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ABSTRACT

This report summarizes data from the National Assessment of Educational Progress (NAEP), which has been monitoring the scholastic achievement of America's 9-, 13-, and 17-year-olds since 1969. The 1990 NAEP trend data provide several ways of describing changes in student achievement in each curriculum area. For science, mathematics, and reading, the NAEP has used proficiency scales developed through item response theory to summarize student achievement across questions and to give a basis for describing overall student achievement in each area. Trends are presented for science, mathematics, reading, and writing overall, and for the following demographic subpopulations: (1) racial and ethnic groups (White, Black, and Hispanic American students); (2) gender; and (3) region (Northeast, Southeast, Central, and West). Trends in percentages of student at or above proficiency levels are summarized for five levels for each subject area. Comparative statistics are provided for selected NAEPs between 1970 and 1990. Thirteen figures show trends for the subject areas in graph form. (SLD)

NATIONAL CENTER FOR EDUCATION STATISTICS

Trends in Academic Progress

Achievement of American Students in Science, 1970–90, Mathematics, 1973–90, Reading, 1971–90, and Writing, 1984–90

Prepared by EDUCATIONAL TESTING SERVICE under contract with the National Center for Education Statistics
Office of Educational Research and Improvement
U.S. Department of Education

E M B A R G O E D UNTIL 9am E.D.S.T., SEPTEMBER 30, 1991

National Center for Educational Statistics

Data Summary of Trends in Academic Progress: Achievement of American Students in Science, 1970-90, Mathematics, 1973-90, Reading, 1971-90, and Writing, 1984-90

compiled by Eugene H. Owen

from the report by Ina V.S. Mullis, John A. Dossey, Mary Foertsch, Lee Jones, and Claudia Gentile

INTRODUCTION

The National Assessment of Educational Progress (NAEP) has been monitoring the scholastic achievement of our nation's 9-, 13-, and 17-year-olds since its inception in 1969. NAEP's 1990 trend data in science, mathematics, reading, and writing provide several avenues for describing changes in student achievement in each curriculum area, including results for specific assessment questions and summaries of achievement across the questions. For science, mathematics, and reading, NAEP has used proficiency scales that range from 0 to 500 to summarize student performance across questions and to provide a basis for describing overall student achievement in each curriculum area. To "anchor" or give meaning to the results, students' performance is characterized at five levels along the proficiency scales (i.e., 150, 200, 250, 300, and 350), and the percentages of students reaching each level are presented.[1] For writing, NAEP summarized achievement across a common set of writing assignments administered in three successive assessments and computed trends in performance on each of the tasks.

[1]The NAEP trend scales, each with a range of 0 to 500, were developed using Item Response Theory (IRT) technology. The numerical values on each scale were established on the basis of student performance in the 1984 reading, 1986 science, and 1986 mathematics assessments. Each scale was set to span the range of student performance across all three ages in that subject-area assessment and to have a mean of 250.5 and a standard deviation of 50. To characterize levels of student performance, NAEP began by empirically identifying items that discriminated between adjacent pairs of proficiency levels. These items were grouped for each of the levels, and subject-area experts were then asked to interpret the items and describe what students at each level knew and could do compared to students at the next lower level.

OVERALL TRENDS

The overall trends in science, mathematics, reading and writing are presented in FIGURE 1.*

Science

- At all three age levels, performance in science declined in the 1970s and improved in the 1980s.
- In 1990, science achievement was at the same level at ages 9 and 13 as it was in 1970.
- Science achievement for 17 year-olds in 1990 was lower than 1969.

Mathematics

- Average mathematics performance improved between 1973 and 1990 at ages 9 and 13.
- Average mathematics performance for 17 year-olds in 1990 was at the same level as in 1973.
- At all three ages, students' average proficiency was significantly higher in 1990 than 1978.

Reading

- At age 17, average reading proficiency was higher in 1990 than it was in 1975.
- Average reading performance for 9- and 13-year-olds was the same in 1990 as it was in 1971.
- For 9-year-olds, improvement in the 1970s was offset by declines in the 1980s. There was no change across the two decades in reading performance for 13-year-olds.

Writing

- Average performance in writing was unchanged from 1984 to 1990 for 4th and 11th grade students.
- For 8th graders, average writing performance in 1990 was lower than in 1984.

* Note: All FIGURES are attached at the end of the data summary.

TRENDS FOR DEMOGRAPHIC SUBPOPULATIONS

The NAEP trend data in the four subject areas are presented for three racial/ethnic groups (White, Black and Hispanic Students), males and females, and for four geographic regions (Northeast, Southeast, Central and West.) The race/ethnicity data are presented in FIGURES 2 through 5, the gender data in FIGURES 6 through 9, and the regional data in FIGURES 10 through 13.

RACE/ETHNICITY

Science. Trends in the average science performance of White, Black, and Hispanic students are shown in FIGURE 2.

- From 1970 to 1977, the average proficiency in science of White 9- and 13-year-olds declined. During the same period the average proficiency of 9- and 13-year-old Black students remained the same. (No data are available for Hispanic students for 1970 and 1973.)

- Between 1977 and 1990, the average science proficiency of 9- and 13-year-olds increased in all three racial/ethnic groups.

- There was a decline in average science performance for White and Black 17-year-olds from 1969 to 1982. The average science performance of Hispanic 17-year-olds declined from 1977 to 1982.

- The average science proficiency of 17-year-olds in all three racial/ethnic groups increased from 1982 to 1990.

- For Black students, average performance in science of 9-year-olds in 1990 is above that in 1970, but for 13- and 17-year-olds there was no difference from 1970 to 1990.

- Although the gap between the performance of White and Black 9- and 13-year-olds did decrease between 1970 and 1982, the average performance of Black students was significantly below that of White students at all three ages in 1990.

- For Hispanic students, the average science performance of 9- and 13-year-olds in 1990 was higher than that in 1977. For Hispanic 17-year-olds there was no change between 1977 and 1990.

- Hispanic students at all three ages have lower average proficiency than their White counterparts, although the gap at age 13 decreased from 1977 to 1990.

Mathematics. Trends in average mathematics proficiency of White, Black and Hispanic students are displayed in FIGURE 3.

- For all three racial/ethnic groups, the average mathematics proficiency of 9-year-olds was higher in 1990 than in 1973.

- At age 13, both Black and Hispanic Students showed significant gains from 1973 to 1990. The performance of White 13-year-olds in 1990 was the same as in 1973.

- At age 17, White students showed an increase in average mathematics proficiency from 1982 to 1990 following a decline from 1973 to 1982. Black 17-year-olds had a higher average proficiency in mathematics in 1990 than in 1973. There was no significant change in average mathematics proficiency of Hispanic 17-year-olds during the period.

- At all three ages, White students in 1990 continued to have a higher average mathematics proficiency than Black and Hispanic students. The gap between White students and their Black and Hispanic counterparts has not narrowed significantly since 1982, except between Black students and White students at age 17.

Reading. Trends in average reading proficiency for White, Black, and Hispanic students are presented in FIGURE 4.

- White 9- and 13-year-olds had the same average proficiency in reading in 1990 as they did in 1971. The average proficiency of 9-year-olds was higher in 1980 and 1984 than 1971, and for 13-year-olds the proficiency was higher in 1980 than in 1971.

- The average performance of White 17-year-olds was higher in 1990 and 1984 than in 1971.

- For Black students at all three ages, average reading performance was higher in 1990 than in 1971.

- Hispanic 9- and 13-year-olds were reading at about the same level in 1990 as in 1975.

- Hispanic 17-year-olds were reading significantly better in 1990 than in 1975 or 1980.

- The gap between White and Black 13- and 17-year-olds decreased significantly in 1990 from the 1970s and in 1980.

- The gap between Hispanic and White 17-year-olds was significantly smaller in 1990 than in 1975.

Writing. Trends in average writing achievement for White, Black, and Hispanic students are displayed in FIGURE 5.

- Average writing achievement for White 8th graders was lower in 1990 than 1984. Average writing achievement for White 4th and 11th graders was about the same in 1990 as in 1984.

- The average writing performance for Black and Hispanic students at all three grades showed no change from 1984 to 1990.

- On average, the gaps between White students' writing achievement and the achievement of their Black and Hispanic counterparts remained quite large.

GENDER

Science. Trends in average science proficiency for males and females are shown in FIGURE 6.

- At ages 9 and 13, the average proficiency of both males and females was lower in 1977 than 1970, but was about the same in 1990 as in 1970.

- At age 17, both males and females showed declines in science performance between 1969 and 1982. Although females did significantly better in 1990 than in 1982, neither males nor females did as well in 1990 as in 1969.

- There were small or no gender differences at age 9 for any science assessment. At ages 13 and 17, the average science proficiency of females in 1990 was significantly lower than that of males, continuing a trend that began in the 1970s.

Mathematics. Trends in average mathematics proficiency for males and females are presented in FIGURE 7.

- At age 9, both male and female students made significant gains in 1990 compared with their levels of performance in 1973, with the improvement generally occurring during the 1980s.

- As in previous assessments, male and female 9-year-olds had about the same level of average mathematics proficiency in 1990.

- Thirteen-year-olds of both genders showed improvement between 1978 and 1990. Their average performance in 1990 was essentially the same.

- At age 17, the average performance of males and females declined significantly between 1973 and 1982 and then improved significantly, returning to the same level in 1990 as in 1973.

- In 1990, the average mathematics proficiency of males remained higher than that of females at age 17.

Reading. The trends in average reading proficiency for males and females are shown in FIGURE 8.

- The reading proficiency of 9-year-old males and females was significantly lower in 1990 than in 1980, however males had significantly higher proficiencies in the 1980s compared with 1971.

- There were no significant differences in the proficiencies of 13-year-old males and females from 1971 to 1990.

- Seventeen-year-old females showed higher levels of reading proficiency in 1990 than in 1975 and 1980. Males at this age

showed no significant change in 1990 compared with previous assessments.

- At all three ages, females outperformed males in reading and have done so in all six NAEP reading assessments since 1971.

Writing. The trends in average writing proficiency for males and females are presented in FIGURE 9.

- Between 1984 and 1990, the average proficiency of fourth-grade females increased significantly, while the performance of fourth-grade males remained the same.

- At grade 8, writing proficiency for both males and females declined significantly between 1984 and 1990.

- The writing performance of both male and female eleventh graders remained the same from 1984 to 1990.

- On average, females at all grades performed better in writing than their male counterparts.

REGION

Science. The trends in average science proficiency for the four regions are presented in FIGURE 10.

- In the Northeast, the average proficiency in science for 9- and 13-year-olds did not change from 1970 to 1990. For 17-year-olds, proficiency was lower in 1982 than in 1969 and was still below the 1969 level in 1990.

- In the Southeast, 9- and 13-year-olds were doing better in science in 1990 than 1970. There was no significant difference in the performance of 17-year-olds in 1990 from that of their counterparts in 1970.

- In the Central region, the proficiency at all three ages was virtually the same in 1990 as two decades earlier.

- In the West, the performance of 9- and 13-year-olds in science was about the same in 1990 as in 1970. However, the science performance of 17-year-olds was significantly lower in 1990 than in 1970.

Mathematics. The trends in average mathematics performance for the four regions are shown in FIGURE 11.

- The average mathematics proficiency for 9-year-olds was higher in all four regions in 1990 than it was in 1973.

- At age 13, students in the Southeast and West showed improvement in their average mathematics performance in 1990 compared with the 1970s, but there was no significant change in the proficiencies in the Northeast and Central regions.

- At age 17, during the 1980s, an increase was observed in the Southeast, West, and Central regions. However, in the Northeast, students' performance at age 17 did not change significantly during this period.

Reading. The trends in average reading proficiency for the four regions are shown in FIGURE 12.

- In the Northeast, reading achievement at all three ages was about the same in 1990 as it was in 1971.

- In the Southeast, 13- and 17-year-olds were reading significantly better in 1990 than they were in 1971. For 9-year-olds, gains made in the 1970s were offset by declines in the 1980s, with the result that average reading proficiency in 1990 was about the same as that in 1971.

- For 9- and 17-year-old students in the Central region, reading performance was about the same in 1990 as in 1971. Thirteen-year-olds' performance declined significantly in 1990 compared to 1980, but remained unchanged from 1971.

- For the West, average reading proficiency at all three ages was about the same in 1990 as in 1971.

Writing. Trends in average writing proficiency for the four regions are shown in FIGURE 13.

- In the Northeast from 1984 to 1990, average writing proficiency for 4th and 11th graders did not change significantly. For 8th grade students, writing performance was significantly lower in 1990 than in 1984.

- In the Southeast, average writing performance did not significantly change at grade 4, while 8th graders' performance in 1990 was significantly lower than in both 1984 and 1988. The trend at grade 11 is similar to those in grade 8, but the apparent decline is not statistically significant.

- In both the Central and Western regions at all three grades, average writing performance was about the same in 1990 as in 1984.

Trends in Percentages of Students At or Above Proficiency Levels

Trends in percentages of students at or above proficiency levels in science, mathematics, and reading are presented in TABLES 1, 2 and 3. The trends cover the period 1977-1990 for science, 1978-1990 for mathematics, and 1971-1990 for reading. Comparisons are made only between each assessment year and 1990.

TABLE 1* Trends in Percentages of Students At or Above Five Science Proficiency Levels, 1977 to 1990

		Assessment Years			
Proficiency Levels	Age	1977	1982	1986	1990
Level 350					
Integrates Specialized	9	0 (0.0)	0 (0.1)	0 (0.1)	0 (0.0)
Scientific Information	13	1 (0.1)	0 (0.1)	0 (0.1)	0 (0.1)
	17	9 (0.4)	7 (0.4)*	8 (0.7)	9 (0.5)
Level 300					
Analyzes Scientific	9	3 (0.3)	2 (0.7)	3 (0.5)	3 (0.3)
Procedures and Data	13	11 (0.5)	10 (0.7)	9 (0.9)	11 (0.5)
	17	42 (0.9)	37 (0.9)*	41 (1.4)	43 (1.3)
Level 250					
Applies General	9	26 (0.7)*	24 (1.8)*	28 (1.4)	31 (0.8)
Scientific Information	13	49 (1.1)*	51 (1.6)*	53 (1.6)	57 (1.0)
	17	82 (0.7)	77 (1.0)*	81 (1.3)	81 (0.9)
Level 200					
Understands Simple	9	68 (1.1)*	71 (1.9)*	72 (1.1)*	76 (0.9)
Scientific Principles	13	86 (0.7)*	90 (0.8)*	92 (1.0)	92 (0.7)
	17	97 (0.2)	96 (0.5)	97 (0.5)	97 (0.3)
Level 150					
Knows Everyday	9	94 (0.6)	95 (0.7)	96 (0.3)	97 (0.3)
Science Facts	13	99 (0.2)	100 (0.1)	100 (0.1)	100 (0.1)
	17	100 (0.0)	100 (0.1)	100 (0.1)	100 (0.2)

*Statistically significant difference from 1990, as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of comparisons between previous science assessments and 1990. (No significance test is reported when the percentage of students is either > 95.0 or < 5.0). The standard errors of the estimated percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. When the percentage of students is either 0 or 100, the standard error is inestimable. However, percentages 99.5 percent and greater were rounded to 100 percent and percentages less than 0.5 percent were rounded to 0 percent. When reading tables, comparisons are made only with 1990. No extrapolations for proficiency levels can be made for years before those presented in the tables.

Level 150: Knows Everyday Science Facts

The results from 1990 show that nearly every student at all three ages had some knowledge of general scientific facts and an ability to read simple

graphs, the material typical of performance at Level 150. This was also the case in 1977 at ages 13 and 17.

Level 200: Understands Simple Scientific Principles

In 1990, three-fourths of 9-year-olds and most 13- and 17-year-olds had some understanding of simple scientific principles as well as basic knowledge about plants and animals. At both ages 9 and 13, the percentages of students performing at Level 200 increased since 1977, while at age 17 the percentage remained constant.

Level 250: Applies Basic Scientific Information

In 1990, 31 percent of 9-year-olds and 57 percent of 13-year-olds were able to perform tasks typical of Level 250, such as interpreting graphs and making inferences from experimental results. These results represent a significant increase in the percentages since 1977 at both ages. The percentage of 17-year-olds reaching Level 250 was about the same in 1990 as in 1977 (about four-fifths).

Level 300: Analyzes Scientific Procedures and Data

In both the 1977 and 1990 assessments, very few 9- or 13-year-olds were successful in evaluating the appropriateness of an experimental design or in using scientific knowledge to interpret new information -- tasks typical of performance at Level 300. Additionally, fewer than half of the 17-year-olds reached this level in either year.

Level 350: Integrates Specialized Scientific Information

Students attaining Level 350 were able to use detailed knowledge from the physical sciences to make inferences and draw conclusions or apply basic genetics principles. Only 9 percent of 17-year-olds performed at or above this level in either 1977 or 1990. Although 9-year-olds probably would not be expected to achieve this level of performance, all but a very few 13-year-olds (1 percent or less) also found this material beyond their grasp in every assessment from 1977 to 1990.

TABLE 2 Trends in Percentages of Students At or Above Five Mathematics Proficiency Levels, 1978 to 1990

Proficiency Levels	Age	Assessment Years 1978	1982	1986	1990
Level 350					
Multi-Step Problem	9	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Solving and Algebra	13	1 (0.2)	1 (0.1)	0 (0.1)	0 (0.1)
	17	7 (0.4)	6 (0.4)	7 (0.5)	7 (0.6)
Level 300					
Moderately Complex	9	1 (0.1)	1 (0.1)	1 (0.2)	1 (0.3)
Procedures and Reasoning	13	18 (0.7)	17 (0.9)	16 (1.0)	17 (1.0)
	17	52 (1.1)*	49 (1.3)*	52 (1.4)	56 (1.4)
Level 250					
Numerical Operations and	9	20 (0.7)*	19 (1.0)*	21 (0.9)*	28 (0.9)
Beginning Problem Solving	13	65 (1.2)*	71 (1.2)	73 (1.6)	75 (1.0)
	17	92 (0.5)	93 (0.5)	96 (0.5)	96 (0.5)
Level 200					
Beginning Skills and	9	70 (0.9)*	71 (1.2)*	74 (1.2)*	82 (1.0)
Understandings	13	95 (0.5)	98 (0.4)	99 (0.2)	99 (0.2)
	17	100 (0.1)	100 (0.0)	100 (0.1)	100 (0.1)
Level 150					
Simple Arithmetic	9	97 (0.3)	97 (0.3)	98 (0.3)	99 (0.2)
Facts	13	100 (0.1)	100 (0.1)	100 (0.0)	100 (0.0)
	17	100 (0.0)	100 (0.0)	100 (0.0)	100 (0.0)

*Shows statistically significant difference from 1990, by an application of the Bonferroni procedure where alpha equals .05 per set of three comparisons (each year compared with 1990). Thus, alpha equals .0167 for each comparison. (No significance test is reported when the percentage of students is either > 95.0 or < 5.0.) The standard errors of the estimated percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. When the percentage of students is either 0 percent or 100 percent, the standard error is inestimable. However, percentages 99.5 percent and greater were rounded to 100 percent and percentages less than 0.5 percent were rounded to 0 percent.

Level 150: Simple Arithmetics Facts

Students performing at or above Level 150 were able to perform elementary addition and subtraction; however, their ability to apply these simple arithmetic procedures was quite limited. In 1990, as in the three previous assessments conducted since 1978, nearly all students in each of the three age groups performed at or above Level 150.

Level 200: Beginning Skills and Understandings

Students performing at or above Level 200 demonstrated a greater range and depth of basic mathematical skill than those who reached only Level 150, but were still developing a grasp of multiplication and division and

reasoning ability beyond that required by simple numerical computation. Virtually all 13- and 17-year-olds and more than four-fifths of 9-year-olds performed at or above Level 200 in the 1990 assessment. The findings at ages 13 and 17 were consistent with previous assessments. However, at age 9, the results represented dramatic improvement compared to the 1978 performance level, with an increase from 70 to 82 percent of the students showing an initial understanding of mathematical skills and concepts.

Level 250: Numerical Operations and Problem Solving

Students performing at or above Level 250 had developed a surface understanding of the four basic operations, and were beginning to acquire more developed reasoning skills. Trends in the percentages of students demonstrating this level of mathematical understanding showed a significant increase at ages 9 and 13. Yet in 1990, the percentages of students reaching this level differed considerably across the age groups. The percentage of 9-year-olds demonstrating these basic computation abilities increased from 20 percent in 1978 to 28 percent in 1990, and 10 percent more 13-year-olds attained this level in 1990 than in 1978 (75 percent compared to 65 percent).

Level 300: Moderately Complex Procedures and Reasoning

Students performing at or above Level 300 demonstrated more sophisticated numerical reasoning, and were able to draw from a wider range of mathematical areas, including algebra and geometry. At age 17, significantly more students performed at this level in 1990 than did in 1978 -- 56 percent compared to 52 percent. There was little or no change in performance at ages 9 and 13.

Level 350: Multi-step Problem Solving and Algebra

Students performing at Level 350 demonstrated the capacity to apply mathematical operaions in a variety of problem settings. Yet virtually no 13-year-olds and only 7 percent of the 17-year-olds attending school attained this level, and these results have remained essentially constant since 1978.

TABLE 3 **Trends in Percentages of Students At or Above Five Reading Proficiency Levels, 1971 to 1990**

Skills and Strategies	Age	Assessment Years 1971	1975	1980	1984	1988	1990
Level 350	9	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.1)
Learn from	13	0(0.0)	0(0.0)	0(0.0)	0(0.1)	0(0.1)	0(0.1)
Specialized Reading	17	7(0.4)	6(0.3)	5(0.4)	6(0.3)	5(0.6)	7(0.5)
Materials							
Level 300	9	1(0.1)	1(0.1)	1(0.1)	1(0.1)	1(0.3)	2(0.3)
Understand	13	10(0.5)	10(0.5)	11(0.5)	11(0.4)	11(0.9)	11(0.6)
Complicated	17	39(1.0)	39(0.8)	38(1.1)	40(0.8)	41(1.5)	41(1.0)
Information							
Level 250	9	16(0.6)	15(0.6)*	18(0.8)	17(0.6)	18(1.1)	18(1.0)
Interrelate Ideas	13	58(1.1)	59(1.0)	61(1.1)	59(0.6)	59(1.3)	59(1.0)
and Make	17	79(0.9)*	80(0.7)*	81(0.9)	83(0.5)	86(0.8)	84(1.0)
Generalizations							
Level 200	9	59(1.0)	62(0.8)	68(1.0)*	62(0.7)	63(1.3)	59(1.3)
Partially Developed	13	93(0.5)	93(0.4)	95(0.4)	94(0.3)	95(0.6)	94(0.6)
Skills and	17	96(0.3)	96(0.3)	97(0.3)	98(0.1)	99(0.3)	98(0.3)
Understanding							
Level 150	9	91(0.5)	93(0.4)*	95(0.4)*	92(0.3)	93(0.7)	90(0.9)
Simple, Discrete	13	100(0.0)	100(0.1)	100(0.0)	100(0.0)	100(0.1)	100(0.1)
Reading Tasks	17	100(0.1)	100(0.1)	100(0.1)	100(0.0)	100(0.0)	100(0.1)

* Statistically significant difference from 1990, as determined by an application of the Bonferroni procedure where alpha equals .05 per set of comparisons between previous reading assessments and 1990. Thus, alpha equals .01 for each comparison. (No significance test is reported when the percentage of students is either >95.0 or <5.0.) The standard errors of the estimated percentages and proficiencies appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. When the proportion of students is either 0 or 100 percent, the standard error is inestimable. However, percentages 99.5 percent and greater were rounded to 100 percent, and percentages less than .5 percent were rounded to 0 percent.

Level 150–Simple, Discrete Reading Tasks

Students performing at this level of proficiency were able to read and understand brief, uncomplicated passages and respond correctly to questions based on information presented in the passage -- for example, questions asking them to recall particular details.

In each assessment, virtually all 13- and 17-year-olds and most 9-year-olds reached or surpassed this level of reading proficiency. The percentage of 9-year-olds at or above Level 150 in 1990 remained essentially the same as in 1971.

Level 200–Partially Developed Skills and Understanding

Students performing at Level 200 demonstrated partial use of reading skills and strategies, evidenced by their basic understanding of stories and expository passages, ability to summarize main ideas, and capacity to distill information from the material presented.

Students at ages 13 and 17 performed at or above Level 200 on all six assessments. At age 9, however, the percentage of students demonstrating some use of reading skills and strategies declined significantly since 1980, when 68 percent of the students performed at or above this level. Only 59 percent did so in 1990. The performance of nine-year-olds in 1990 represented a return to 1971 levels.

Level 250–Interrelate Ideas and Make Generalizations

The reading passages that characterize Level 250 performance tend to be longer and more complex than those at the lower levels, and the questions are more demanding, asking students to interpret, make inferences from, and elaborate on the information and ideas presented.

In the 1990 assessment, as with previous NAEP reading assessments, there were large differences across the age groups in the ways that the percentages of students who demonstrated reading skills and strategies at this level changed across time. Since 1971, the percentage of 13-year-olds reaching Level 250 remained constant. Over the same time period, however, the percentage of 17-year-olds who reached Level 250 increased from 79 percent in 1971 to 84 percent in 1990.

Level 300–Understand Complicated Information

Performance at Level 300 indicates an ability to read and comprehend a wide variety of materials, including various types of informational and literary passages as well as documents. It also reflects the ability to summarize and elaborate on the information and ideas presented. To a greater extent than at the lower levels of proficiency, the reader performing at this level is attentive to genre, form, and rhetorical features.

There have not been significant changes across time in the percentage of students performing at this level of reading proficiency across age groups. In 1990, fewer than half the 17-year-olds, 11 percent of the 13-year-olds, and 2 percent of the 9-year-olds reached Level 300.

Level 350–Learn from Specialized Reading Materials

Performance at this level reflects the ability to integrate ideas and information presented in a variety of genres, to understand specialized content, and make meaning from passages that contain challenging syntactic and rhetorical elements. Many of the questions following the passages at this level are open-ended, asking students to articulate their views and ideas based on the selection presented.

The percentage of students across age groups who reached Level 350 in the 1990 assessment is essentially unchanged from 1971. Virtually none of the 13-year-olds reached Level 350 during the past six reading assessments, and very few 17-year-olds reached this level.

Trends in Students' Writing by Types of Writing Tasks

Rating Scale for Writing. To examine trends in writing achievement from 1984 to 1990, one set of analyses, based on primary trait scoring was conducted which focused on the writer's effectiveness in accomplishing each task. Primary trait scoring is designed to be sensitive to the writer's understanding of the audience as well as to the inclusion of specific features needed to accomplish the specific purpose of that task. The primary trait scoring crietria, while specific to each writing prompt, also defined five levels of task accomplishment: not rated, unsatisfactory, minimal, adequate, and elaborated.

Informative Writing. Trends in students' responses to the five informative writing tasks reveal little progress from 1984 to 1990. Overall, a majority of students at all three grades wrote minimal or better responses to various informative tasks, but fewer wrote papers rated as adequate or better.

Persuasive Writing. Students' achievement on various persuasive writing tasks indicates a slippage in persuasive writing performance at grades 8 and or 11, with fewer students writing a minimal or better paper in 1990 than in 1984. Fourth graders' persuasive writing remained the same between 1984 and 1990.

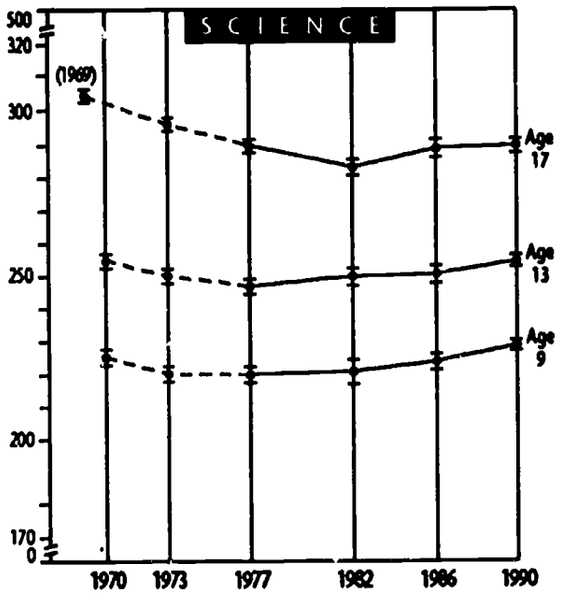
Narrative Writing. In 1990, as in 1984, the majority of fourth graders wrote minimal or better stories, but only 9 to 12 percent wrote at the adequate or better level.

Explanatory Note for the Figures

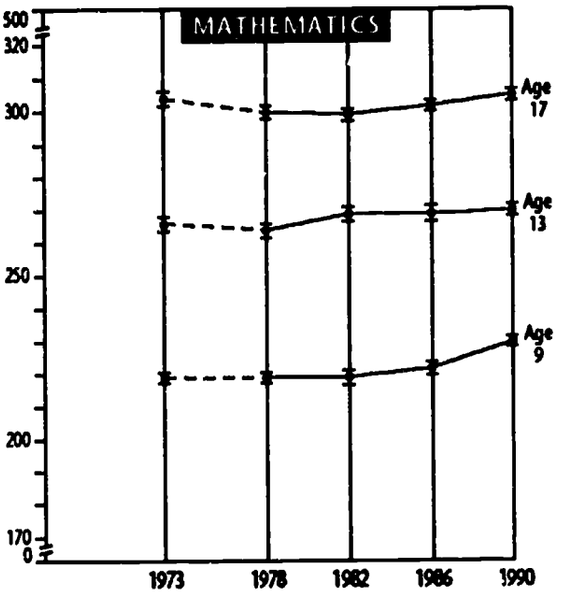
For trend analysis, each assessment was compared with the two end years in the time series. Adjacent assessments were not tested against each other. Asterisks (*) indicate significant differences from 1990 and daggers ($^{+}$) indicate significant differences from the first year in the series. For example, in Figure 1 for science, at age 17, the average proficiency in 1973 is significantly lower than in 1970 and significantly higher than in 1990.

FIGURE 1

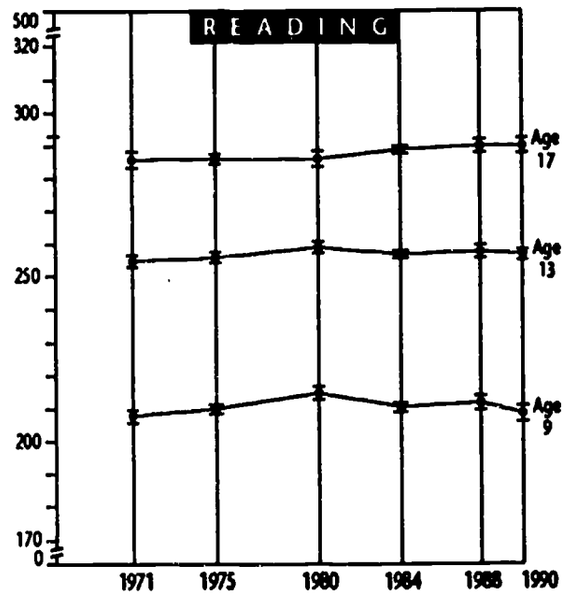
National Trends in Average Achievement in Science, Mathematics, Reading, and Writing



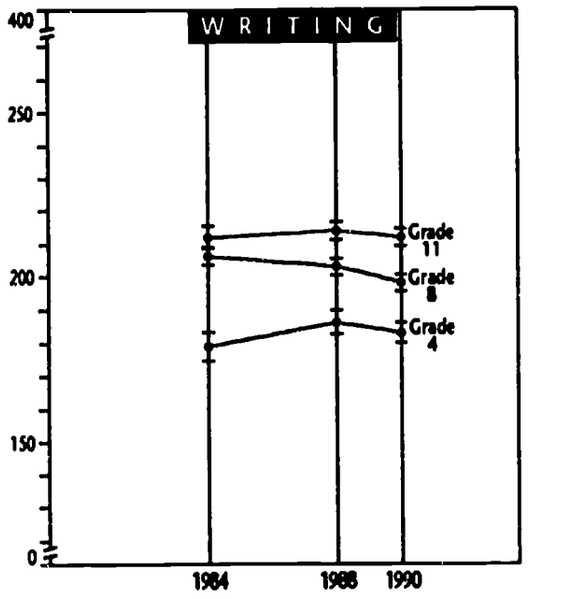
	1970	1973	1977	1982	1986	1990
Age 17	305(1.0)*	296(1.0)*†	290(1.0)†	283(1.2)*†	289(1.4)†	290(1.1)†
Age 13	255(1.1)	250(1.1)*†	247(1.1)*†	250(1.3)*	251(1.4)	255(0.9)
Age 9	225(1.2)	220(1.2)*†	220(1.2)*†	221(1.8)*	224(1.2)*	229(0.8)



	1973	1978	1982	1986	1990
Age 17	304(1.1)	300(1.0)*	299(0.9)*†	302(0.9)	305(0.9)
Age 13	266(1.1)*	264(1.1)*	269(1.1)	269(1.2)	270(0.9)†
Age 9	219(0.8)*	219(0.8)*	219(1.1)*	222(1.0)*	230(0.8)†



	1971	1975	1980	1984	1988	1990
Age 17	285(1.2)*	286(0.8)*	286(1.2)	289(0.6)	290(1.0)†	290(1.1)†
Age 13	255(0.9)	256(0.8)	259(0.9)	257(0.5)	258(1.0)	257(0.8)
Age 9	208(1.0)	210(0.7)	215(1.0)*†	211(0.7)	212(1.1)	209(1.2)



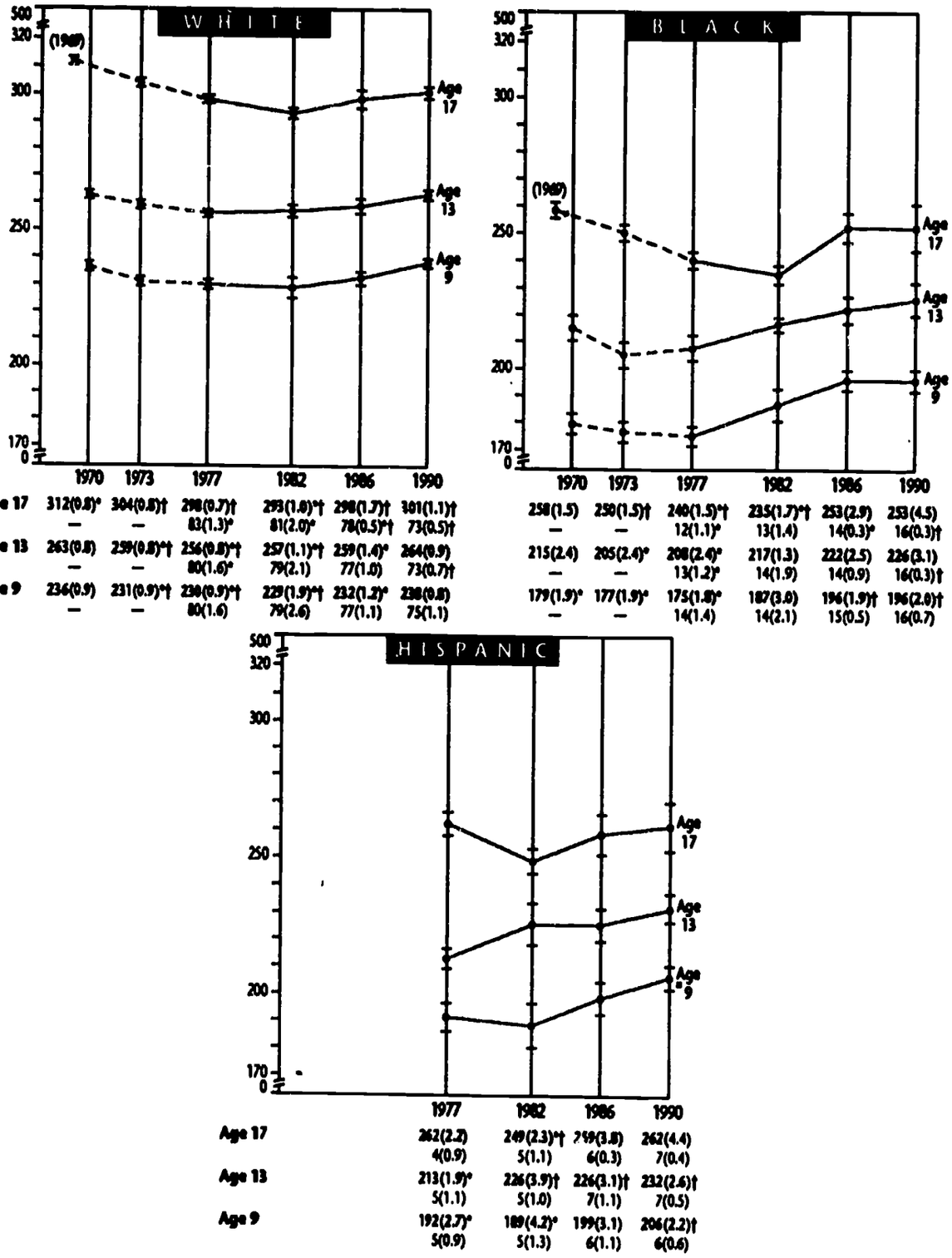
	1984	1988	1990
Grade 11	212(1.7)	214(1.4)	212(1.3)
Grade 8	206(1.4)*	203(1.3)*	198(1.3)
Grade 4	179(2.2)	186(1.8)	183(1.5)

I 95 percent confidence interval. [- - -] Extrapolated from previous NAEP analyses.

* Statistically significant difference from 1990 and † statistically significant difference from 1969–70 for scier :, 1973 for mathematics, and 1971 for reading, as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of comparisons. The standard errors of the estimated proficiencies appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample.

FIGURE 2

Trends in Average Science Proficiency by Race/Ethnicity, 1969–70 to 1990*



	1970	1973	1977	1982	1986	1990
Age 17	312(0.8)*	304(0.8)†	298(0.7)†	293(1.0)*†	298(1.7)†	301(1.1)†
	—	—	83(1.3)*	81(2.0)*	78(0.5)*†	73(0.5)†
Age 13	263(0.8)	259(0.8)*†	256(0.8)*†	257(1.1)*†	259(1.4)*	264(0.9)
	—	—	80(1.6)*	79(2.1)	77(1.0)	73(0.7)†
Age 9	236(0.9)	231(0.9)*†	230(0.9)*†	229(1.9)*†	232(1.2)*	238(0.8)
	—	—	80(1.6)	79(2.6)	77(1.1)	75(1.1)

	1970	1973	1977	1982	1986	1990
Age 17	258(1.5)	250(1.5)†	240(1.5)*†	235(1.7)*†	253(2.9)	253(4.5)
	—	—	12(1.1)*	13(1.4)	14(0.3)*	16(0.3)†
Age 13	215(2.4)	205(2.4)*	208(2.4)*	217(1.3)	222(2.5)	226(3.1)
	—	—	13(1.2)*	14(1.9)	14(0.9)	16(0.3)†
Age 9	179(1.9)*	177(1.9)*	175(1.8)*	187(3.0)	196(1.9)†	196(2.0)†
	—	—	14(1.4)	14(2.1)	15(0.5)	16(0.7)

	1977	1982	1986	1990
Age 17	262(2.2)	249(2.3)*†	259(3.8)	262(4.4)
	4(0.9)	5(1.1)	6(0.3)	7(0.4)
Age 13	213(1.9)*	226(3.9)†	226(3.1)†	232(2.6)†
	5(1.1)	5(1.0)	7(1.1)	7(0.5)
Age 9	192(2.7)*	189(4.2)*	199(3.1)	206(2.2)†
	5(0.9)	5(1.3)	6(1.1)	6(0.6)

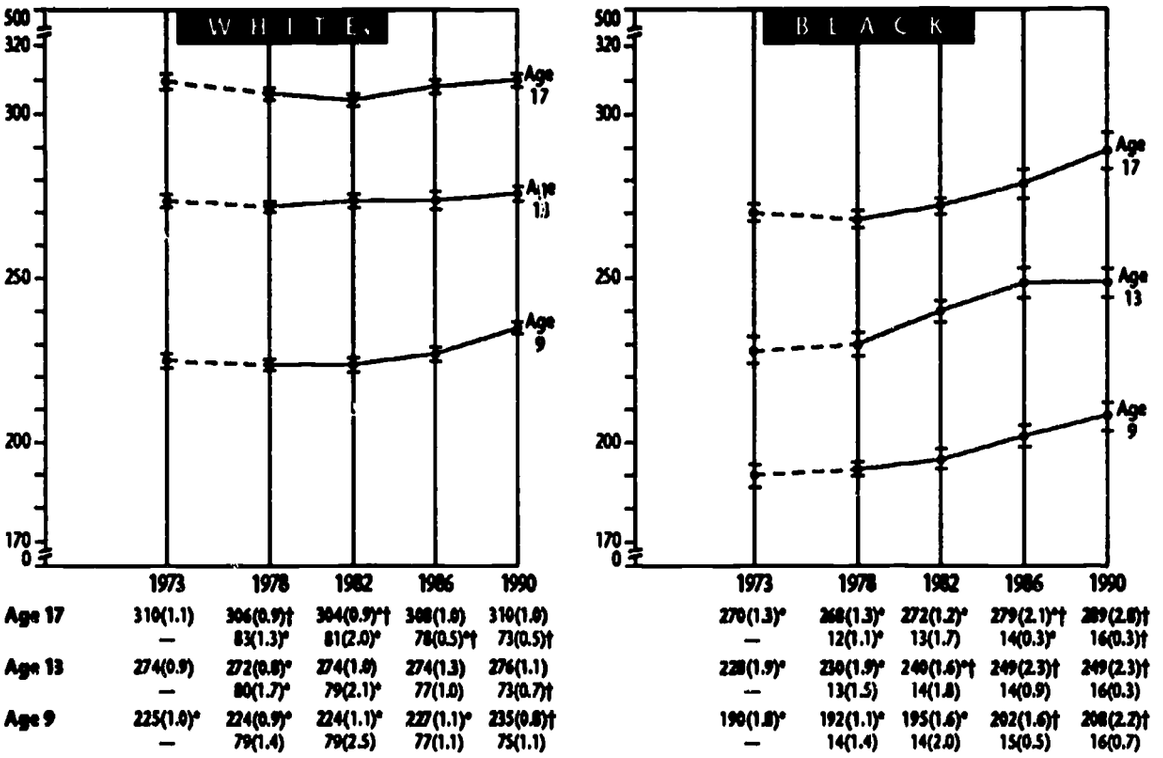
Note: Average proficiencies are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup. Unavailable data are shown by dashes (—).

‡ 95 percent confidence interval. [- - -] Extrapolated from previous NAEP analyses.

* Statistically significant difference from 1990 and † statistically significant difference from 1969–70 (for proficiencies for White and Black students) or 1977 (for proficiencies for Hispanic students and for all percentages), as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of comparisons. (No significance test is reported when the percentage of students is either > 95.0 or < 5.0.) The standard errors of the estimated proficiencies and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages do not total 100 percent because Asian/Pacific Islander and American Indian student data were analyzed separately. For Asian/Pacific Islander or American Indian students, the sample sizes were insufficient to permit robust trend estimates.

FIGURE 3

Trends in Average Mathematics Proficiency by Race/Ethnicity, 1973 to 1990*



	1973	1978	1982	1986	1990
Age 17	310(1.1)	306(0.9)† 83(1.3)*	304(0.9)*† 81(2.0)*	308(1.0) 78(0.5)*†	310(1.0) 73(0.5)†
Age 13	274(0.9) —	272(0.8)* 80(1.7)*	274(1.0) 79(2.1)*	274(1.3) 77(1.0)	276(1.1) 73(0.7)†
Age 9	225(1.0)* —	224(0.9)* 79(1.4)	224(1.1)* 79(2.5)	227(1.1)* 77(1.1)	235(0.8)† 75(1.1)

	1973	1978	1982	1986	1990
Age 17	270(1.3)* —	268(1.3)* 12(1.1)*	272(1.2)* 13(1.7)	279(2.1)*† 14(0.3)*	289(2.8)† 16(0.3)†
Age 13	228(1.9)* —	230(1.9)* 13(1.5)	240(1.6)*† 14(1.8)	249(2.3)† 14(0.9)	249(2.3)† 16(0.3)
Age 9	190(1.8)* —	192(1.1)* 14(1.4)	195(1.6)* 14(2.0)	202(1.6)† 15(0.5)	208(2.2)† 16(0.7)

	1973	1978	1982	1986	1990
Age 17	277(2.2) —	276(2.3) 4(0.5)	277(1.8) 5(1.0)	283(2.9) 6(0.3)	284(2.9) 7(0.4)
Age 13	239(2.2)* —	238(2.0)* 6(0.9)	252(1.7)† 5(1.2)	254(2.9)† 7(1.1)	255(1.8)† 7(0.5)
Age 9	202(2.4)* —	203(2.2)* 5(0.7)	204(1.3)* 5(1.1)	205(2.1) 6(1.1)	214(2.1)† 6(0.6)

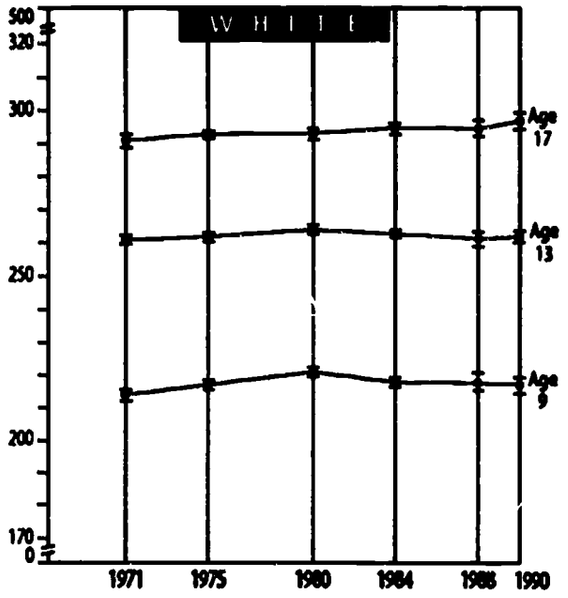
Note: Average proficiencies are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup. Unavailable data are shown by dashes (—).

I 95 percent confidence interval. [- - -] Extrapolated from previous NAEP analyses.

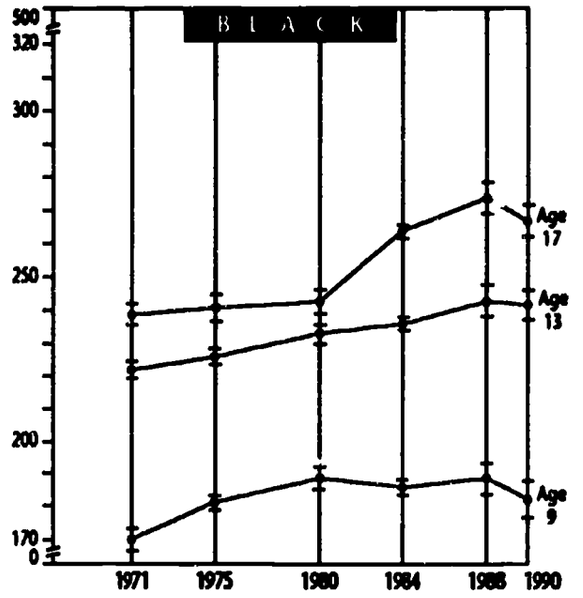
* Statistically significant difference from 1990 and † statistically significant difference from 1973 (for proficiencies) or 1978 (for percentages), as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of comparisons. (No significance test is reported when the percentage of students is either > 95.0 or < 5.0.) The standard errors of the estimated proficiencies and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages do not total 100 percent because Asian/Pacific Islander and American Indian student data were analyzed separately. For Asian/Pacific Islander or American Indian students, the sample sizes were insufficient to permit robust trend estimates.

FIGURE 4

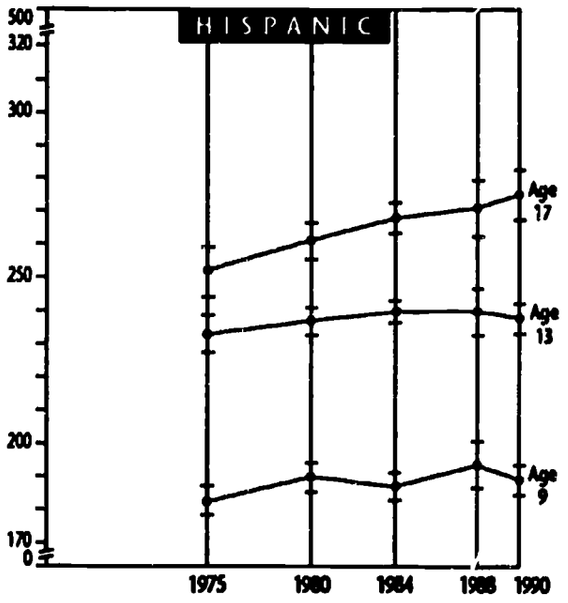
Trends in Average Reading Proficiency by Race/Ethnicity, 1971 to 1990



	1971	1975	1980	1984	1988	1990
Age 17	291(1.8)*	293(0.6)	293(0.9)	295(0.7)†	295(1.2)	297(1.2)†
	87(1.3)*	84(1.0)*	83(1.6)*	77(0.6)*†	77(0.6)*†	74(0.5)†
Age 13	261(0.7)	262(0.7)	264(0.7)†	263(0.6)	261(1.1)	262(0.9)
	84(1.4)*	81(1.2)*	80(1.8)*	77(0.6)*†	76(0.7)†	74(0.8)†
Age 9	214(0.9)	217(0.7)	221(0.8)†	218(0.8)†	218(1.4)	217(1.3)
	84(1.4)*	80(1.2)*	79(1.3)*	75(1.2)†	75(1.0)†	74(1.0)†



	1971	1975	1980	1984	1988	1990
Age 17	239(1.7)*	241(2.0)*	243(1.8)*	264(1.6)†	274(2.4)†	267(2.3)†
	11(1.2)*	11(0.8)*	12(1.4)*	14(0.2)*	15(0.3)†	16(0.3)†
Age 13	222(1.2)*	226(1.2)*	233(1.5)*†	236(1.0)†	243(2.4)†	242(2.2)†
	15(1.4)	13(0.9)*	14(1.3)	14(0.2)*	15(0.3)	15(0.2)
Age 9	170(1.7)*	181(1.2)†	189(1.8)†	186(1.1)†	189(2.4)†	182(2.9)†
	14(1.3)	13(0.8)	14(1.0)	16(0.5)	16(0.7)	16(0.6)



	1975	1980	1984	1988	1990
Age 17	252(3.6)*	251(2.7)*	268(2.2)†	271(4.3)†	275(3.6)†
	3(0.6)	4(0.6)	7(0.7)	6(0.5)	7(0.4)
Age 13	233(3.9)	237(2.0)	240(1.7)	240(3.5)	238(2.3)
	5(0.8)*	6(1.0)	7(0.7)	6(0.6)	8(0.5)†
Age 9	183(2.2)	190(2.3)	187(2.1)	194(3.5)	189(2.3)
	5(0.8)	6(0.8)	7(1.4)	6(1.0)	6(0.6)

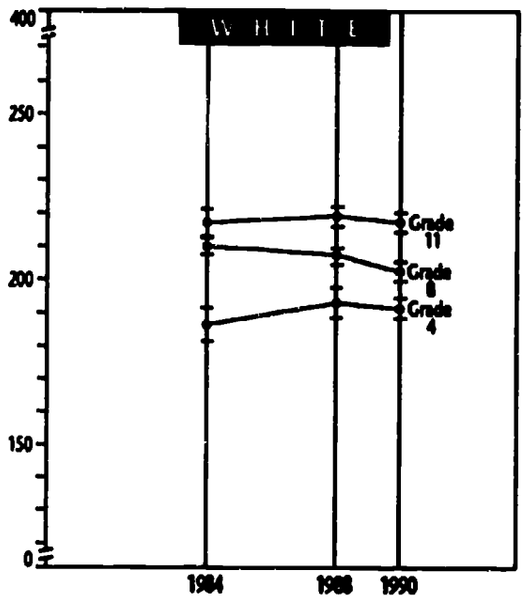
Note: Average proficiencies are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup. Unavailable data are shown by dashes (—).

I 95 percent confidence interval.

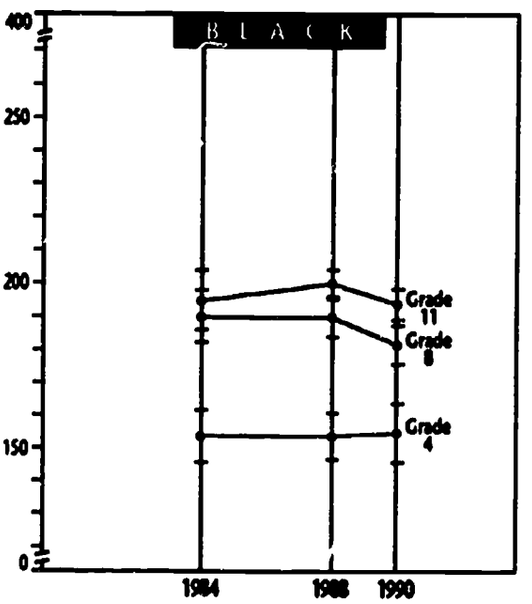
* Statistically significant difference from 1990 and † statistically significant difference from 1971 (for White and Black students) or 1975 (for Hispanic students), as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of comparisons. (No significance test is reported when the percentage of students is either > 95.0 or < 5.0.) The standard errors of the estimated proficiencies and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages do not total 100 percent because Asian/Pacific Islander and American Indian student data were analyzed separately. For Asian/Pacific Islander or American Indian students, the sample sizes were insufficient to permit robust trend estimates.

FIGURE 5

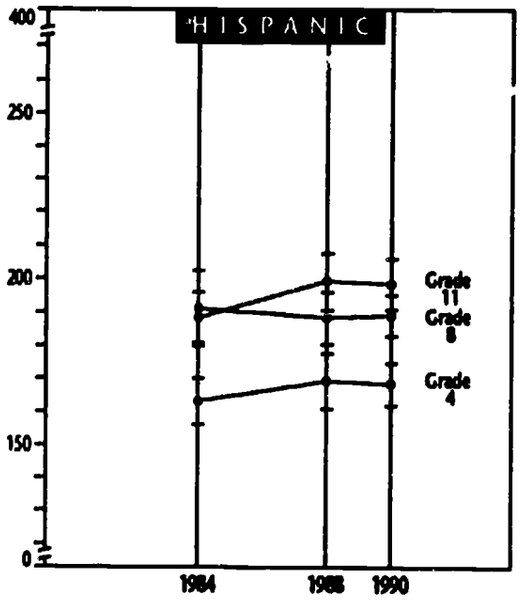
Trends in Average Writing Achievement by Race/Ethnicity, 1984 to 1990



	1984	1988	1990
Grade 11	218(2.2)	219(1.6)	217(1.5)
	75(1.1)*	74(0.1)*	71(0.2)
Grade 8	210(1.6)*	267(1.3)*	262(1.5)
	76(0.9)*	71(0.2)	70(0.2)
Grade 4	186(2.6)	193(2.1)	191(1.6)
	71(0.9)	70(0.2)	70(0.3)



	1984	1988	1990
	195(4.4)	209(3.8)	194(2.3)
	15(1.0)	15(0.1)*	16(0.2)
	190(3.6)	190(3.4)	182(2.8)
	12(0.6)*	15(0.2)	15(0.2)
	154(4.3)	154(3.6)	155(4.8)
	15(0.6)	15(0.2)	15(0.3)



	1984	1988	1990
Grade 11	188(3.9)	199(4.2)	198(3.9)
	8(0.6)	8(0.1)*	9(0.1)
Grade 8	191(5.7)	188(3.8)	189(3.0)
	8(0.7)*	10(0.1)	10(0.2)
Grade 4	163(3.5)	169(4.4)	168(3.4)
	11(0.7)	11(0.1)	11(0.2)

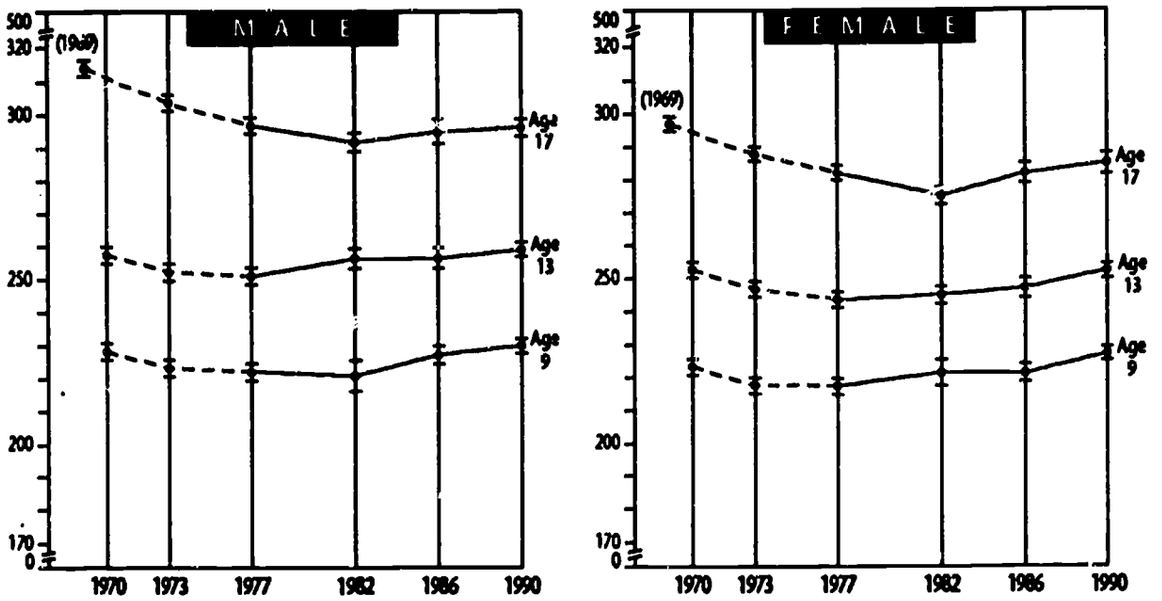
Note: Average proficiencies are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup. Unavailable data are shown by dashes (—).

‡ 95 percent confidence interval.

* Statistically significant difference from 1990, as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of two comparisons (each year compared to 1990). The standard errors of the estimated averages and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages do not total 100 percent because Asian/Pacific Islander and American Indian student data were analyzed separately. For Asian/Pacific Islander or American Indian students, the sample sizes were insufficient to permit robust trend estimates.

FIGURE 6

Trends in Average Science Proficiency by Gender, 1969-70 to 1990



	1970	1973	1977	1982	1986	1990
Age 17	314(1.2)*	304(1.2)*†	297(1.2)†	292(1.4)†	295(1.9)†	296(1.3)†
	—	—	50(0.7)	48(0.7)	49(1.2)	49(0.9)
Age 13	257(1.3)	252(1.3)*	251(1.3)*†	256(1.5)	256(1.6)	259(1.1)
	—	—	50(0.3)	49(0.7)	50(0.9)	50(0.6)
Age 9	228(1.3)	223(1.3)*	222(1.3)*†	221(2.3)*	227(1.4)	230(1.1)
	—	—	51(0.4)	51(1.5)	50(0.6)	49(0.6)

	1970	1973	1977	1982	1986	1990
Age 17	297(1.1)*	288(1.1)†	282(1.1)†	275(1.3)*†	282(1.5)†	285(1.6)†
	—	—	51(0.7)	52(0.7)	51(1.2)	51(0.9)
Age 13	253(1.2)	247(1.2)†	244(1.2)*†	245(1.3)*†	247(1.5)†	252(1.1)
	—	—	50(0.3)	52(0.7)	50(0.9)	50(0.6)
Age 9	223(1.2)	218(1.2)*	218(1.2)*†	221(2.0)*	221(1.4)*	227(1.0)
	—	—	49(0.4)	50(1.5)	50(0.6)	51(0.6)

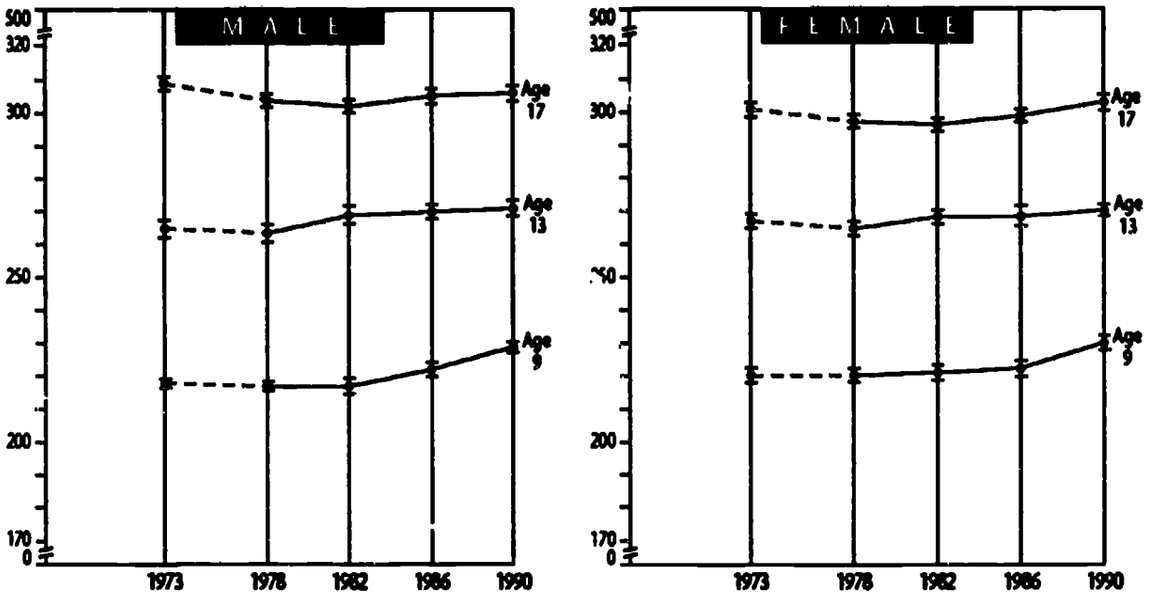
Note: Average proficiencies are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup. Unavailable data are shown by dashes (—).

I 95 percent confidence interval. [- - -] Extrapolated from previous NAEP analyses.

* Statistically significant difference from 1990 and † statistically significant difference from 1969–70 (for proficiencies) or 1977 (for percentages), as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of comparisons. The standard errors of the estimated proficiencies and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages of students may not total 100 percent due to rounding.

FIGURE 7

Trends in Average Mathematics Proficiency by Gender, 1973 to 1990



	1973	1978	1982	1986	1990
Age 17	309(1.2)	304(1.0)†	302(1.0)*†	305(1.2)	306(1.1)
	—	49(0.5)	49(0.6)	49(1.2)	49(0.9)
Age 13	265(1.3)*	264(1.3)*	269(1.4)	270(1.1)†	271(1.2)†
	—	50(0.5)	50(0.4)	50(0.9)	50(0.6)
Age 9	218(0.7)*	217(0.7)*	217(1.2)*	222(1.1)*†	229(0.9)†
	—	50(0.5)	49(0.6)	50(0.6)	49(0.6)

	1973	1978	1982	1986	1990
Age 17	301(1.1)	297(1.0)*	296(1.0)*†	299(1.0)	303(1.1)
	—	51(0.5)	51(0.6)	51(1.2)	51(0.9)
Age 13	267(1.1)	265(1.1)*	268(1.1)	268(1.5)	270(0.9)
	—	50(0.5)	50(0.4)	50(0.9)	50(0.6)
Age 9	220(1.1)*	220(1.0)*	221(1.2)*	222(1.2)*	230(1.1)†
	—	50(0.5)	51(0.6)	50(0.6)	51(0.6)

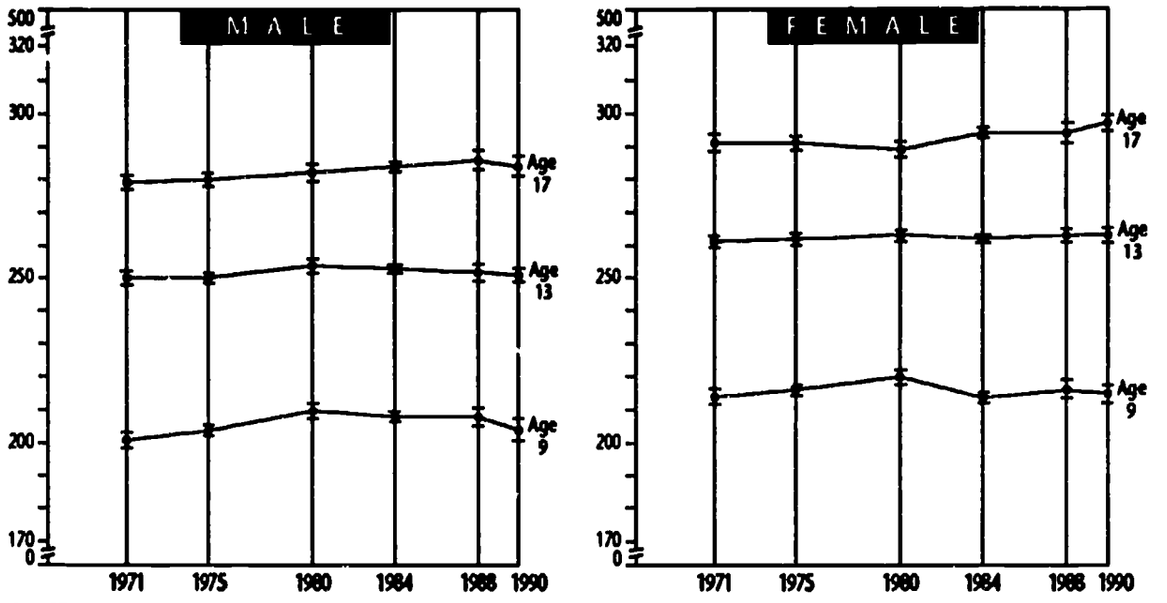
Note: Average proficiencies are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup. Unavailable data are shown by dashes (—).

I 95 percent confidence interval. [- - -] Extrapolated from previous NAEP analyses.

* Statistically significant difference from 1990 and † statistically significant difference from 1973 (for proficiencies) or 1978 (for percentages), as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of comparisons. The standard errors of the estimated proficiencies and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages of students may not total 100 percent due to rounding.

FIGURE 8

Trends in Average Reading Proficiency by Gender, 1971 to 1990



	1971	1975	1980	1984	1988	1990
Age 17	**279(1.2)**	**280(1.0)**	**282(1.3)**	**284(0.6)†**	**286(1.5)†**	**284(1.6)**
	49(0.5)	49(0.5)	51(0.6)	51(0.7)	48(1.4)	50(0.6)
Age 13	**250(1.0)**	**250(0.8)**	**254(1.1)†**	**253(0.6)**	**252(1.3)**	**251(1.1)**
	50(0.4)	50(0.5)	49(0.3)	51(0.5)	50(0.8)	50(0.9)
Age 9	**201(1.1)**	**204(0.8)**	**210(1.1)*†**	**208(0.8)†**	**208(1.4)†**	**204(1.7)**
	50(0.4)	50(0.4)	50(0.4)	50(0.5)	50(0.8)	51(0.9)

	1971	1975	1980	1984	1988	1990
Age 17	**291(1.3)**	**291(1.0)***	**289(1.2)***	**294(0.8)**	**294(1.5)**	**297(1.2)**
	51(0.5)	51(0.5)	50(0.6)	49(0.7)	52(1.4)	50(0.6)
Age 13	**261(0.9)**	**262(0.9)**	**263(0.9)**	**262(0.6)**	**263(1.0)**	**263(1.1)**
	50(0.4)	50(0.5)	51(0.3)	49(0.5)	51(0.8)	50(0.9)
Age 9	**214(1.0)**	**216(0.8)**	**220(1.1)*†**	**214(0.8)**	**216(1.3)**	**215(1.2)**
	50(0.4)	50(0.4)	50(0.4)	50(0.5)	50(0.8)	49(0.9)

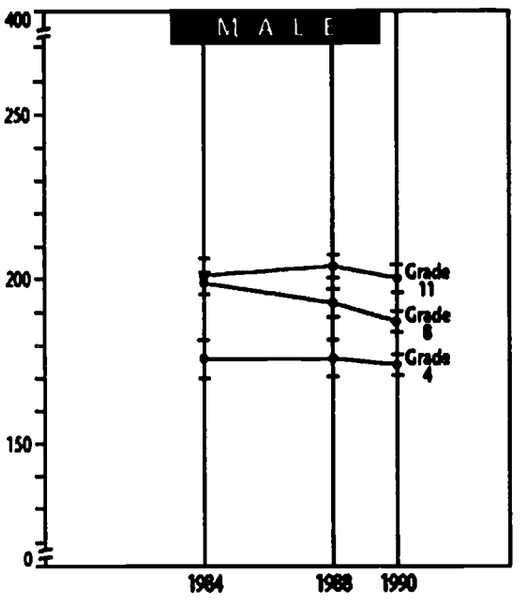
Note: Average proficiencies are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup. Unavailable data are shown by dashes (—).

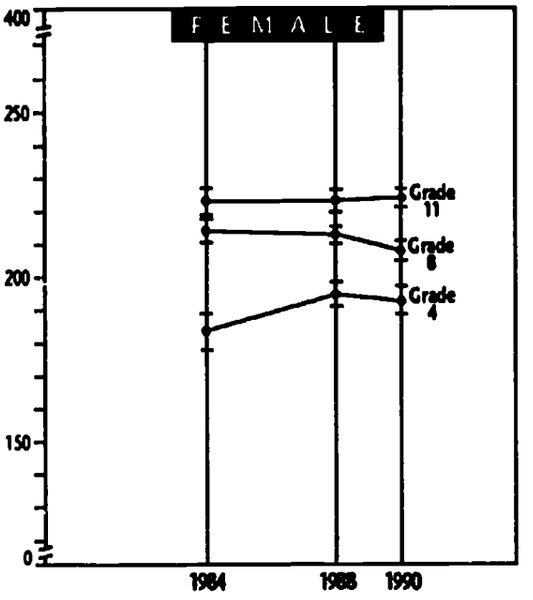
‡ 95 percent confidence interval.

* Statistically significant difference from 1990 and † statistically significant difference from 1971, as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of nine comparisons. The standard errors of the estimated proficiencies and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages of students may not total 100 percent due to rounding.

FIGURE 9

Trends in Average Writing Achievement by Gender, 1984 to 1990





	1984	1988	1990
Grade 11	**201(2.7)**	**204(1.9)**	**200(2.0)**
	51(1.6)	47(1.5)*	51(0.8)
Grade 8	**199(1.8)***	**193(2.1)**	**187(1.6)**
	51(1.2)	49(1.1)	51(0.9)
Grade 4	**176(3.0)**	**176(2.8)**	**174(1.6)**
	53(1.5)	51(0.9)	51(0.9)

	1984	1988	1990
	223(2.0)	**223(1.6)**	**224(1.4)**
	49(1.6)	53(1.5)*	49(0.8)
	214(1.9)*	**213(1.4)**	**208(1.5)**
	49(1.2)	51(1.1)	50(0.9)
	184(2.6)*	**195(1.8)**	**193(2.2)**
	47(1.5)	49(0.9)	49(0.9)

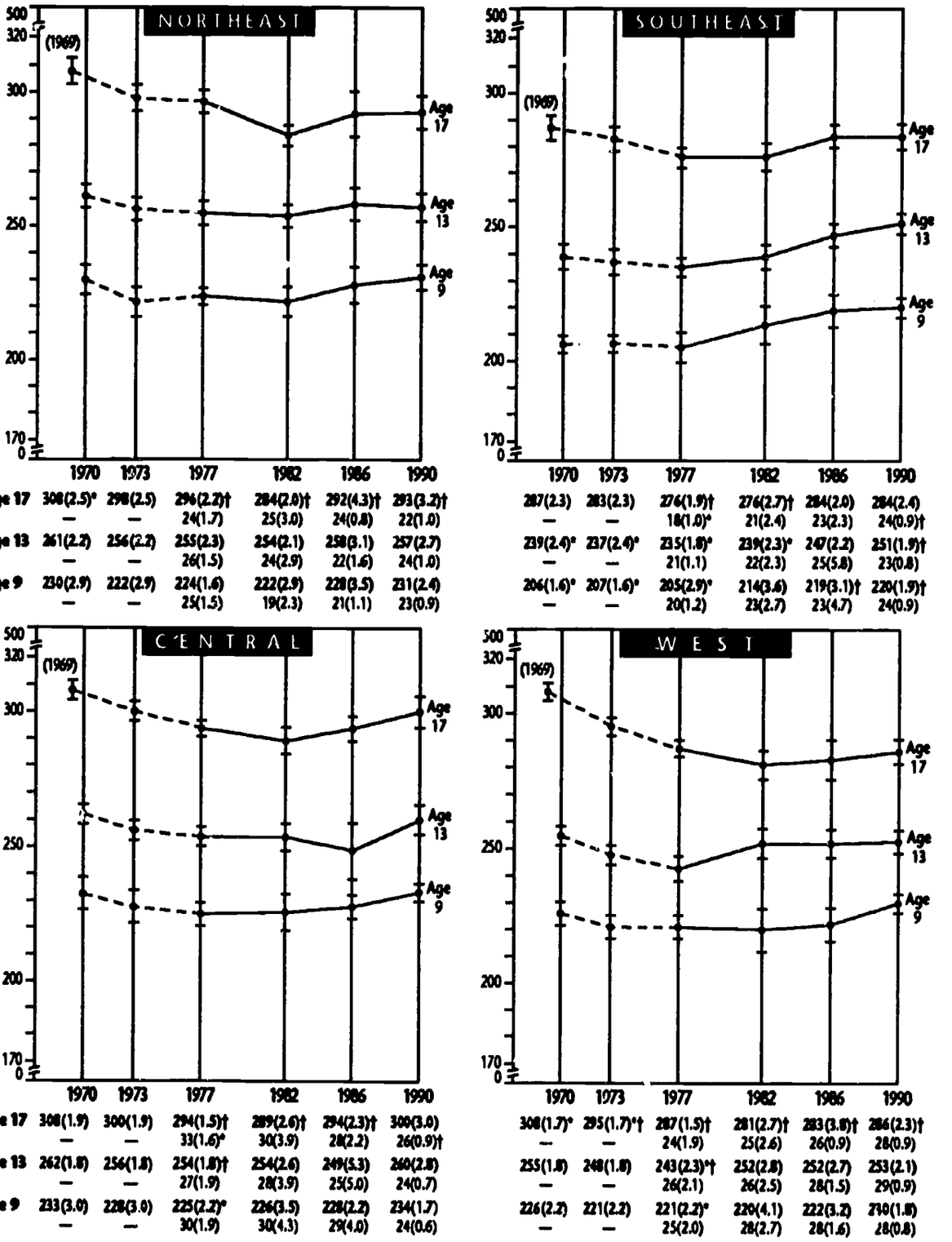
Note: Average proficiencies are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup. Unavailable data are shown by dashes (—).

‡ 95 percent confidence interval.

* Statistically significant difference from 1990, as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of two comparisons (each year compared to 1990). The standard errors of the estimated averages and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages of students may not total 100 percent due to rounding.

FIGURE 10

Trends in Average Science Proficiency by Region, 1969-70 to 1990



	1970	1973	1977	1982	1986	1990
NORTHEAST						
Age 17	308(2.5)*	298(2.5)	296(2.2)†	284(2.0)†	292(4.3)†	293(3.2)†
	—	—	24(1.7)	25(3.0)	24(0.8)	22(1.0)
Age 13	261(2.2)	256(2.2)	255(2.3)	254(2.1)	258(3.1)	257(2.7)
	—	—	26(1.5)	24(2.9)	22(1.6)	24(1.0)
Age 9	230(2.9)	222(2.9)	224(1.6)	222(2.9)	228(3.5)	231(2.4)
	—	—	25(1.5)	19(2.3)	21(1.1)	23(0.9)
SOUTHEAST						
Age 17	287(2.3)	283(2.3)	276(1.9)†	276(2.7)†	284(2.0)	284(2.4)
	—	—	18(1.0)*	21(2.4)	23(2.3)	24(0.9)†
Age 13	239(2.4)*	237(2.4)*	235(1.8)*	239(2.3)*	247(2.2)	251(1.9)†
	—	—	21(1.1)	22(2.3)	25(5.8)	23(0.8)
Age 9	206(1.6)*	207(1.6)*	205(2.9)*	214(3.6)	219(3.1)†	220(1.9)†
	—	—	20(1.2)	23(2.7)	23(4.7)	24(0.9)
CENTRAL						
Age 17	308(1.9)	300(1.9)	294(1.5)†	289(2.6)†	294(2.3)†	300(3.0)
	—	—	33(1.6)*	30(3.9)	28(2.2)	26(0.9)†
Age 13	262(1.8)	256(1.8)	254(1.8)†	254(2.6)	249(5.3)	260(2.8)
	—	—	27(1.9)	28(3.9)	25(5.0)	24(0.7)
Age 9	233(3.0)	228(3.0)	225(2.2)*	226(3.5)	228(2.2)	234(1.7)
	—	—	30(1.9)	30(4.3)	29(4.0)	24(0.6)
WEST						
Age 17	308(1.7)*	295(1.7)*†	287(1.5)†	281(2.7)†	283(3.0)†	286(2.3)†
	—	—	24(1.9)	25(2.6)	26(0.9)	28(0.9)
Age 13	255(1.8)	248(1.8)	243(2.3)*†	252(2.8)	252(2.7)	253(2.1)
	—	—	26(2.1)	26(2.5)	28(1.5)	29(0.9)
Age 9	226(2.2)	221(2.2)	221(2.2)*	220(4.1)	222(3.2)	230(1.8)
	—	—	25(2.0)	28(2.7)	28(1.6)	28(0.8)

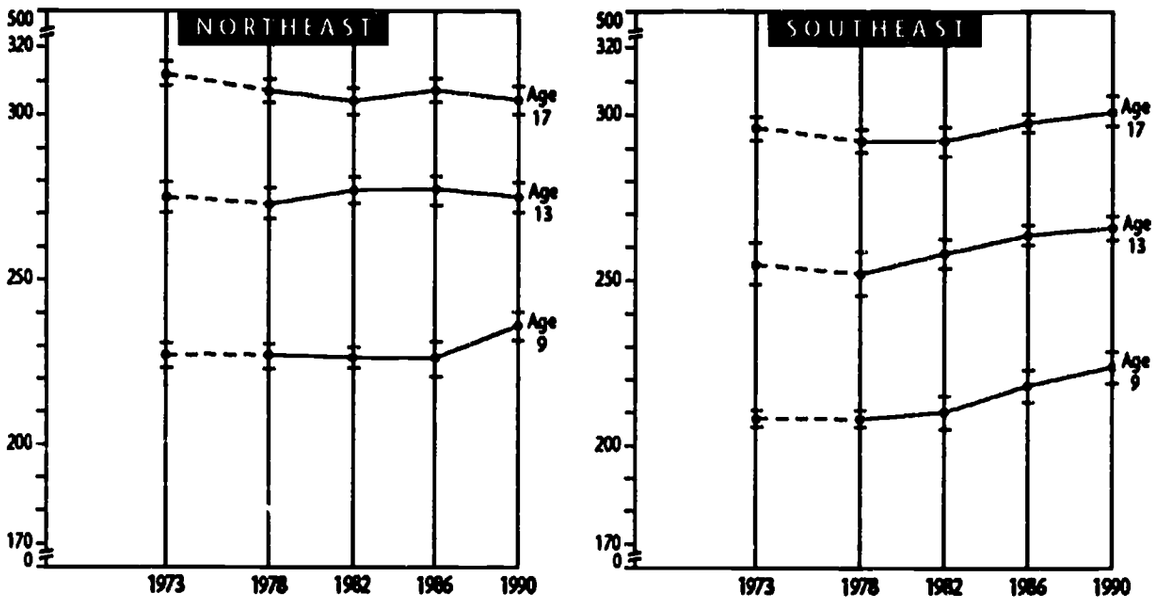
Note: Average proficiencies are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup. Unavailable data are shown by dashes (—).

I 95 percent confidence interval. [- - -] Extrapolated from previous NAEP analyses.

* Statistically significant difference from 1990 and † statistically significant difference from 1969–70 (for proficiencies) or 1977 (for percentages), as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of comparisons. The standard errors of the estimated proficiencies and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages of students may not total 100 percent due to rounding.

FIGURE 11

Trends in Average Mathematics Proficiency by Region, 1973 to 1990



	1973	1978	1982	1986	1990
Northeast					
Age 17	**312(1.8)**	**307(1.8)**	**304(2.0)**	**307(1.9)**	**304(2.1)**
	—	23(2.0)	24(2.8)	24(0.8)	22(1.0)
Age 13	**275(2.4)**	**273(2.4)**	**277(2.0)**	**277(2.2)**	**275(2.3)**
	—	23(2.2)	24(2.5)	22(1.6)	24(1.0)
Age 9	**227(1.9)***	**227(1.9)***	**226(1.8)***	**226(2.7)***	**236(2.1)†**
	—	23(2.5)	21(2.7)	21(1.1)	23(0.9)
Southeast					
	296(1.8)	**292(1.7)***	**292(2.1)**	**297(1.4)**	**301(2.3)**
	—	22(2.1)	21(2.1)	23(2.3)	24(0.9)
	255(3.2)	**252(3.3)***	**258(2.2)**	**264(1.4)**	**266(1.9)**
	—	23(2.0)	23(2.1)	25(5.8)	23(0.8)
	208(1.3)*	**208(1.2)***	**210(2.5)***	**218(2.5)†**	**224(2.4)†**
	—	24(2.1)	24(2.7)	23(4.7)	24(0.9)
Central					
Age 17	**306(1.8)**	**305(1.9)**	**302(1.4)***	**304(1.9)**	**311(2.1)**
	—	31(2.1)	30(4.3)	28(2.2)	26(0.9)
Age 13	**271(1.8)**	**269(1.8)**	**273(2.1)**	**266(4.5)**	**272(2.4)**
	—	31(1.8)*	27(3.4)	25(5.0)	24(0.7)†
Age 9	**224(1.5)***	**224(1.5)***	**221(2.7)***	**226(2.3)**	**231(1.3)†**
	—	31(1.8)*	28(3.8)	29(4.0)	24(0.6)†
West					
	303(2.0)	**296(1.8)**	**294(1.9)*†**	**299(2.7)**	**302(1.5)**
	—	23(2.5)	26(2.8)	26(0.9)	28(0.9)
	262(1.9)*	**260(1.9)***	**266(2.4)**	**270(2.1)†**	**269(1.6)†**
	—	24(2.2)	27(2.3)	28(1.5)	29(0.9)
	216(2.2)*	**214(1.3)***	**219(1.8)***	**217(2.4)***	**229(1.8)†**
	—	23(2.0)	27(2.0)	28(1.6)	28(0.8)

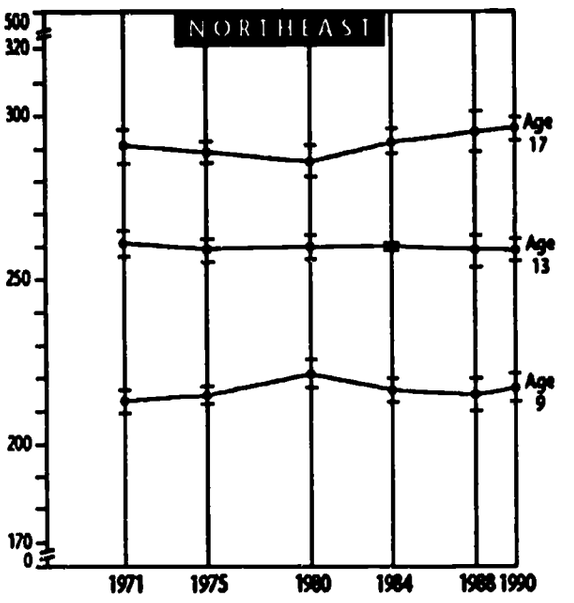
Note: Average proficiencies are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup. Unavailable data are shown by dashes (—).

I 95 percent confidence interval. [- - -] Extrapolated from previous NAEP analyses.

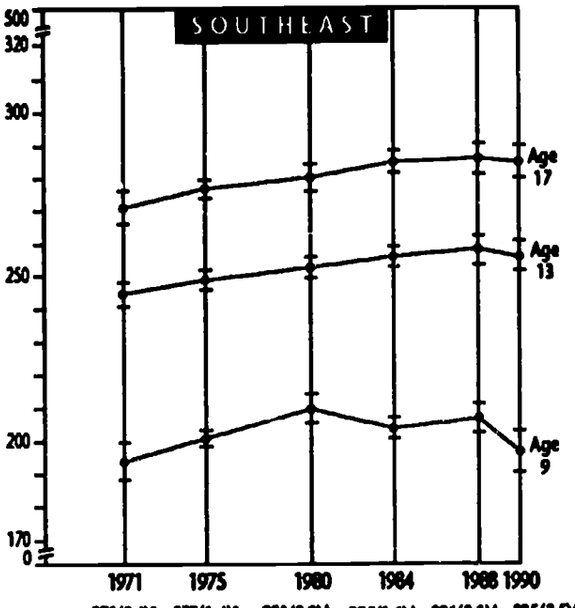
* Statistically significant difference from 1990 and † statistically significant difference from 1973 (for proficiencies) or 1978 (for percentages), as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of comparisons. The standard errors of the estimated proficiencies and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages of students may not total 100 percent due to rounding.

FIGURE 12

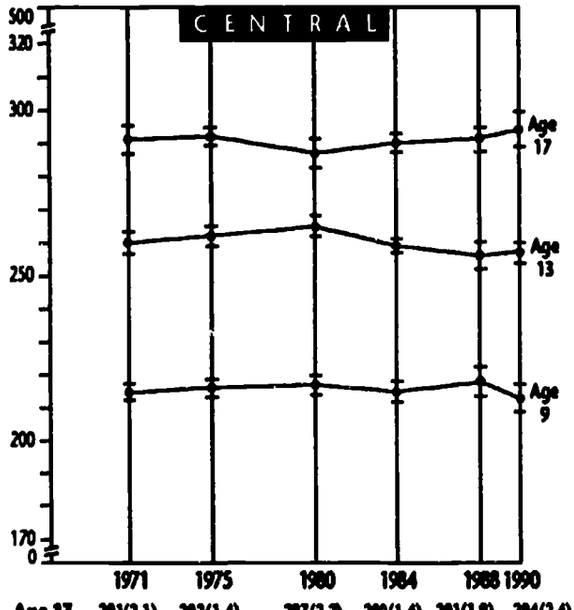
Trends in Average Reading Proficiency by Region, 1971 to 1990



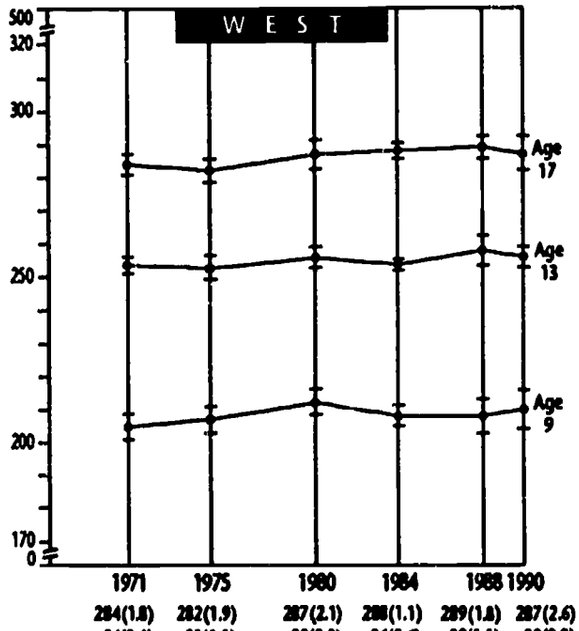
	1971	1975	1980	1984	1988	1990
Age 17	291(2.8)	289(1.7)	286(2.4)*	292(1.9)	295(2.9)	296(1.8)
	26(1.9)	26(1.2)	22(2.9)	24(0.4)	23(0.8)	23(1.1)
Age 13	261(2.0)	259(1.8)	260(1.8)	260(0.6)	259(2.4)	259(1.8)
	24(1.5)	25(1.1)	24(2.2)	23(0.4)	23(2.2)	23(1.0)
Age 9	213(1.7)	215(1.3)	221(2.1)†‡	216(1.7)	215(2.6)	217(2.2)
	26(1.5)	27(1.1)*	23(2.1)	22(0.4)†	22(1.5)	22(1.1)



	1971	1975	1980	1984	1988	1990
Age 17	271(2.4)*	277(1.4)*	280(2.2)†	285(1.6)†	286(2.1)†	285(2.5)†
	20(1.8)	20(0.8)*	21(1.9)	22(1.8)	23(1.0)	23(0.9)
Age 13	245(1.7)*	249(1.5)	253(1.6)†	256(1.5)†	258(2.2)†	256(2.2)†
	24(2.2)	22(1.1)	24(2.7)	23(1.7)	24(1.4)	23(0.8)
Age 9	194(2.9)	201(1.2)	210(2.3)*†	204(1.6)	207(2.1)	197(3.2)
	22(1.7)	22(0.8)	24(2.3)	24(1.2)	25(1.7)	24(1.2)



	1971	1975	1980	1984	1988	1990
Age 17	291(2.1)	292(1.4)	287(2.2)	290(1.4)	291(1.9)	294(2.4)
	30(2.4)	30(1.2)	28(3.2)	27(1.7)	26(1.8)	27(1.0)
Age 13	260(1.8)	262(1.4)	265(1.4)*	259(1.0)	256(2.0)	257(1.5)
	29(2.2)	28(1.3)	26(3.5)	27(1.6)	26(2.0)	24(0.7)
Age 9	215(1.2)	216(1.2)	217(1.4)	215(1.5)	218(2.2)	213(2.0)
	29(2.0)	26(1.2)	25(3.4)	27(1.3)	24(0.6)†	25(0.7)



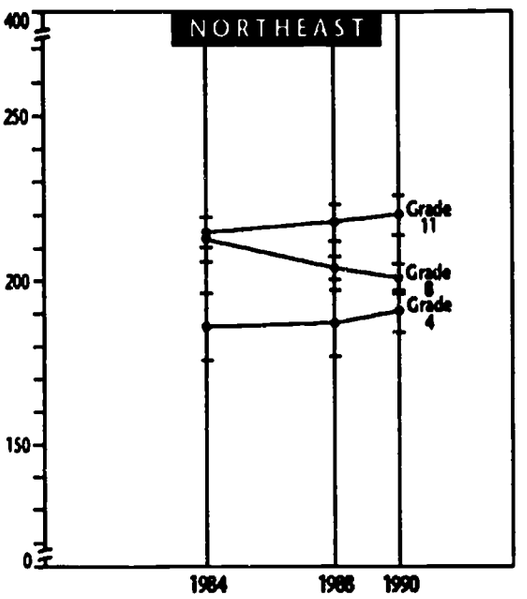
	1971	1975	1980	1984	1988	1990
	284(1.8)	282(1.9)	287(2.1)	288(1.1)	289(1.8)	287(2.6)
	24(2.4)	25(1.1)	28(2.3)	26(0.6)	28(1.1)	28(0.9)
	254(1.3)	253(1.7)	256(2.0)	254(0.9)	258(2.1)	256(1.6)
	23(2.3)	26(1.1)*	26(2.3)	27(0.5)	28(1.0)	30(0.9)
	205(2.0)	207(2.0)	213(1.9)	208(1.5)	208(2.6)	210(2.8)
	23(1.9)*	25(1.1)	28(2.1)	28(0.5)†	29(1.1)	29(0.8)†

Note: Average proficiencies are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup. Unavailable data are shown by dashes (—).

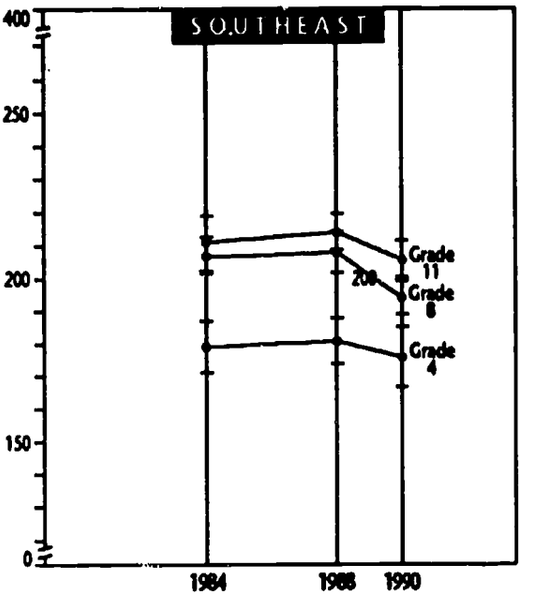
‡ 95 percent confidence interval.

* Statistically significant difference from 1990 and † statistically significant difference from 1971, as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of nine comparisons. The standard errors of the estimated proficiencies and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages of students may not total 100 percent due to rounding.

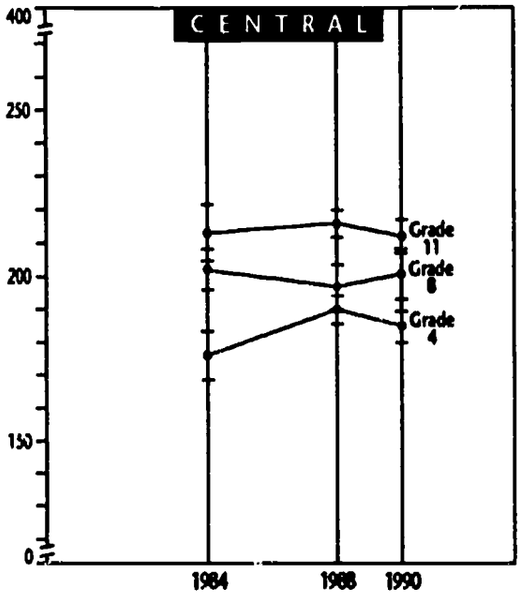
FIGURE 13
Trends in Average Writing Achievement by Region, 1984 to 1990



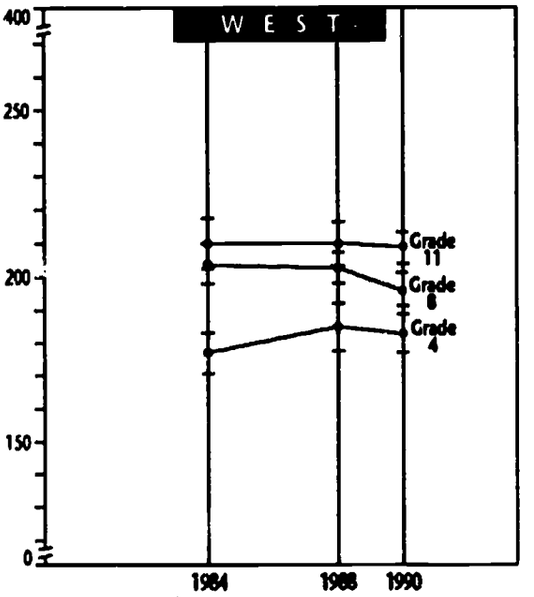
	1984	1988	1990
Grade 11	215(2.2)	218(2.7)	220(2.9)
	26(0.8)*	23(0.8)	22(1.0)
Grade 8	213(3.3)*	204(1.8)	201(2.2)
	23(1.0)	23(2.2)	23(1.0)
Grade 4	186(5.3)	187(5.2)	191(3.2)
	21(0.8)	23(1.6)	22(1.0)



	1984	1988	1990
	211(3.9)	214(2.8)	206(2.9)
	22(1.7)	22(1.0)	23(0.9)
	207(2.8)*	208(3.3)*	194(2.5)
	23(1.7)	24(1.3)	25(1.1)
	179(4.0)	181(3.5)	176(4.7)
	25(1.3)	26(1.7)	24(1.2)



	1984	1988	1990
Grade 11	213(4.0)	216(2.0)	212(2.5)
	27(1.6)	27(1.7)	27(1.1)
Grade 8	202(3.0)	197(3.5)	201(3.8)
	27(1.6)	26(2.2)	23(0.7)
Grade 4	176(3.8)	190(2.3)	185(2.4)
	26(1.6)	23(0.5)	25(0.7)



	1984	1988	1990
	210(3.8)	210(3.2)	209(2.4)
	25(0.8)*	28(1.1)	28(0.9)
	204(3.0)	203(2.2)	196(2.4)
	26(0.8)*	28(1.1)	29(1.0)
	177(3.3)	185(3.7)	183(3.0)
	28(1.0)	28(1.1)	29(0.8)

Note: Average proficiencies are in bold face type. For each age, the second row of data lists the percentages of students in the total population from each subgroup. Unavailable data are shown by dashes (—).

I 95 percent confidence interval.

* Statistically significant difference from 1990, as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of two comparisons (each year compared to 1990). The standard errors of the estimated averages and percentages appear in parentheses. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within plus or minus two standard errors of the estimate for the sample. Percentages of students may not total 100 percent due to rounding.

What is The Nation's Report Card?

THE NATION'S REPORT CARD, the National Assessment of Educational Progress (NAEP), is the only nationally representative and continuing assessment of what America's students know and can do in various subject areas. Since 1969, assessments have been conducted periodically in reading, mathematics, science, writing, history/geography, and other fields. By making objective information on student performance available to policymakers at the national, state, and local levels, NAEP is an integral part of our nation's evaluation of the condition and progress of education. Only information related to academic achievement is collected under this program. NAEP guarantees the privacy of individual students and their families.

NAEP is a congressionally mandated project of the National Center for Education Statistics, the U.S. Department of Education. The Commissioner of Education Statistics is responsible, by law, for carrying out the NAEP project through competitive awards to qualified organizations. NAEP reports directly to the Commissioner, who is also responsible for providing continuing reviews, including validation studies and solicitation of public comment, on NAEP's conduct and usefulness.

In 1988, Congress created the National Assessment Governing Board (NAGB) to formulate policy guidelines for NAEP. The board is responsible for selecting the subject areas to be assessed, which may include adding to those specified by Congress; identifying appropriate achievement goals for each age and grade; developing assessment objectives; developing test specifications; designing the assessment methodology; developing guidelines and standards for data analysis and for reporting and disseminating results; developing standards and procedures for interstate, regional, and national comparisons; improving the form and use of the National Assessment; and ensuring that all items selected for use in the National Assessment are free from racial, cultural, gender, or regional bias.

The National Assessment Governing Board

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