

# Section 2

## *Learner Outcomes*





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## Summary: Learner Outcomes

At an education summit in 1989, former President George Bush and the Nation's governors decided to establish the educational goals for 2000. These National Education Goals subsequently became the basis of major federal education legislation and a benchmark against which America's progress in educating our students can be measured. Two of these goals declare that U.S. "students will be the first in the world in mathematics and science achievement" and "all students will leave grades 4, 8, and 12 having demonstrated competency over challenging subject matter . . . [and] . . . learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our Nation's modern economy" (National Education Goals Panel 1999). Now that the year 2000 has passed, it is useful to see how much progress has been made in achieving these goals.

### EARLY CHILDHOOD OUTCOMES

A school's effectiveness is predicated in part on its ability to narrow the gaps in student achievement to bring the low-performing students up to the level of the high-performing students. Results of the Early Childhood Longitudinal Study (ECLS-K) indicate that children whose mothers have more education than those of their peers tend to enter school with more skills and knowledge in reading and mathematics. From the beginning of kindergarten to the end of 1<sup>st</sup> grade, most children show marked improvement in reading and mathematics, but the initial gaps in performance associated with their mother's education do not decrease (*Indicator 8*). As children progress through kindergarten and 1<sup>st</sup> grade, students from better educated families continue to score higher and acquire more advanced skills and knowledge, such as multiplication and division and recognizing

and understanding words in context, than do other students (*Indicator 9*).

### ACADEMIC OUTCOMES

How students perform academically is a key component of educational success. The federal government and other organizations sponsor assessments to measure student performance. The results of these assessments sometimes show mixed results and can be interpreted differently, depending on the definitions of academic success used. For example, international assessments typically examine student performance relative to that of their peers in other countries. Assessments that measure performance over several years offer a means to examine changes over time. Finally, national assessments often assess performance relative to predefined standards of performance.

#### International assessments

The Third International Mathematics and Science Study–Repeat (TIMSS-R), conducted in 1999, followed the Third International Mathematics and Science Study (TIMSS) by 4 years. These two studies provide a gauge of the progress American students have made in mathematics and science in grades 4, 8, and 12 in 1995, and grade 8 in 1999. In 1995, U.S. 4<sup>th</sup>-graders scored higher than the international average in mathematics, while their 8<sup>th</sup>- and 12<sup>th</sup>-grade counterparts scored lower than the international average (*Indicator 18, The Condition of Education 2000*). The results from TIMSS-R are mixed. Eighth-grade students in the United States exceeded the international average of the 38 countries that participated in the mathematics and science studies in 1999 (*Indicator 14*). Similar to most other countries participating in both assessments, there was no significant improvement, however, in the average scores of U.S. 8<sup>th</sup>-graders in either subject between 1995 and 1999. By permitting a



## Summary: Learner Outcomes

Continued

comparison of 4<sup>th</sup>-graders in 1995 and the same cohort 4 years later in 8<sup>th</sup> grade, TIMSS-R shows that U.S. 4<sup>th</sup>-graders in 1995 performed at about the international average of the 17 countries participating in both assessments in mathematics but that by 1999 U.S. 8<sup>th</sup>-graders had fallen behind the international average. In science, U.S. 4<sup>th</sup>-graders performed above the international average of the 17 participating countries in 1995, while U.S. 8<sup>th</sup>-graders' performance was similar to the international average in 1999.

### Change over time

Since the early 1970s, the National Assessment of Educational Progress (NAEP) long-term assessment has measured student performance regularly with assessment instruments that have not changed, allowing the progress of students to be tracked. These assessments show that in reading, average scores for 9- and 13-year-olds in 1999 were higher than the scores in 1971, when the test was first administered. In contrast, scores for 17-year-olds in 1999 were similar to the scores in 1971 (*Indicator 10*). In mathematics, the results showed a pattern of improvement for 9-, 13-, and 17-year-olds from 1973, the first year of the assessment, to 1999 (*Indicator 12*). In science, 9-year-old students scored slightly higher in 1999 than in 1970, while scores for 13-year-olds were similar in 1999 and 1970. Scores for 17-year-olds were lower in 1999 than they were in the first year of the assessment, 1969, but they had increased from their low point in 1982 (*Indicator 13*).

The achievement gap between white and black students can also be examined using the NAEP's long-term trend results. Over recent years, this gap has been the focus of considerable attention among those concerned with equity in the quality of American education. For some people, equity is a more important benchmark

against which to measure educational success than are international comparisons of performance (Jencks and Phillips 1998). Although the NAEP long-term trend data indicate that the average reading score of black students was lower than that of white students at ages 9, 13, and 17 for each year of the assessment, the achievement gap between white and black students has decreased across all three age groups. Most of this decline occurred between 1971 and 1988: 17-year-olds in the lowest quartile improved at a faster rate than did students in the highest quartile, with blacks outgaining whites at all quartile levels. This trend reversed itself from 1988 to 1999, and a similar pattern occurred for 13-year-olds (*Indicator 11*).

As was the case in reading, white students outperformed black students in each assessment in both mathematics and science. In mathematics, the gap decreased from 1973 until 1990 for 17-year-olds and from 1973 until 1986 for 13-year-olds. The gaps have widened since then. In 1999, the gaps were greater for both 13-year-olds and 17-year-olds than in 1990 and 1986, respectively (*Indicator 12*). In science, there has been no significant change from 1969 to 1999 among 17-year-olds. Among 13-year-olds, the gap decreased from 1977 to 1982, and has remained stable since (*Indicator 13*).

### Standards-based assessments

Since 1992, NAEP has also measured American students' performance in several subjects in grades 4, 8, and 12 based on predetermined achievement levels, which have been modified to reflect advances in educational curricula and practices. In mathematics, about two-thirds of students at each grade level performed at or above the "basic" level of achievement in 1996, an increase from 1990 (*Indicator 15, The Condition of Education 2000*). In reading, almost two-thirds of 4<sup>th</sup>-grade students and roughly

## Summary: Learner Outcomes

Continued

three-quarters of 8<sup>th</sup>- and 12<sup>th</sup>-grade students performed at or above the “basic” level in 1998 (*Indicator 13, The Condition of Education 2000*).

### ADULT LITERACY

The reading habits of adults are positively correlated with their educational attainment. People age 25 and above with a bachelor’s degree or higher are more likely than their peers with less than a high school education to read regularly; that is, to read one or more magazines regularly, to read the newspaper at least once a week, and to have read a book in the past 6 months (*Indicator 15*).

### SOCIAL AND CULTURAL OUTCOMES

Another aspect of learner outcomes is the creation of a responsible citizenry. Preparing students for citizenship is one of the primary goals of education (Branson 1994). On the 1998 NAEP civics assessment, approximately two-thirds of the students in grades 4, 8, and 12 scored at or above the “basic” level in civics, and approximately one-quarter scored at or above the “proficient” level (*Indicator 20, The Condition of Education 2000*). Beyond students’ knowledge of civic issues is their participation in civic activities in their community. Some argue that Americans are losing a sense of community by not volunteering and joining community groups (Putnam 2000). Fifty-two percent of students in grades 6–12, however, reported volunteering for community service in 1999, up from 49 percent in 1996. Students were more likely to participate in community service when the school provided an opportunity by arranging an activity than when the school did not (*Indicator 16*).

Voting behavior is another civic activity that has an impact on the social environment. In the 1996 and 1998 elections, among those ages 25–44, college graduates were much more likely

than high school graduates to vote (*Indicator 22, The Condition of Education 2000*).

Aside from fostering an intelligent and active citizenry, education has an added social benefit: it may create a healthier citizenry. Research has shown that high educational attainment is strongly related to good health and physical functioning (Ross and Wu 1996). Results of the National Health Interview Survey indicate that people with more education were more likely to report being in good health, regardless of age or income in 1997, than their less well-educated peers (*Indicator 17*).

### ECONOMIC OUTCOMES

Finally, many educators, researchers, and policymakers agree that education is strongly tied to the economy’s performance through the productivity of its workforce (Murnane and Levy 1996). An effective education system should teach future workers skills that expand their capacity to perform tasks, use productive technologies, adapt easily to new tasks or to changes in old tasks, and work effectively in teams (NCES 97–269).

Worker productivity is measured by the wages employers are willing to pay, and education is often a key predictor of wage level. The earnings differential between young adults with different levels of educational attainment demonstrates this point. For example, in 1999, 25- to 34-year-old males and females who completed a 4-year college degree earned 58 and 92 percent more per year, respectively, than those who obtained no more than a high school diploma or its equivalent (*Indicator 18*). Further, since 1980, the percentage difference in earnings of young adults who completed at least a bachelor’s degree over their counterparts who completed no more than high school has increased from 19 to 58 percent for males and from 52 to 92 percent for females.

# Early Childhood Outcomes

## Students' Overall Reading and Mathematics Performance Through 1<sup>st</sup> Grade

*Differences in children's reading and mathematics performance persist across the kindergarten and 1<sup>st</sup> grade years.*

The early years of school mark a time of rapid development and learning. Young children acquire the reading and mathematics knowledge and skills that prepare them for future years of schooling and life. In 1998, the knowledge and skills of children who entered kindergarten varied according to their family background (*Indicators 11 and 12, The Condition of Education 2000*). Whether these differences narrow or widen over the course of their schooling is an important measure of educational equity.

Across kindergarten and 1<sup>st</sup> grade, children demonstrated significant gains in reading and mathematics knowledge and skills. During kindergarten, the average reading scale scores increased by 10 points, or about one standard deviation. In 1<sup>st</sup> grade, when many children learn to read, children's average reading scale scores increased by 19 points, or about two standard deviations. In mathematics, children's average scale scores increased by 8 and 10 points in kindergarten and 1<sup>st</sup> grade, respec-

tively, or about one standard deviation in each grade (see supplemental table 8-1).

Children entered kindergarten with knowledge and skills that differed by their mother's education, and these gaps have persisted or increased through the first 2 years of school. Although children's reading gains in kindergarten did not differ by the level of their mother's education, 1<sup>st</sup>-graders whose mothers had at least a high school diploma demonstrated greater gains than children whose mothers had less education. In mathematics, the gains in each year were not statistically different.

In reading, kindergartners whose mothers had less than a high school education had average scale scores in the spring that were similar to the scores in the fall among those children whose mothers had a bachelor's degree or higher. The same pattern was evident in mathematics for both kindergartners and 1<sup>st</sup>-graders.

NOTE: A standard deviation provides information about the distribution of students' scale scores. In a normal distribution, 68 percent of scores fall within plus or minus one standard deviation of the mean, and 95 percent fall within plus or minus two standard deviations of the mean. The reading scale score ranged from 0–72, and the mathematics score from 0–64. Based on those assessed in English (excludes 19 percent of Asian/Pacific Islander and 31 percent of Hispanic children). Based on children who entered kindergarten for the first time in fall 1998.

SOURCE: U.S. Department of Education, NCES, Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K) Public-use file.

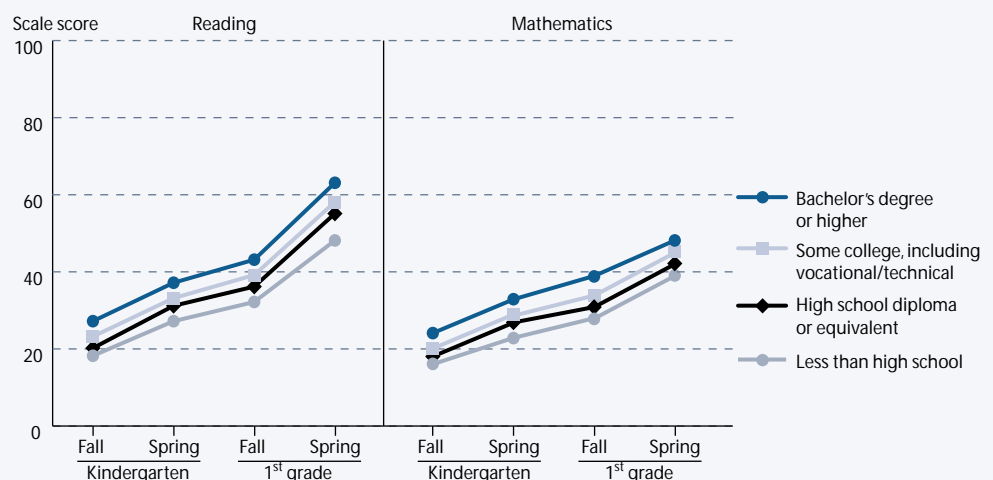


FOR MORE INFORMATION:  
Supplemental Notes 1, 8

Supplemental Table 8-1

NCES 2001–023, NCES 2000–070, NCES 2000–062, Indicators 11, 12

**EARLY READING AND MATHEMATICS PERFORMANCE: Children's overall reading and mathematics performance from kindergarten through 1<sup>st</sup> grade, by mother's education: 1998–2000**



# Early Childhood Outcomes

## Children’s Skills and Proficiency in Reading and Mathematics Through 1<sup>st</sup> Grade

*Young children gain important reading and mathematics skills during the kindergarten and 1<sup>st</sup>-grade years.*

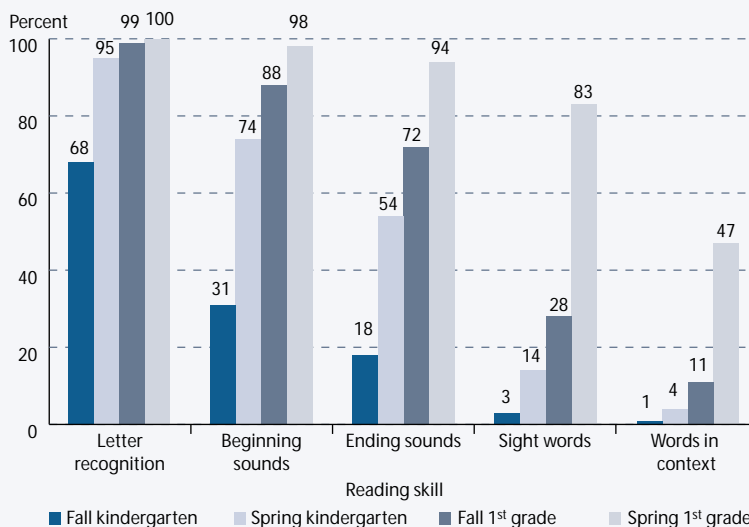
The proficiency children demonstrate in reading and mathematics is vital to their learning experiences. In kindergarten, children develop literacy skills such as recognizing letters and understanding the letter-sound relationship at the beginning and ending of words. At kindergarten entry, 31 percent understood the letter-sound relationship at the beginning of words, and 18 percent at the end of words, compared with 74 and 54, respectively, by the end of kindergarten (see supplemental table 9-1). In kindergarten, children learn to recognize numbers, compare objects (e.g., which one is longer), and understand the sequence of numbers (e.g., 2, 4, 6...). At kindergarten entry, 59 percent understood relative size, and 22 percent ordinality and sequence, compared with 88 and 59, respectively, by the end of the year (see supplemental table 9-2).

In 1<sup>st</sup>-grade reading, children typically learn to read words by sight and understand words in context. At the beginning of 1<sup>st</sup>-grade, 28 percent read words by sight, increasing to 83 percent by the end of the year. At 1<sup>st</sup>-grade entry, 11 percent understood words in context (i.e. reading and understanding sentences), and at the end of the year, 47 percent did so (see supplemental table 9-1). In 1<sup>st</sup>-grade mathematics,

children acquire addition, subtraction, multiplication and division skills. As children entered 1<sup>st</sup> grade, 37 percent were proficient in addition and subtraction, and by the end of the year, 76 percent had become proficient. Seven percent could multiply and divide upon entry, and by the end of 1<sup>st</sup> grade, 27 percent had attained these skills (see supplemental table 9-2).

Children acquire specific reading and mathematics knowledge and skills at different times in their early years of schooling. In reading, the gap in basic kindergarten-related reading skills (i.e., letter recognition) decreased for at-risk kindergartners (whose mothers have less than a high school diploma) but widened in the more complex skills (i.e., reading sight words). A similar phenomenon occurred in 1<sup>st</sup> grade (i.e., reading ending sounds versus words in context) (see supplemental table 9-1). Consequently, in both kindergarten and 1<sup>st</sup> grade, the gap in basic skills (i.e., skills associated with the grade level) between children at risk and more advantaged children narrowed, but it widened in more complex skills (i.e., skills associated with the next grade level). A similar pattern emerged in mathematics (see supplemental table 9-2).

**EARLY PROFICIENCY IN READING: Percentage of children with specific reading skills and proficiency from kindergarten through 1<sup>st</sup> grade: 1998–2000**



NOTE: Based on those assessed in English for all rounds (excludes 19 percent of Asian/Pacific Islander and 31 percent of Hispanic children). Based on children who entered kindergarten for the first time in fall 1998.

SOURCE: U.S. Department of Education, NCES. Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS-K) Public-use file.

FOR MORE INFORMATION:

Supplemental Notes 1, 8

Supplemental Tables 9-1, 9-2

NCES 2001–023, NCES 2000–070, NCES 2000–062, Indicators 11, 12





# Academic Outcomes

## Trends in the Reading Performance of 9-, 13-, and 17-Year-Olds

*The reading performance of 9- and 13-year-olds in 1999 was higher than the performance in 1971, but there was no meaningful difference among 17-year-olds.*

The National Assessment of Educational Progress (NAEP) has assessed the reading performance of 9-, 13-, and 17-year-old students since 1971 and thus provides a long-term perspective on how their performance has changed. In reading, both 9- and 13-year-olds' achievement scores increased in the 1970s. Although no further improvements in average reading scores have occurred for these age groups since the 1970s, their average scores were higher in 1999 than in 1971. In contrast, average scores for 17-year-olds were about the same in both 1971 and 1999. Their scores have remained within a narrow range during all assessment years.

Average reading scores for white students rose slowly across the assessment years. Reading scores were higher in 1992 and 1996 than in 1971 for all ages but remained higher in 1999 only for 9- and 13-year olds. Among Hispanic students at all ages, average reading scores were significantly higher in 1999 than in 1975, the first year in which separate scores were reported for Hispanics. Among blacks, the overall pattern across age groups is reasonably consistent

beginning with low scores that increased throughout the assessment years. For all ages of black students, average reading scores in 1999 were higher than in 1971 (see supplemental table 10-1). White students outperformed their Hispanic and black peers at each age in 1999, a situation unchanged from the one that existed in 1971 (for blacks) and 1975 (for Hispanics). The gap between black and white students at all three ages narrowed between the first and last assessments (see supplemental table 10-2 and *Indicator 11*).

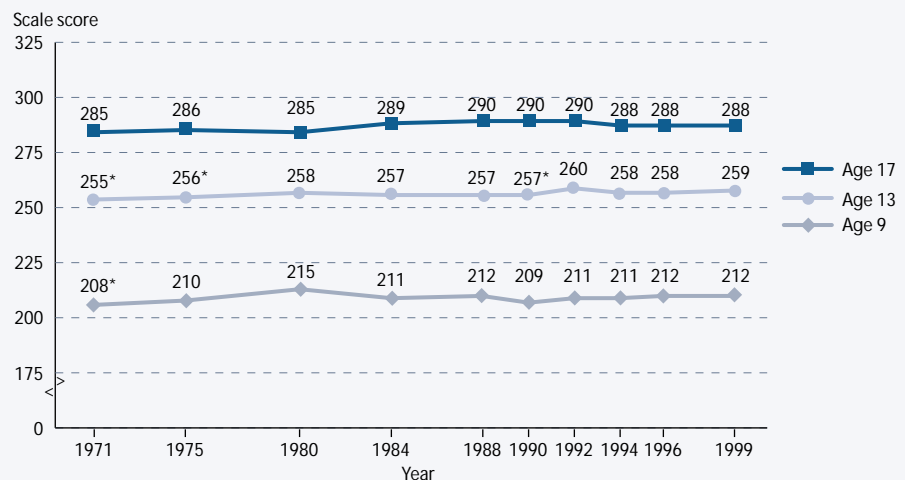
Among males, 9- and 13-year-olds' average reading scores were higher in 1999 than in 1971. In contrast, scores for 17-year-old males were about the same in 1971 and 1999 (as they were for 9- and 17-year-old females). Among 13-year-old females, students' average reading scores were higher in 1999 than in 1971. For all assessment years and ages, the average score for females was higher than that of males. These score gaps have remained relatively constant since 1971, with the exception of the gap for 9-year-olds, which was smaller in 1999 than in 1971 (see supplemental table 10-3).

\* Significantly different from 1999.

NOTE: Descriptions of student performance at different levels on the assessment scale can be found in supplemental table 10-5.

SOURCE: U.S. Department of Education, NCES. *NAEP 1999 Trends in Academic Progress: Three Decades of Student Performance* (NCES 2000-469), 2000.

READING PERFORMANCE: Average reading performance, by age: 1971–99



FOR MORE INFORMATION:  
Supplemental Notes 1, 4  
Supplemental Tables 10-1,  
10-2, 10-3, 10-4, 10-5



# Academic Outcomes

## Trends in the Achievement Gap in Reading Between White and Black Students

*While white students outperform black students in reading, the gaps decreased between the early 1970s and the late 1980s. Since then, however, the gaps have remained relatively stable or increased.*

The National Assessment of Educational Progress (NAEP) has assessed trends in students' reading performance since the early 1970s. NAEP thus provides a picture of how student performance in reading has changed over time, specifically the achievement gap between black and white students. This issue has been the focus of considerable attention among those concerned with equity in the quality of education provided to America's students.

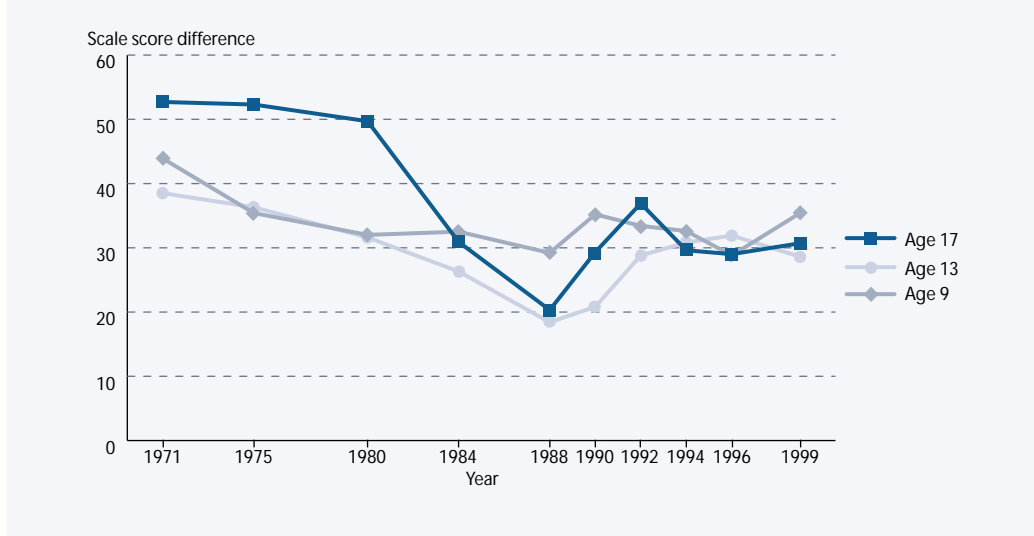
Since 1971, the reading scores of black 9-, 13-, and 17-year-olds have been lower, on average, than those of their white peers. However, the average difference between black and white students' scores has changed over time. There has been an overall narrowing in this achievement gap since 1971, most of which is due to decreases that occurred before 1988. For example, between 1971 and 1988, the black-white score gap decreased for all 13- and 17-year-olds. Between 1988 and 1999, the black-white score gap increased for 13-year-olds. The apparent in-

crease for 17-year-olds, however, was not significant (see supplemental table 11-1).

One indication of what these score changes mean for black students' achievement is that in 1971 the average reading score of black 17-year-olds (239) was below that of white 13-year-olds (261). By 1988, the average reading score of black 17-year-olds (274) was between that of white 17-year-olds (295) and white 13-year-olds (261). In 1999, the average reading score of black 17-year-olds (264) was similar to that of white 13-year-olds (267) (see supplemental table 11-2).

Additional insight into these changes can be gained by examining how the achievement scores of black and white students changed at the high and the low ends of the score distribution in these two time periods. From 1971 to 1988, the overall reading gap for 17-year-olds decreased because the reading scores of black students increased more than the scores of white students at all quartile levels. Furthermore, among black and white

**READING ACHIEVEMENT GAP: Difference in average reading scale scores of 9-, 13- and 17-year-old white and black students: 1971–99**



SOURCE: U.S. Department of Education, NCES. National Assessment of Educational Progress (NAEP), 1999 Long-Term Trend Assessment, and NAEP 1999 Trends in Academic Progress: Three Decades of Student Performance (NCES 2000-469), 2000.

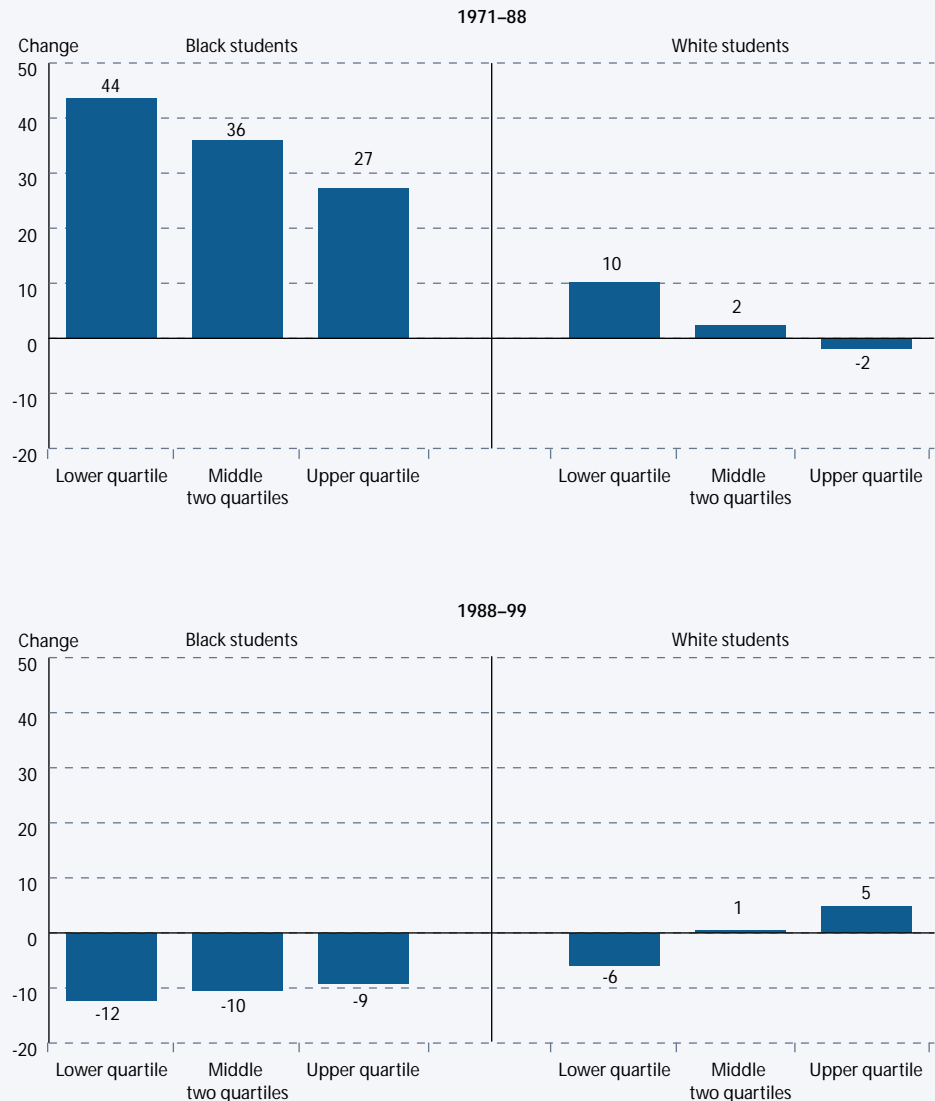
FOR MORE INFORMATION:  
Supplemental Notes 1, 4  
Supplemental Tables 11-1, 11-2



students, the gaps between the highest and lowest performing students narrowed: the average scores of those in the lowest quartile increased relative to those in the highest quartile. These trends changed or were reversed between 1988 and 1999, at which time the scores of blacks at all quartile levels decreased, while the scores of whites varied by

quartile. Among black students, there were no further changes in the gaps between the upper and lower quartile scores. Among white students, the average scores of those in the upper quartile increased, while the scores of those in the bottom quartile decreased, widening the difference between them to a level similar to that in 1971.

**TRENDS IN READING ACHIEVEMENT: Change in average reading scale scores for 17-year-olds, by score quartile and race/ethnicity: 1971–88 and 1988–99**



SOURCE: U.S. Department of Education, NCES. National Assessment of Educational Progress (NAEP), 1999 Long-Term Trend Assessment, and NAEP 1999 Trends in Academic Progress: Three Decades of Student Performance (NCES 2000–469), 2000.



FOR MORE INFORMATION:  
Supplemental Notes 1, 4  
Supplemental Tables 11-1,  
11-2

# Academic Outcomes

## Trends in the Mathematics Performance of 9-, 13-, and 17-Year-Olds

Mathematics scores for 9-, 13-, and 17-year-olds have increased since 1973.

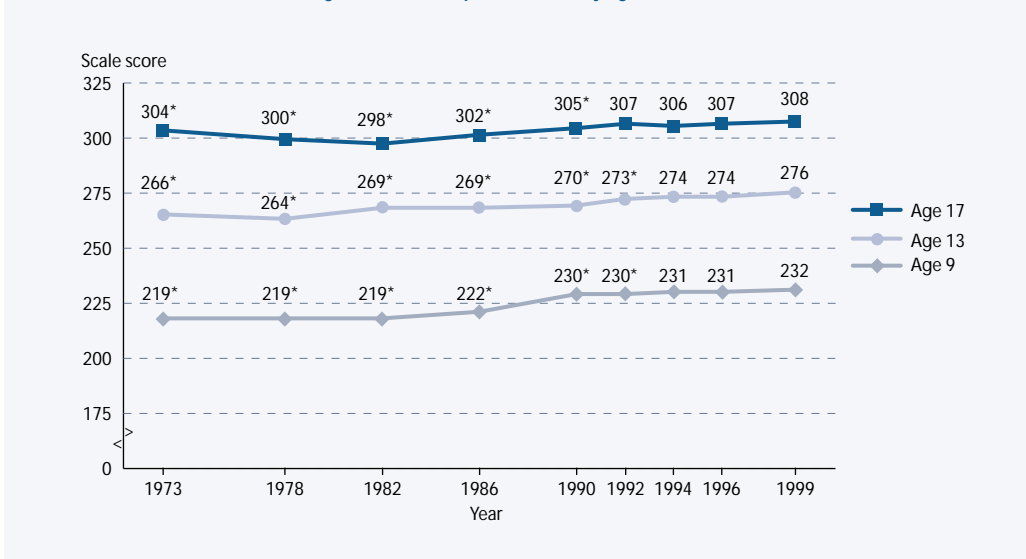
The National Assessment of Educational Progress (NAEP) has assessed trends in mathematics performance for 9-, 13-, and 17-year-old students since 1973 and thus provides a long-term perspective on how their performance has changed. In mathematics, positive trends in the assessment results are evident for all three age groups. For 9-year-olds, a period of stable performance in the 1970s was followed by an increase in average scores from 1982 to 1990, and then some subsequent modest increases through the 1990s. For 13-year-olds, an increase in average scores between 1978 and 1982 was followed by additional increases during the 1990s, resulting in a pattern of overall progress. The average scores of 17-year-olds declined between 1973 and 1982, but since then they have risen. In all three age groups, the average scores were higher in 1999 than in 1973.

Overall, the mathematics scores of white, black, and Hispanic students have increased at all ages (see supplemental table 12-1). The scores for white students declined or remained relatively stable between 1973 and 1982 but then rose between 1982 and 1999. In contrast, the aver-

age scores for black students at all ages generally climbed from 1973 to approximately 1990, with significant increases throughout most of the 1980s. Hispanic students' performance in mathematics was also higher at all three ages in 1999 than it was from 1973 to 1982. White students outperformed black students in mathematics achievement at each age in 1999. From 1973 to 1986, the gaps between blacks and whites narrowed at all three age groups but remained relatively stable in the 1990s. White students also outperformed Hispanic students at each age in 1999, but the gap for 13- and 17-year-olds has narrowed since 1973 (see supplemental table 12-2).

Except for 17-year-old males, the scores for both males and females at all ages were higher in 1999 than in 1973. For 9- and 13-year-olds, score differences that favored females in the 1970s shifted to favor males in the 1990s. At age 17, the score difference favored male students across the assessment years, although the gap was smaller in 1999 than it had been in 1973 (see supplemental table 12-3).

**MATHEMATICS PERFORMANCE: Average mathematics performance, by age: 1973–99**



\* Significantly different from 1999.

NOTE: Descriptions of student performance at different levels on the assessment scale can be found in supplemental table 12-5.

SOURCE: U.S. Department of Education, NCES. *NAEP 1999 Trends in Academic Progress: Three Decades of Student Performance* (NCES 2000-469), 2000.

FOR MORE INFORMATION:

Supplemental Notes 1, 4  
Supplemental Tables 12-1, 12-2, 12-3, 12-4, 12-5



# Academic Outcomes

## Trends in the Science Performance of 9-, 13-, and 17-Year-Olds

*The science performance of 9-, 13-, and 17-year-olds declined during the 1970s, increased during the 1980s and early 1990s, and has been mostly stable since then.*

The National Assessment of Educational Progress (NAEP) has assessed the science performance of 9-, 13-, and 17-year-old students for 30 years and thus provides a long-term perspective on how their performance has changed. Among 9-year-olds, average science scores declined between 1970 and 1973 and then remained stable through 1982. Scores for 9-year-olds rose between 1982 and 1992 but have been stable in more recent assessments. Among 13-year-olds, scores declined from 1970 to 1977 and then increased steadily from 1982 to 1992. Since 1992, scores for 13-year-olds have dropped slightly, resulting in a 1999 average that was similar to that in 1970. Scores for 17-year-olds declined from 1969 to 1982 and then increased over the next 10 years. Since 1992, scores for 17-year-olds have remained stable, but average scores in 1999 were still lower than those in the first assessment.

Average scores for white, black, and Hispanic students at ages 9 and 13 have risen, but scores for 17-year-olds in these racial/ethnic groups have shown a mixed pattern (see supplemental table 13-1). Among white students, there was an initial decline in scores at each age, but by 1999

scores for 9- and 13-year-olds were higher than those in 1970. Average scores for white 17-year-olds were lower in 1999 than 30 years earlier. Average scores for black 9- and 13-year-olds increased significantly between 1970 and 1999, with most of the improvement occurring between 1977 and 1986 and then remaining stable. Scores for black 17-year-olds, which dropped sharply between 1973 and 1982, were about the same in 1999 as in the early 1970s. Hispanic students have varied patterns of score change across age levels. Students at each age attained an average score in 1999 that was higher than that in 1977. Among 17-year-old Hispanics, average scores increased significantly between 1982 and 1999. Overall, white students outperformed black and Hispanic students in science at each age level in 1999 (see supplemental table 13-2).

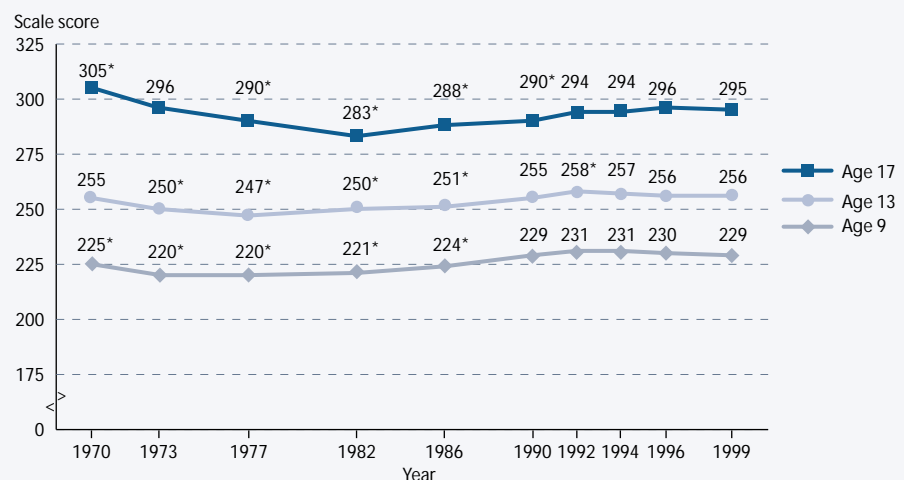
The overall picture for male and female students shows a decrease in scores through the 1970s and early 1980s, followed by small, generally positive changes since that time. Score differences in 1999 favor males at ages 13 and 17, while males and females had similar scores at age 9 (see supplemental table 13-3).

\* Significantly different from 1999.

NOTE: For science, the NAEP was first administered to 17-year-olds in 1969 and to 9- and 13-year-olds in 1970. Descriptions of student performance at different levels on the assessment scale can be found in supplemental table 13-5.

SOURCE: U.S. Department of Education, NCES. *NAEP 1999 Trends in Academic Progress: Three Decades of Student Performance* (NCES 2000-469), 2000.

SCIENCE PERFORMANCE: Average science performance, by age: 1970–99



FOR MORE INFORMATION:  
Supplemental Notes 1, 4  
Supplemental Tables 13-1,  
13-2, 13-3, 13-4, 13-5

# Academic Outcomes

## International Comparisons of 8<sup>th</sup>-Graders' Performance in Mathematics and Science

*In 1999, U.S. 8<sup>th</sup>-graders exceeded the international average of 38 countries in mathematics and science but performed lower than their peers in 14 countries.*

The Third International Mathematics and Science Study–Repeat (TIMSS-R), which was conducted in 1999, follows the previous TIMSS by 4 years and focuses on the mathematics and science achievement of 8<sup>th</sup>-graders in 38 countries. In TIMSS-R, the international average score for 8<sup>th</sup>-graders in mathematics of the 38 participating countries was 487, and the average in science was 488. In 1999, U.S. students on average scored higher in both mathematics and science than the international average of the 38 countries. In mathematics, the average U.S. score was higher than the score in 17 countries, similar to the score in 6 countries, and lower than the score in 14 countries. In science, the average U.S. score for 8<sup>th</sup>-graders was higher than the score in 18 countries, similar to the score in 5 countries, and lower than the score in 14 countries in 1999 (see the figure on the opposite page and supplemental table 14-1).

Both TIMSS and TIMSS-R assessed students in 8<sup>th</sup> grade, allowing for a comparison of 8<sup>th</sup>-grade performance at two points in time. Of the 38 countries that participated in TIMSS-R, 23 also participated in the 8<sup>th</sup>-grade assessment in TIMSS. The international average in 1999 of the 23 countries participating in both studies was 521 in both mathematics and science (see supplemental table 14-2).

Among U.S. 8<sup>th</sup>-graders, there was no statistically significant change in mathematics or science performance from 1995 to 1999. Of the 23 countries that participated at the 8<sup>th</sup>-grade level in mathematics in TIMSS 1995 and TIMSS-R 1999, there was no change in achievement in 19 countries during this period, 3 countries experienced an increase in overall mathematics achievement, and 1 country experienced a decrease. In science, there was no change in 18 of the 23 countries from 1995 to 1999, there was an increase in overall

science achievement in 4 countries, and a decrease in 1 country. The international average of 8<sup>th</sup>-graders in 1999 was similar to that of 8<sup>th</sup>-graders in 1995 in both mathematics and science for the 23 countries that participated in both assessments (see the top figure on page 28 and supplemental table 14-2).

The 1995 TIMSS 4<sup>th</sup>-graders and the 1999 TIMSS-R 8<sup>th</sup>-graders represented the same group of students at two different points in time. These students' performance in 1995 can be compared with their performance in 1999. However, direct comparisons between the 1995 4<sup>th</sup>-grade TIMSS assessment and the 1999 8<sup>th</sup>-grade TIMSS-R assessment are complicated by several factors, including differences in the content areas assessed and the questions that could be asked between the two grade levels. Therefore, comparisons between TIMSS 4<sup>th</sup>-graders and TIMSS-R 8<sup>th</sup>-graders are based on their performance relative to the international average of the 17 countries that participated in 4<sup>th</sup>-grade TIMSS and 8<sup>th</sup>-grade TIMSS-R. The international average in 1999 for the 17 countries in both 8<sup>th</sup>-grade mathematics and science was 524 (see supplemental table 14-3).

The U.S. mathematics score for 4<sup>th</sup>-graders in 1995 was statistically similar to the international average of the 17 participating countries, but the U.S. mathematics score for 8<sup>th</sup>-graders in 1999 was below the international average. In science, the U.S. 4<sup>th</sup>-grade score in 1995 was above the international average of the 17 countries, but the 8<sup>th</sup>-grade score in 1999 was similar to the international average. As a result, in both mathematics and science, U.S. students' performance decreased relative to the international average of the 17 countries, from the 4<sup>th</sup> grade in 1995 to the 8<sup>th</sup> grade in 1999 (see the bottom figure on page 28 and supplemental table 14-3).

FOR MORE INFORMATION:

Supplemental Note 5

Supplemental Tables 14-1, 14-2, 14-3

NCES 2001–027, NCES 2000–062, Indicators 18, 19



**MATHEMATICS AND SCIENCE PERFORMANCE: Average mathematics and science performance of 8<sup>th</sup>-graders for the 38 participating countries: 1999**

Mathematics	Average score relative to the United States	Science
Australia Belgium-Flemish Canada Chinese Taipei Finland Hong Kong, SAR Hungary Japan Korea, Republic of Netherlands Russian Federation Singapore Slovak Republic Slovenia	Significantly higher	Australia Belgium-Flemish Canada Chinese Taipei Czech Republic England Finland Hungary Japan Korea, Republic of Netherlands Singapore Slovak Republic Slovenia
Bulgaria Czech Republic England Latvia-LSS <sup>1</sup> Malaysia New Zealand	Not significantly different	Bulgaria Hong Kong, SAR Latvia-LSS <sup>1</sup> New Zealand Russian Federation
Chile Cyprus Indonesia Iran, Islamic Republic of Israel <sup>2</sup> Italy <i>International average</i> Jordan Lithuania <sup>3</sup> Macedonia, Republic of Moldova Morocco Philippines Romania South Africa Thailand Tunisia Turkey	Significantly lower	Chile Cyprus Indonesia Iran, Islamic Republic of Israel <sup>2</sup> Italy <i>International average</i> Jordan Lithuania <sup>3</sup> Macedonia, Republic of Malaysia Moldova Morocco Philippines Romania South Africa Thailand Tunisia Turkey

<sup>1</sup> Only Latvian-speaking schools were tested.

<sup>2</sup> Israel did not meet the international sampling and/or other guidelines. See *Supplemental Note 5* for details.

<sup>3</sup> Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

NOTE: Eighth grade in most countries. See *Supplemental Note 5* for details. The international average is the average of the national averages of the 38 countries.

SOURCE: U.S. Department of Education, NCES. *Pursuing Excellence: Comparisons of International Eighth-Grade Mathematics and Science Achievement from a U.S. Perspective, 1995 and 1999* (NCES 2001–028), 2000.



FOR MORE INFORMATION:

Supplemental Note 5

Supplemental Tables 14-1,  
14-2, 14-3

NCES 2001–027, NCES 2000–  
062, Indicators 18, 19

**CHANGE IN MATHEMATICS AND SCIENCE PERFORMANCE : Mathematics and science performance of 8<sup>th</sup>-graders in 1995 and 1999 for the 23 participating countries**

Mathematics	Average score in 1999 relative to the country's score in 1995	Science
Canada Cyprus Latvia-LSS <sup>1,2</sup>	Significantly higher	Canada Hungary Latvia-LSS <sup>1,2</sup>
Australia <sup>1</sup> Belgium-Flemish Bulgaria <sup>1</sup> England <sup>1</sup> Hong Kong, SAR Hungary <i>International average</i> Iran, Islamic Republic of Italy Japan	Not significantly different	Lithuania <sup>1,3</sup> Australia <sup>1</sup> Belgium-Flemish Cyprus Czech Republic England <sup>1</sup> Hong Kong SAR <i>International average</i> Iran, Islamic Republic of Italy Japan
Korea, Republic of Lithuania <sup>1,3</sup> Netherlands <sup>1</sup> New Zealand Romania <sup>1</sup> Russian Federation Singapore Slovak Republic Slovenia <sup>1</sup> <i>United States</i>		Korea, Republic of Netherlands <sup>1</sup> New Zealand Romania <sup>1</sup> Russian Federation Singapore Slovak Republic Slovenia <sup>1</sup> <i>United States</i>
Czech Republic	Significantly lower	Bulgaria <sup>1</sup>

<sup>1</sup>Country did not meet the international sampling and/or other guidelines at 8<sup>th</sup>-grade level in 1995. See *Supplemental Note 5* for more details.

<sup>2</sup>Only Latvian-speaking schools were tested.

<sup>3</sup>Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

NOTE: Eighth grade in most countries. See *Supplemental Note 5* for details. International average is the average for the 23 countries that participated in the 8<sup>th</sup>-grade assessment in both 1995 and 1999.

SOURCE: U.S. Department of Education, NCES. *Pursuing Excellence: Comparisons of International Eighth-Grade Mathematics and Science Achievement from a U.S. Perspective, 1995 and 1999* (NCES 2001–028), 2000.

**MATHEMATICS PERFORMANCE: Average mathematics performance of 4<sup>th</sup>-graders in 1995 and 8<sup>th</sup>-graders in 1999 for the 17 countries that participated in both assessments**

4 <sup>th</sup> -graders in 1995	Average score relative to the international average	8 <sup>th</sup> -graders in 1999
Czech Republic Japan Hong Kong, SAR Netherlands <sup>1</sup> Korea, Republic of Singapore	Significantly higher	Hong Kong, SAR Singapore Japan Korea, Republic of
Australia <sup>1</sup> Hungary <sup>1</sup> Italy <sup>1</sup>	Not significantly different	Australia Hungary Canada Netherlands Czech Republic Slovenia
Canada Latvia-LSS <sup>1,2</sup> Cyprus New Zealand England <sup>1</sup> Iran, Islamic Republic of	Significantly lower	Cyprus Latvia-LSS <sup>2</sup> England New Zealand Iran, Islamic Republic of <i>United States</i> Italy

<sup>1</sup>Country did not meet the international sampling and/or other guidelines at 4<sup>th</sup>-grade level in 1995. See *Supplemental Note 5* for more details.

<sup>2</sup>Only Latvian-speaking schools were tested.

NOTE: Fourth and 8<sup>th</sup> grade in most countries. See *Supplemental Note 5* for details. International average is the average for the 17 countries that participated in the 4<sup>th</sup>-grade assessment in 1995 and the 8<sup>th</sup>-grade assessment in 1999.

SOURCE: U.S. Department of Education, NCES. *Pursuing Excellence: Comparisons of International Eighth-Grade Mathematics and Science Achievement from a U.S. Perspective, 1995 and 1999* (NCES 2001–028), 2000.

FOR MORE INFORMATION:  
Supplemental Note 5

Supplemental Tables 14-1,  
14-2, 14-3

NCES 2001–027, NCES 2000–  
062, Indicators 18, 19



# Adult Literacy

## Adult Literacy Habits and Media Use

*The percentage of people with a bachelor's degree who reported reading regularly was three times the percentage of people with less than a high school diploma.*

One goal of the National Education Goals Panel is that “every adult American will be literate and will . . . exercise the rights and responsibilities of citizenship.” A measure of how well the Nation is doing in meeting this goal is the reading habits of adults. In 1999, about half of all adults 25 and above reported reading regularly (defined as reading a newspaper once a week, at least one magazine regularly, and a book in the past 6 months). Women were more likely than men to report reading regularly. Men and women differed in their particular reading habits: men were more likely to report reading a newspaper daily and women more likely to report having read a book in the past 6 months (see supplemental table 15-1).

White and black adults reported reading regularly at similar levels, and both groups were more likely than Hispanic adults to report reading regularly. White and black adults also differed from Hispanic adults in their particular reading habits: they were more likely to read the newspaper daily, to read five or more maga-

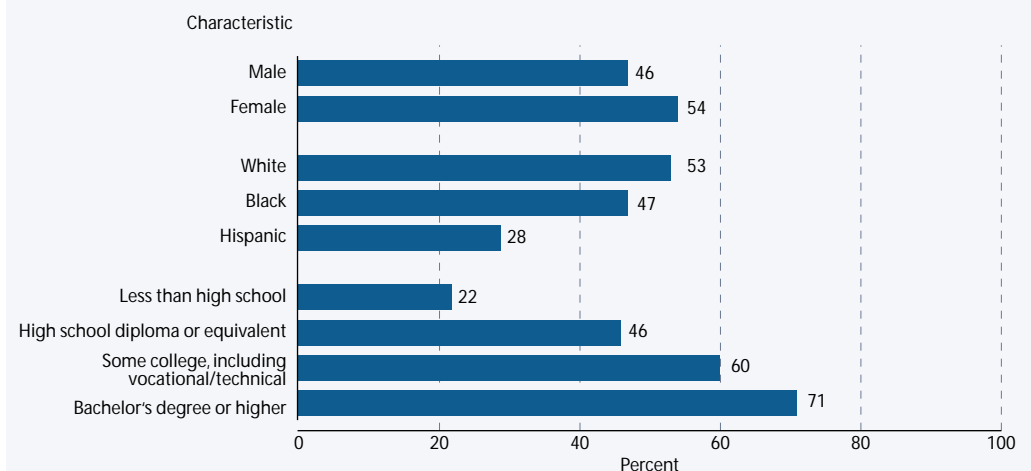
zines regularly, and to have read a book in the past 6 months than Hispanic adults. It should be noted, however, that people were asked only about their reading habits for literature printed in English, and the survey may have underestimated the reading habits of adults whose primary language is not English.

Education is positively correlated with the reading habits of adults. People with a bachelor's degree or higher were more likely than less well-educated people to report reading regularly. In 1999, the percentage of those with a bachelor's degree or higher who had undertaken all three activities was three times the percentage of those with less than a high school diploma (71 versus 22 percent). In addition, people with a bachelor's degree or higher were more likely to have more extensive particular reading habits. They were more likely than people with less than a high school diploma to read the newspaper every day, to read five or more magazines regularly, and to have read a book in the past 6 months (see supplemental table 15-1).

NOTE: The category “having read regularly” consists of people who reported doing all three of the following activities: read a newspaper at least once a week, read one or more magazines regularly, and read a book in the past 6 months. Adults were asked about their reading habits for literature printed in English.

SOURCE: U.S. Department of Education, NCES. *National Household Education Surveys Program (NHES) 1999 Data Files: Adult Education and Life-Long Learning Survey* (NCES 2000–079), 2000.

**READING HABITS OF ADULTS: Percentage of adults age 25 and above who reported having read regularly, by selected characteristics: 1999**



FOR MORE INFORMATION:  
Supplemental Notes 1, 3  
Supplemental Table 15-1



# Social and Cultural Outcomes

## Community Service Participation in Grades 6–12

Students were somewhat more likely to participate in community service in 1999 than in 1996. They were more likely to participate in community service when their school arranged an activity than when the school did not.

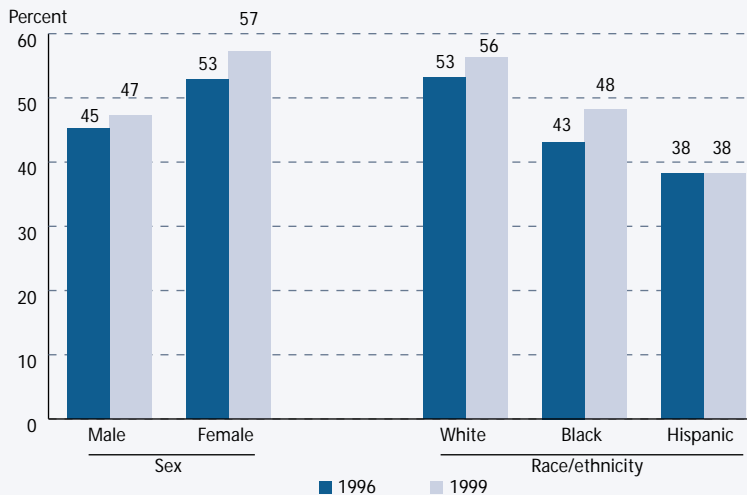
One objective of the National Education Goals Panel is that “all students will be involved in activities that promote and demonstrate good citizenship, good health, community service, and personal responsibility.” In 1999, 52 percent of students in grades 6–12 had participated in community service in the past year, an increase from 49 percent in 1996. Females were more likely than males to participate in community service in 1999 (57 versus 47 percent). In addition, female participation increased from 1996 to 1999 (53 to 57 percent), while male participation remained unchanged (see supplemental table 16-1).

White students were more likely than black and Hispanic students to participate in community service in 1999: 56 percent of white students, 48 percent of black students, and 38 percent of Hispanic students volunteered. While the rate of participation among white students increased from 1996 to 1999, there was no significant increase in participation among black and Hispanic students. Student participation in community service was positively associated with

their parents’ highest level of educational attainment; for example, in 1999, students with parents who had attained a bachelor’s degree were more likely to participate in community service (62 percent) than students with parents who had a high school diploma (46 percent).

The majority of students (86 percent) reported that their school arranged community service activities in 1999 (see supplemental table 16-2). Students were more likely to participate in community service when their school arranged an activity than when the school did not. In 1999, 60 percent of the students participated in community service when their school required and arranged it, and 54 percent participated when their schools arranged but did not require service (see supplemental table 16-1). Fewer students participated when the school required participation without arranging an activity (35 percent) or neither required nor arranged an activity (29 percent). In short, students appear more likely to participate when the opportunity is provided but may be less likely to seek out opportunities.

**PARTICIPATION IN COMMUNITY SERVICE: Percentage of students in grades 6–12 who participated in community service, by sex and race/ethnicity: 1996 and 1999**



SOURCE: U.S. Department of Education, NCES. *Youth Service-Learning and Community Service Among 6<sup>th</sup>- Through 12<sup>th</sup>-Grade Students in the United States: 1996 and 1999* (NCES 2000-028), 2000.

FOR MORE INFORMATION:  
Supplemental Notes 1, 3  
Supplemental Tables 16-1, 16-2





# Social and Cultural Outcomes

## Education and Health

*The better educated a person is, the more likely that person is to report being in very good or excellent health, regardless of income.*

Better education is associated with better health. In the National Health Interview Survey, the National Center for Health Statistics annually surveys people concerning their health. One question asks respondents to rate their own health. In 1997, the better educated a person was, the more likely that person was to report being in “excellent” or “very good” health. People with a bachelor’s degree or higher were twice as likely as those without a high school diploma or equivalent to report being in excellent or very good health (80 versus 39 percent) (see supplemental table 17-1).

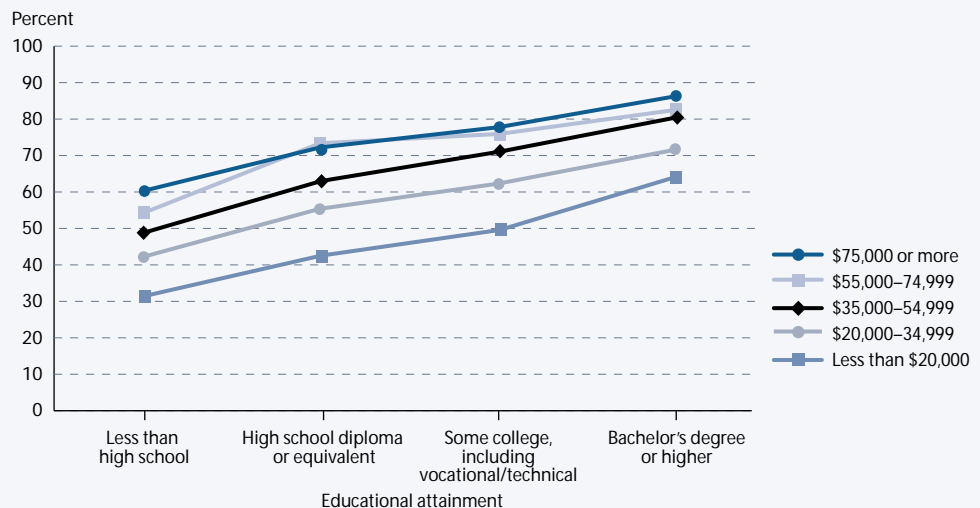
Family income was also related to health. The more family income a person had, the more likely that person was to report being in excellent or very good health. In 1997, those with a family income of \$75,000 or more were nearly twice as likely as people making less than \$20,000 to report being in excellent or very good health (80 versus 41 percent) (see supplemental table 17-1).

In addition to this strong relationship between family income and health, education is positively related to health, independent of income. Within each income range, people with a bachelor’s degree or higher reported being in better health than people with some education beyond high school, who, in turn, reported being in better health than high school completers. High school completers, in turn, reported being in better health than people with less than a high school diploma. For example, for all adults with a family income between \$35,000 and \$54,999 in 1997, those with a bachelor’s degree or higher (80 percent) were more likely than those with some education beyond high school (71 percent) to report being in excellent or very good health. People with some education beyond high school, in turn, were more likely than high school completers (63 percent) to report being in good health. Finally, people with a high school diploma or equivalent reported having better health on average than those who had not completed high school (49 percent).

NOTE: Includes those who responded excellent or very good on a scale of excellent, very good, good, fair, and poor.

SOURCE: U.S. Department of Health and Human Services, Centers for Disease Control, National Center for Health Statistics. National Health Interview Survey, 1997.

**EDUCATION AND HEALTH: Percentage of the population age 25 and above who reported being in excellent or very good health, by educational attainment and family income: 1997**



FOR MORE INFORMATION:  
 Supplemental Notes 1, 8  
 Supplemental Table 17-1  
 Bjorner et al. 1996  
 Lantz et al. forthcoming

# Economic Outcomes

## Annual Earnings of Young Adults

Over the past 20 years, the earnings of young adults who had completed at least a bachelor's degree increased relative to their counterparts who had completed no more than a high school education.

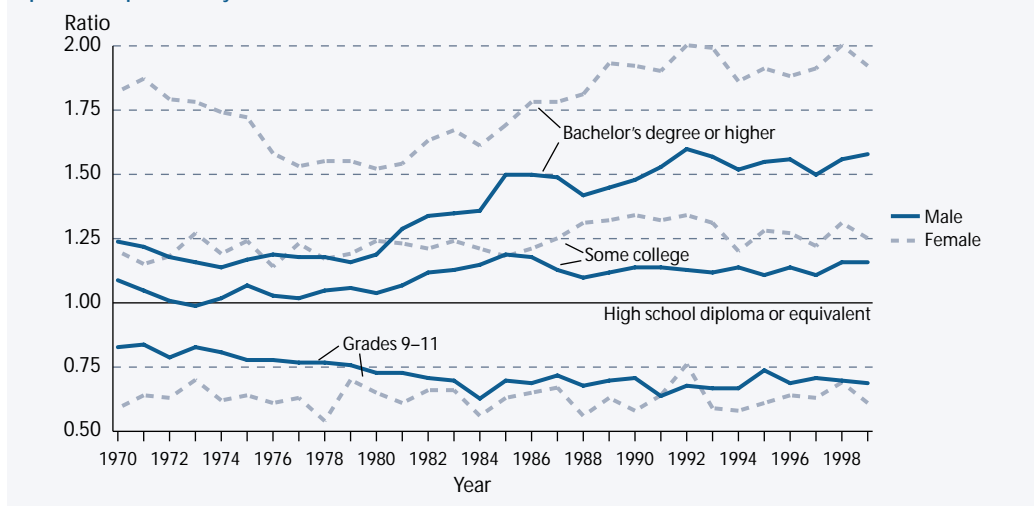
Young adults ages 25–34 who had completed at least a bachelor's degree earned more than those with less education. For example, in 1999, male and female college graduates earned 58 and 92 percent more, respectively, than those who had completed high school. In contrast, young men and women ages 25–34 who had dropped out of high school earned 31 and 39 percent less, respectively, than their peers who had received a high school diploma (see supplemental tables 18-1 and 18-2).

Between 1980 and 1999, the earnings of young adults who had completed at least a bachelor's degree have increased relative to their counterparts with no more than a high school education. This increase occurred for both men and women, from 19 percent to 58 percent higher for men, and from 52 percent to 92 percent higher for women. During the same pe-

riod, the earnings of young adults with less than a high school education continued to lag behind those who had completed high school, varying from 27 percent to 31 percent less for men and from 35 to 39 percent less for women (see supplemental table 18-2).

Gaps in earnings between males and females decline with increasing levels of education: as educational attainment increases, the ratio of median annual earnings of male to female wage and salary workers decreases. However, the association between education and the male/female earnings gap has lessened over time. That is, the earnings of women have achieved greater parity with the earnings of men in recent years, regardless of the level of educational attainment (see supplemental table 18-3).

**ANNUAL EARNINGS: Ratio of median annual earnings of all wage and salary workers ages 25–34 whose highest level of education was grades 9–11, some college, and a bachelor's degree or higher, compared with those with a high school diploma or equivalent, by sex: March 1970–99**



NOTE: This ratio is most useful when compared with 1.0. For example, the ratio of 1.58 in 1999 for males whose highest level of education was a bachelor's degree or higher means that they earned 58 percent more than males who had a high school diploma or equivalent. The ratio of 0.69 in 1999 for males whose highest level of education was grades 9–11 means that they earned 31 percent less than males who had a high school diploma or equivalent. The Current Population Survey (CPS) questions used to obtain educational attainment were changed in 1992. In 1994, the survey methodology for the CPS was changed and weights were adjusted. See Supplemental Note 2 for further discussion.

SOURCE: U.S. Department of Commerce, Bureau of the Census. March Current Population Surveys, various years.

FOR MORE INFORMATION:

Supplemental Notes 1, 2  
Supplemental Tables 18-1, 18-2, 18-3



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