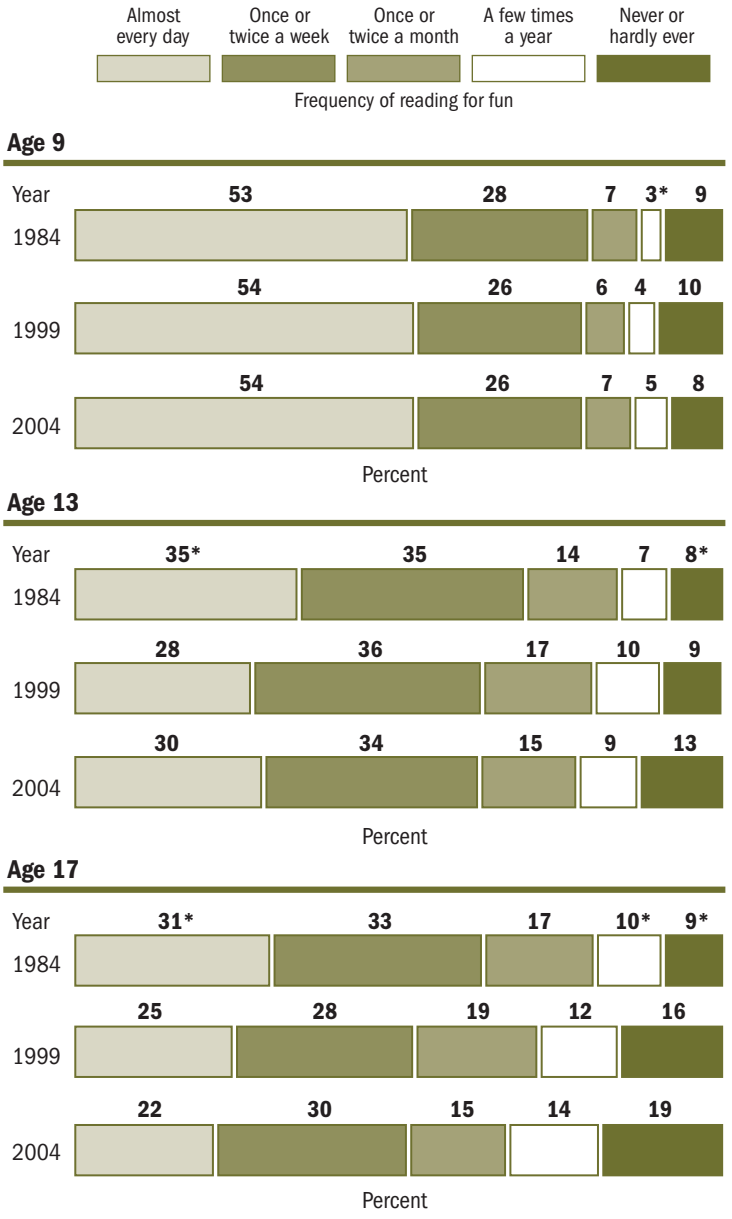
As seen in figure 4-6, at age 9 the only category showing a measurable change during this period was an increase in the percentage of students who indicated that they read a few times a year—up from 3 percent in 1984 to 5 percent in 2004. At ages 13 and 17, the percentage saying they read for fun almost every day was lower in 2004 than in 1984. This trend accompanied an increase over the same 20-year time period in the percentage indicating that they never or hardly ever read for fun.

Figure 4-5. Average reading scale scores for students ages 9, 13, and 17, by frequency of reading for fun: 2004



‡Reporting standards not met. Sample size is insufficient to permit a reliable estimate.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2004 Long-Term Trend Reading Assessment.

Figure 4-6. Percentages of students ages 9, 13, and 17, by frequency of reading for fun: 1984, 1999, 2004



*Significantly different from 2004.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1984, 1999, and 2004 Long-Term Trend Reading Assessments.

Contextual Factors Associated With Mathematics

Students responded to several background questions relating to mathematics as they took the long-term trend assessment. This section reports on four types of factors associated with mathematics: course-taking patterns, availability of and amount of time spent on computers in mathematics studies, frequency of homework, and television-watching patterns. Each of these factors is analyzed to determine how it relates to performance in mathematics as measured by the long-term trend assessment and how the responses to these questions have changed over the past two to three decades.

Course-Taking Patterns

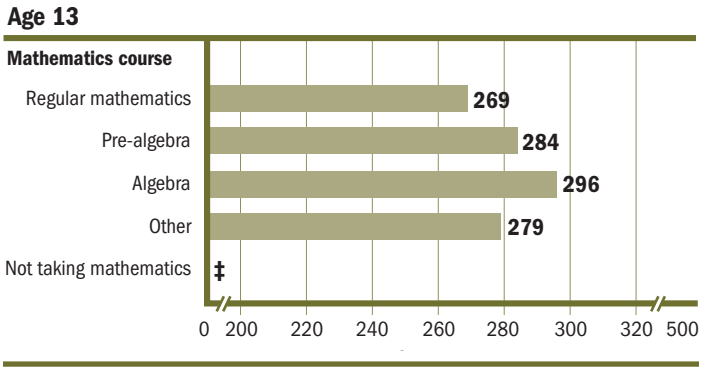
Questions on mathematics courses were given to students in the long-term trend background questionnaire at ages 13 and 17. At age 13, the question read: "What kind of mathematics class are you in this year?" The response options were the following:

- I am not taking mathematics this year.
- Regular mathematics
- Pre-algebra
- Algebra
- Other

In 2004, almost all 13-year-olds said that they were taking some mathematics course, and only 6 percent indicated that they were taking a mathematics class other than the ones listed (see figure 4-8). The remainder of the students at age 13 was split almost evenly among the choices of regular mathematics, pre-algebra, and algebra.

It was not possible to determine any variation in content or difficulty of mathematics classes across schools. As seen in figure 4-7, among those subjects, more advanced mathematics courses were associated with higher scores on the 2004 long-term trend mathematics assessment. That is, students who were in algebra scored higher than those in pre-algebra, who scored higher than those in regular mathematics classes.

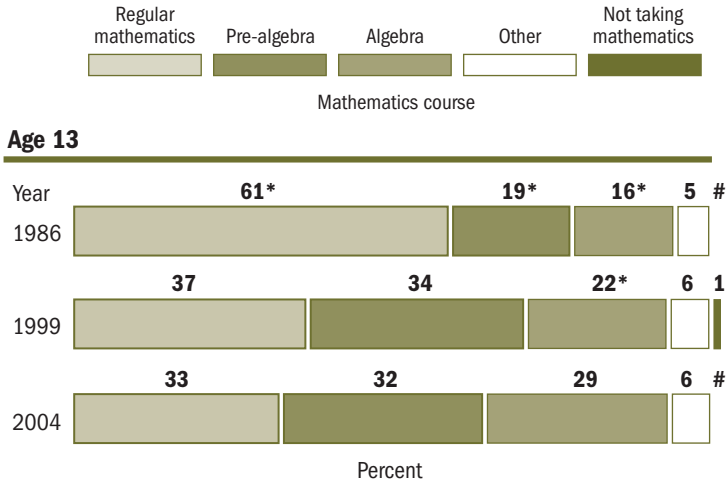
Figure 4-7. Average mathematics scale scores for students age 13, by type of mathematics course: 2004



‡ Reporting standard not met. Sample size is insufficient to permit a reliable estimate.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2004 Long-Term Trend Mathematics Assessment.

Figure 4-8 shows the trends in mathematics course-taking patterns at age 13 from 1986 through 2004. Overall, more 13-year-olds are enrolled in algebra, up from 16 percent in 1986 to 29 percent in 2004—a higher percentage of students than in any previous assessment year. The percentage in pre-algebra has also increased from 19 percent in 1986 to 32 percent in 2004, while the percentage in regular mathematics decreased from 61 percent in 1986 to 33 percent in 2004.

Figure 4-8. Percentage of students age 13, by type of mathematics course: 1986, 1999, and 2004



The estimate rounds to zero.
*Significantly different from 2004.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1986, 1999, and 2004 Long-Term Trend Mathematics Assessments.

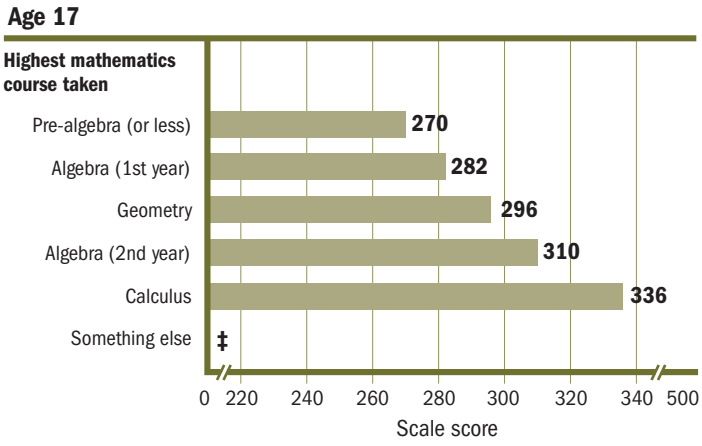
At age 17, the question was worded differently to focus on all mathematics classes taken. The question read: "Counting what you are taking now, have you ever taken any of the following mathematics courses?" Students indicated that they had or had not taken each of the following subjects:

- General, business, or consumer mathematics
- Pre-algebra or introduction to algebra
- First-year algebra
- Second-year algebra
- Geometry
- Trigonometry
- Pre-calculus or calculus

The most advanced mathematics class checked by the students was recorded as the highest level of mathematics taken.

The majority of students at age 17 (53 percent) indicated that the highest level of mathematics they had taken was second-year algebra (figure 4-10). Only 4 percent had not yet taken algebra, and 17 percent had taken calculus. As seen in figure 4-9, the highest level of mathematics taken was positively associated with average scores on the 2004 long-term trend assessment. That is, students who had taken calculus had a higher average score than those whose highest mathematics class was second-year algebra. Those who took algebra II had a higher average score than those whose highest class was geometry, and geometry students outperformed algebra I students. Pre-algebra students had a lower average score in mathematics than students who had taken any mathematics course beyond pre-algebra.

Figure 4-9. Average mathematics scale scores for students age 17, by highest mathematics course taken: 2004



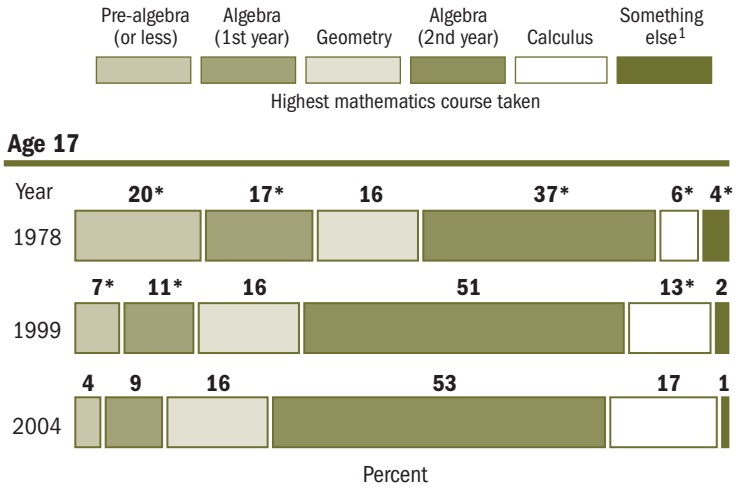
‡ Reporting standards not met. Sample size is insufficient to permit a reliable estimate.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2004 Long-Term Trend Mathematics Assessment.

How to interpret this graphic . . .

Each variable in this section has two graphics. The first graphic, such as figure 4-7, shows the different categories of responses with horizontal bars showing the average score for each category. The second graphic, such as figure 4-8, shows the percentage of students selecting each response category in the first year the question was asked and in 1999 and 2004. The percentages should add up to 100 percent of assessed students but may not be exact due to rounding.

Figure 4-10 shows the trend in course-taking patterns of 17-year-olds from 1978 through 2004. As with 13-year-olds, the trend at age 17 is for more advanced course-taking in mathematics. A greater percentage of 17-year-olds indicated they were taking or had taken calculus in 2004 than in any previous assessment year. The percentage taking second-year algebra as their highest class also increased from 37 percent in 1978 to 53 percent in 2004. Conversely, the percentage of students who indicated that the highest level of mathematics they had taken by age 17 was pre-algebra or algebra was lower in 2004 than in 1978.

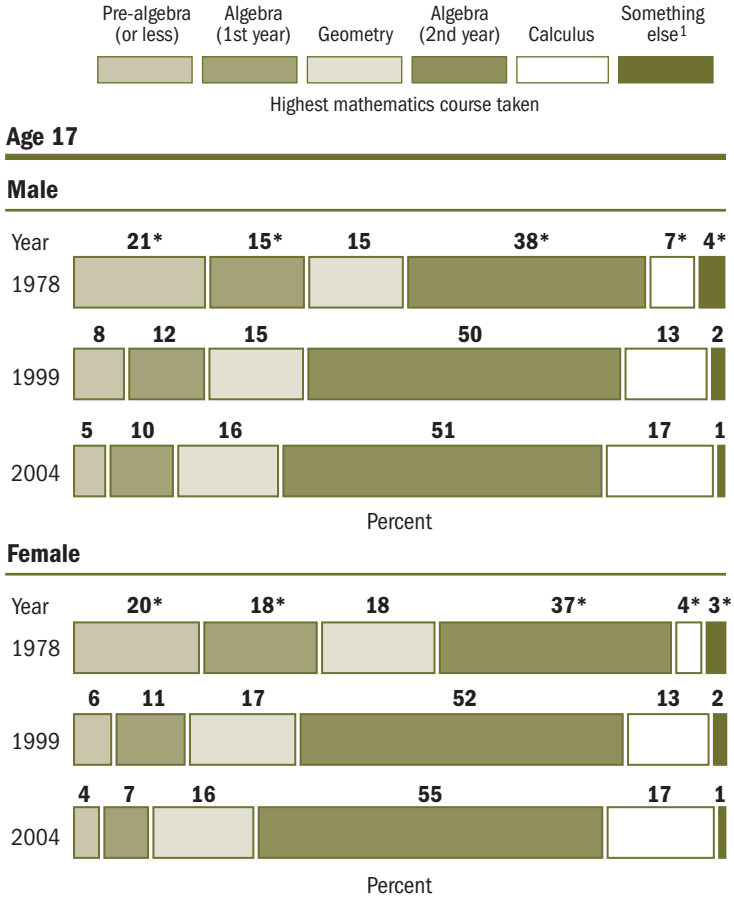
Figure 4-10. Percentage of students age 17, by highest mathematics course taken: 1978, 1999, and 2004



*Significantly different from 2004.
1 "Something else" implies that students checked a series of courses that did not follow a logical course-taking pattern.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1978, 1999, and 2004 Long-Term Trend Mathematics Assessments.

Figure 4-11 shows students' course-taking patterns broken down by gender to analyze whether male students reported taking more advanced courses than female students. Almost no measurable differences by gender were evident in 2004. Similar percentages of males and females (17 percent each) took calculus. Although the percentages in 2004 did not differ measurably from those in 1999, more males and females took calculus in 2004 than in 1978, when 4 percent of female and 7 percent of male 17-year-olds said their highest mathematics class was calculus. In 2004, 55 percent of females and 51 percent of males at age 17 indicated the highest level of mathematics they had taken was second-year algebra, up from 37 and 38 percent, respectively, in 1978.

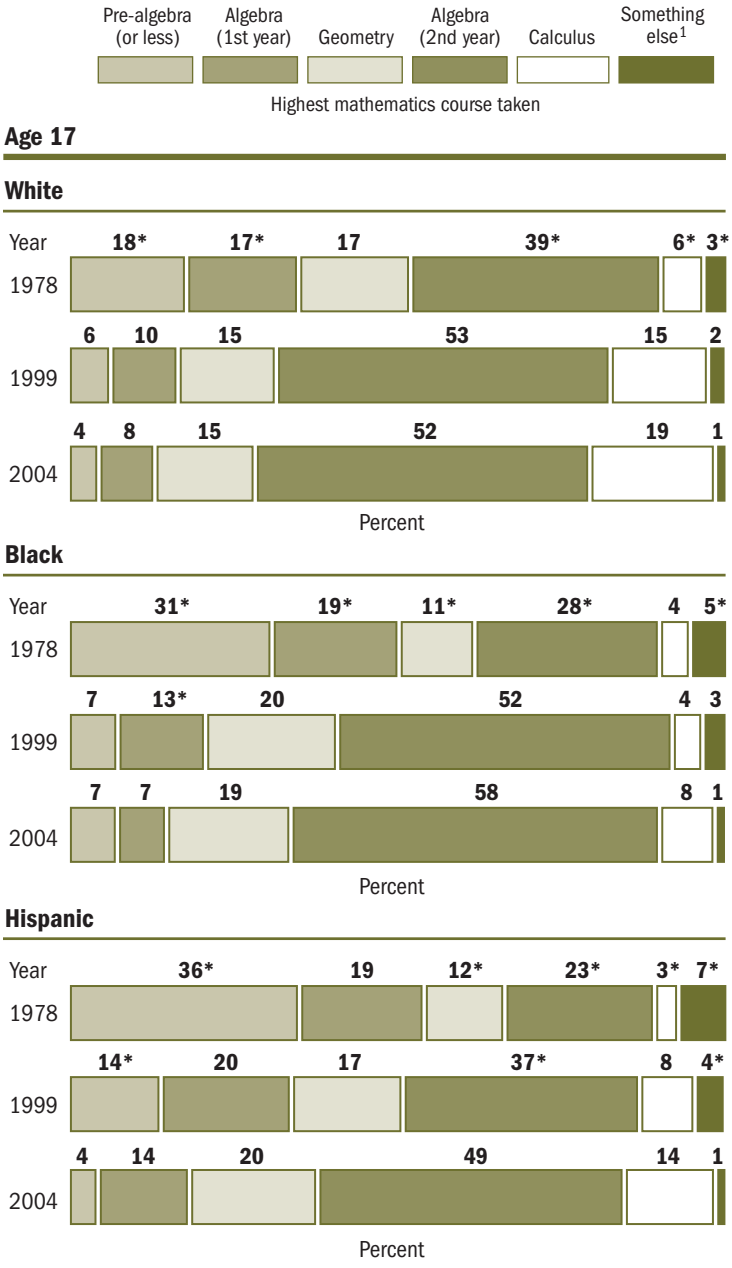
Figure 4-11. Percentage of students age 17, by gender and highest mathematics course taken: 1978, 1999, and 2004



*Significantly different from 2004.
1 "Something else" implies that students checked a series of courses that did not follow a logical course-taking pattern.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1978, 1999, and 2004 Long-Term Trend Mathematics Assessments.

Figure 4-12 shows the highest mathematics course taken at age 17, by racial/ethnic group. In 2004, a higher percentage of White students took calculus (19 percent) compared to Black students at the same age (8 percent). At 14 percent, the percentage of Hispanic students taking calculus was not measurably different from either group. The pattern of higher-level course-taking was seen across all three racial/ethnic groups as a greater percentage of students in all three racial/ethnic groups took high-level courses in 2004 compared to 1999 or 1978. A greater percentage of Black, Hispanic, and White students indicated their highest course was second-year algebra in 2004 than in 1978. In each racial/ethnic group, a smaller percentage of students in 2004 compared to 1978 indicated that their highest mathematics course at age 17 was pre-algebra.

Figure 4-12. Percentage of students age 17, by race/ethnicity and highest mathematics course taken: 1978, 1999, and 2004



*Significantly different from 2004.
[1] "Something else" implies that students checked a series of courses that did not follow a logical course-taking pattern.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1978, 1999, and 2004 Long-Term Trend Mathematics Assessments.

Availability and Use of Computers

Students at ages 13 and 17 were asked several questions regarding their access to and use of computers. From these questions, three factors relating to computer availability and usage discussed in this section were derived. The first question asked, "Have you ever studied mathematics through computer instruction?" and had the following response options:

- Often
- Sometimes
- Never
- I don't know.

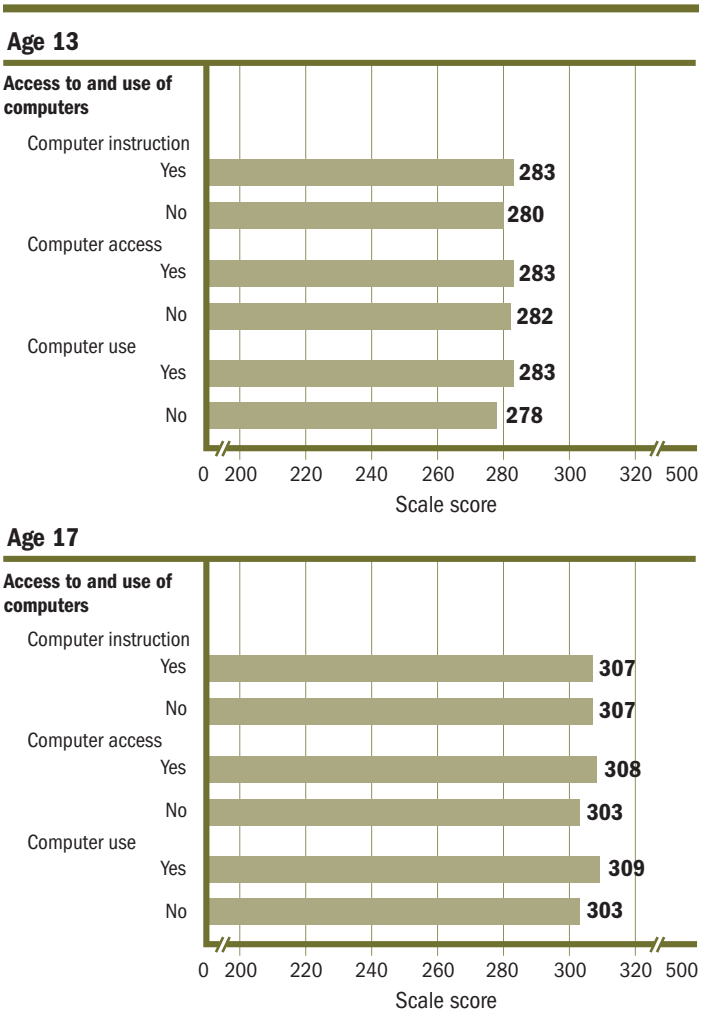
The first two categories—"often" and "sometimes"—were combined to indicate a positive response to the question. The second question asked, "Do you have access to a computer terminal in your school for learning mathematics?" and had the same response options as the previous question. The third question asked, "Have you ever used a computer to solve a mathematical problem?" and had the following response options:

- Yes
- No
- I don't know.

Figure 4-13 shows the relationship between these three questions and students' average scores on the long-term trend mathematics assessment at ages 13 and 17. Figure 4-14 shows the percentage of students at ages 13 and 17 responding positively to each question. In the 2004 assessment, 57 percent of 13-year-olds indicated that they had access to a computer at their school (either often or sometimes), and 69 percent said that they had used a computer to solve a mathematical problem (either often or sometimes). Just under one-half (48 percent) indicated that they had studied mathematics using computers. However, there were no measurable differences in mathematics scores between 13-year-olds who responded positively and those who responded negatively to any of these questions in 2004.

At age 17, the responses showed a similar pattern—57 percent said that they had access to a computer at their school, and 70 percent said they had used a computer to solve a mathematical problem. Because computer location was not specified in the question about using a computer to solve a mathematical problem but was specified in the question on access, it makes sense that more students indicated that they had used a computer than had access to a computer. Thirty-six percent responded that they had studied mathematics using computers. A relationship between computer access and use and long-term trend mathematics scores was seen at age 17. Students who indicated that they had access to a computer at school scored 5 points higher on average than students who did not have access. Likewise, students who responded that they had used a computer to solve a mathematical problem scored 6 points higher on average than students who had not used a computer for that purpose. There was no measurable difference in average mathematics scores for students based on whether or not they had studied mathematics through computer instruction.

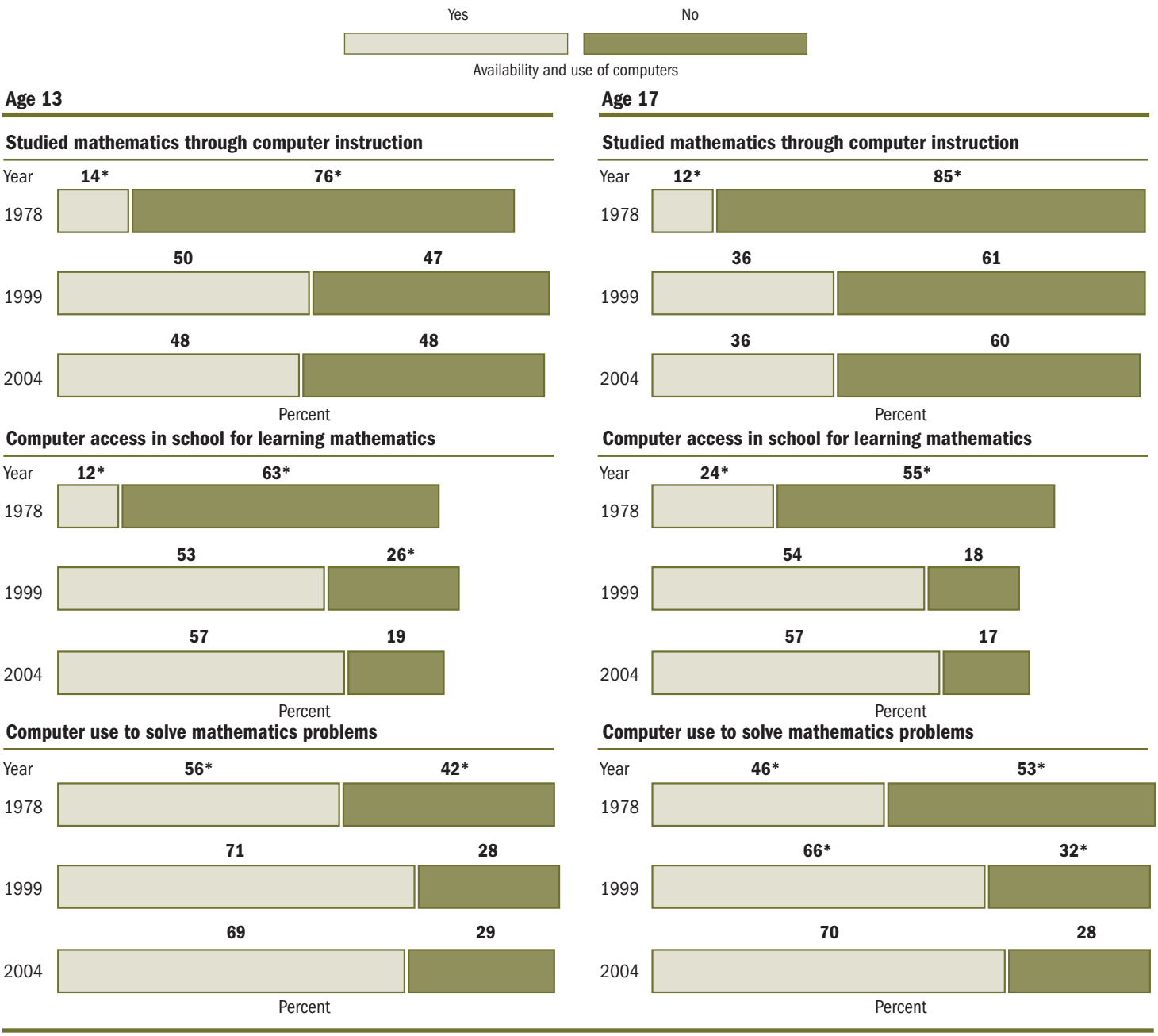
Figure 4-13. Average mathematics scale scores for students ages 13 and 17, by access to and use of computers for mathematics: 2004



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2004 Long-Term Trend Mathematics Assessment.

Figure 4-14 shows the trends in computer access at school and usage in learning mathematics for both 13- and 17-year-olds. Although few differences were seen between 1999 and 2004 at age 13, measurable increases in the percentages of students with access to computers at school and of those who used computers for learning mathematics were seen between 1978 and 2004. The percentage of 13-year-olds with access to computers in schools increased from 12 percent in 1978 to 57 percent in 2004. The percentage of students receiving instruction in mathematics using computers at age 13 also showed a measurable increase, from 14 percent in 1978 to 48 percent in 2004. Similar increases were also seen at age 17, where the percentage of students with access to a computer in school increased by 33 percentage points between 1978 and 2004, from 24 to 57 percent. The percentage of 17-year-olds using a computer to solve mathematics problems increased from 46 percent in 1978 to 66 percent in 1999 to 70 percent in 2004. Small, but statistically significant, increases in the percentage of 17-year-olds studying mathematics through computer instruction occurred between 1978 and 2004 at both ages.

Figure 4-14. Percentages of students ages 13 and 17, by availability and use of computers: 1978, 1999, and 2004



*Significantly different from 2004.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1978, 1999, and 2004 Long-Term Trend Mathematics Assessments.

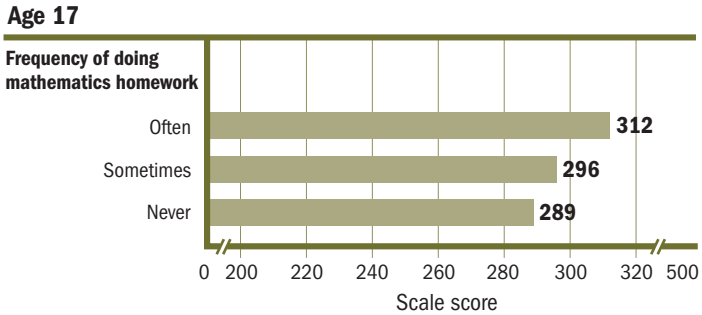
Homework

Students at age 17 were asked in the background questionnaire about the frequency with which they did homework. Specifically, the question asked, "How often did you do these activities in your high school mathematics courses?" Included in the list of activities was, "Do mathematics homework." The possible response options were the following:

- Often
- Sometimes
- Never

Figure 4-15 shows the average mathematics score as related to the frequency of doing mathematics homework at age 17. The majority (73 percent) of 17-year-olds indicated that they often did mathematics homework in 2004 (figure 4-16). The frequency of doing mathematics homework was associated with the average score on the 2004 long-term trend mathematics assessment. Those who often did mathematics homework had a higher average score in mathematics (312) than those who sometimes (296) or never (289) did mathematics homework. Likewise, those who indicated that they sometimes did mathematics homework had a higher average score than those who said they never did mathematics homework.

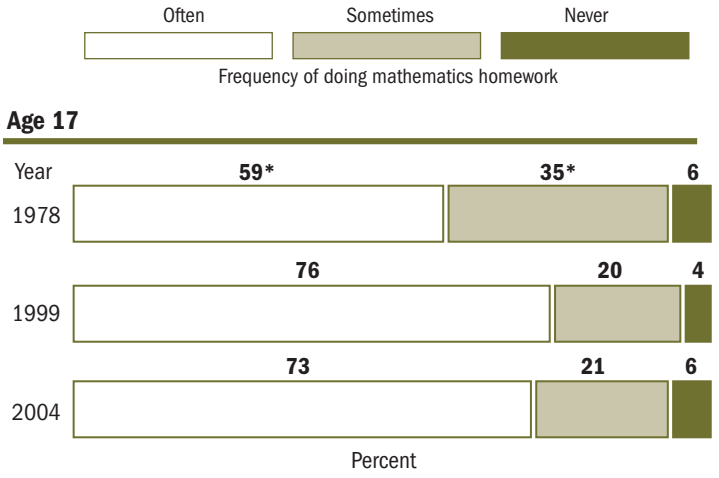
Figure 4-15. Average mathematics scale scores for students age 17, by frequency of doing mathematics homework: 2004



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2004 Long-Term Trend Mathematics Assessment.

Figure 4-16 shows how the frequency of doing mathematics homework has changed from 1978 and 1999 to 2004 at age 17. There were no measurable differences in the percentage of students reporting various frequencies of doing mathematics homework between 1999 and 2004, but the percentage of students reporting that they often did mathematics homework increased by 14 percentage points between 1978 and 2004. The percentage of 17-year-olds indicating they sometimes did homework decreased by about the same amount. No measurable differences were found in the percentage of students who indicated they never did mathematics homework.

Figure 4-16. Percentage of students age 17, by frequency of doing mathematics homework: 1978, 1999, 2004



*Significantly different from 2004.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1978, 1999, and 2004 Long-Term Trend Mathematics Assessments.

Television Watching

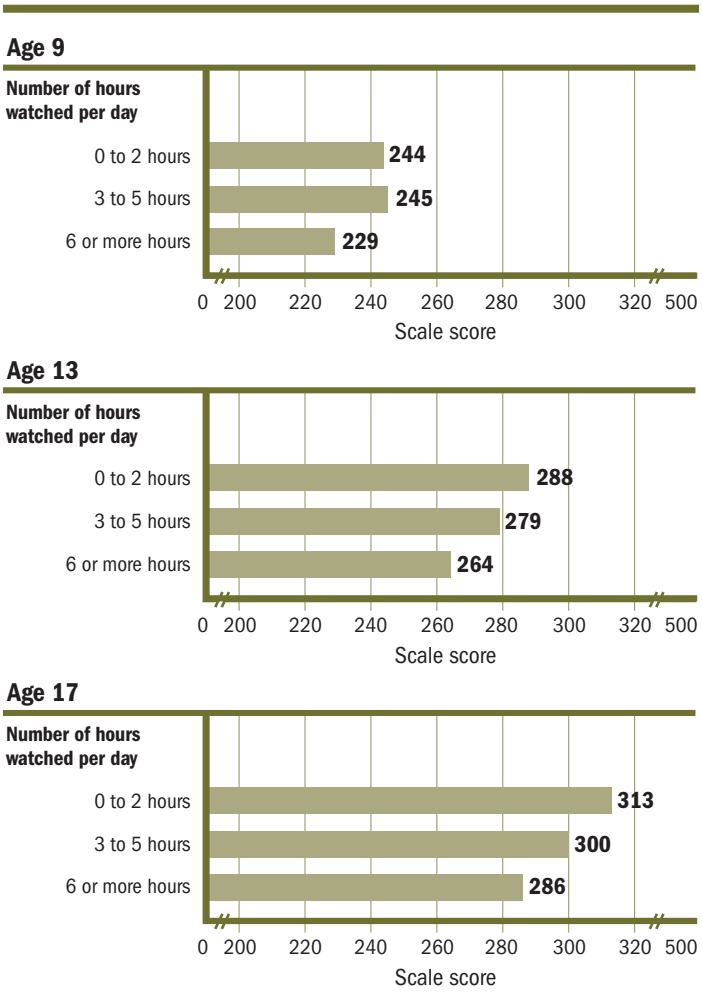
Examining television-watching habits provides information on the home environment, and specifically focuses on an activity that may compete with time spent on schoolwork. Students at all three ages were asked a question about their television-watching habits. Specifically, they were asked, "How much television do you usually watch each day?" The possible responses were the following:

- None
- 1 hour or less
- 2 hours
- 3 hours
- 4 hours
- 5 hours
- 6 hours or more

These options were then collapsed into three reporting categories: 0 to 2 hours, 3 to 5 hours, 6 or more hours. Information on television-watching habits is available for all assessment years from 1978 through 2004 for age 17 and from 1982 through 2004 for ages 9 and 13.

Figure 4-17 shows the average score on the 2004 long-term trend mathematics assessment by the amount of television watching for all three ages, and figure 4-18 shows the percentage of students watching varying amounts of television over time. In 2004, about half of 9-year-olds (51 percent) reported that they watched 0 to 2 hours of television each day. There were no measurable differences in average mathematics score at age 9 between students who watched 0 to 2 hours and those who watched 3 to 5 hours, but students in both these categories had higher average scores than students who watched 6 or more hours of television each day, 244 and 245 compared to 229, respectively. At age 13, students were about evenly split between those who watched 0 to 2 hours (45 percent) and those who watched 3 to 5 hours (44 percent), and 11 percent reported watching 6 or more hours of television each day. Thirteen-year-olds who reported watching 0 to 2 hours had higher average mathematics scores than those who watched 3 to 5 hours, and both groups had higher average scores than students who watched 6 or more hours of television each day. At age 17, the majority of students (58 percent) reported watching 0 to 2 hours of television each day, and 6 percent reported watching 6 or more hours per day. As with 13-year-olds, more television watching was associated with lower mathematics scores, as those watching 0 to 2 hours had higher average mathematics scores than those watching 3 to 5 hours, and both groups had higher average scores than students watching 6 or more hours of television each day.

Figure 4-17. Average mathematics scale scores for students ages 9, 13, and 17, by amount of daily television watching: 2004



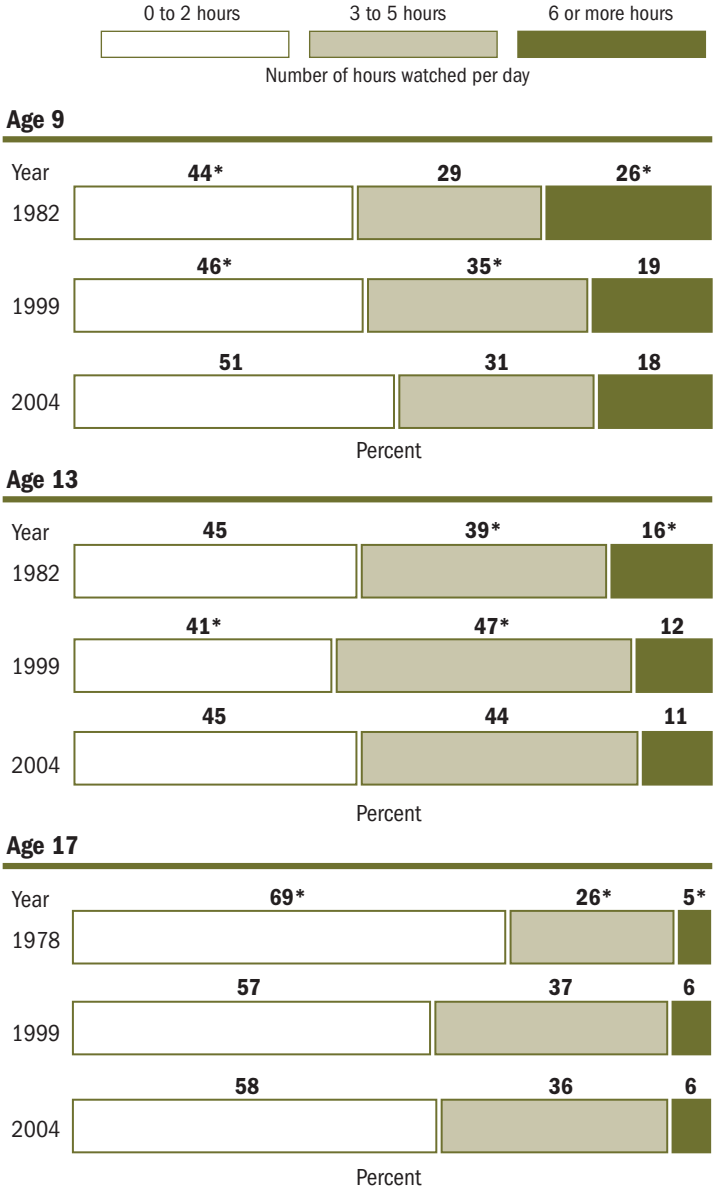
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2004 Long-Term Trend Mathematics Assessment.

Examining trends in television watching over time shows that, overall, 9-year-olds are watching less television in 2004 than they were in 1982, while 17-year-olds appear to be watching more television in 2004 than they were in 1978. As seen in figure 4-18, more 9-year-olds reported that they watched 0 to 2 hours of television in 2004 compared to 1982, while fewer reported that they watched 6 or more hours. At age 13, the percentage of students watching 0 to 2 hours of television in 2004 was not measurably different from 1982, fewer students reported watching 6 or more hours of television, and more reported watching 3 to 5 hours in 2004 than in 1982. At age 17, fewer students reported watching 0 to 2 hours of television in 2004 than in 1978, and more students reported watching 3 to 5 hours and 6 or more hours. It is important to note, however, that, as the question is worded, students may not be reporting the time they spend watching movies or playing video games using the television. The question only asks about the amount of time spent watching television.

Summary

This chapter has provided a snapshot of how contextual variables may relate to performance in reading and mathematics. School variables, such as homework, pages read, mathematics course-taking, and access to and use of computers were explored, as were some home variables, including reading at home and watching television. In most cases there were relationships between these contextual factors and average scores, and trends over time were seen. However, readers again are cautioned against making causal inferences about a contextual factor producing a high or low score. Instead, these data should be used as a starting point to guide future research.

Figure 4-18. Percentages of students ages 9, 13, and 17, by amount of daily television watching: 1978, 1982, 1999, and 2004



*Significantly different from 2004.
NOTE: Detail may not sum to totals because of rounding.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 1978, 1982, 1999, and 2004 Long-Term Trend Mathematics Assessments.

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