3

What Has Changed and What Has Not

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A *Nation at Risk*'s findings can be summarized succinctly: Its authors argued that American public education was being watered down, so that the typical 1982 high school graduate was *less* capable of mastering information and technology than the typical graduate from an earlier cohort. The report's authors, the National Commission on Excellence in Education (Excellence Commission), recognized that more students than ever were graduating from high school, but argued that it was not acceptable to let standards slip in order to graduate more students. Just the opposite, they said: The typical high school graduate needs to be *better* than his predecessors because the knowledge and analytic demands of science and the economy are ever increasing.The claim that American education was being watered down was made up of four subclaims:

1. The content of public school curricula was not challenging.
2. Expectations for students were set too low.

3. Students spent too little time in school and wasted much of their time while in school.
4. Teachers lacked ability and preparation.

The recommendations in *A Nation at Risk* focused on remedying these four perceived problems.

Very Uneven Progress

Progress on the recommendations of *A Nation at Risk* has not been even. It can be summed up as follows:

- Apparently substantial progress has been made on recommendations that could be fulfilled by rule changes, without corresponding *real* changes. For example, the report recommended that students take a greater number of advanced classes. While we can see whether this recommendation is being followed in form, it is nearly impossible to know whether it is being followed in spirit.
- Progress has also been made on recommendations that required real change, *if* they were supported by powerful political interest groups in education, especially teachers' unions. Higher teacher salaries are one such recommendation.
- Virtually no progress has been made on recommendations that required real change if they were opposed by these same interest groups. For example, merit pay for teachers remains negligible, and the school year has not lengthened.
- *A Nation at Risk* made several recommendations that were not quantified (for example, recommending cooperation in textbook development). It is difficult to assess progress on these recommendations, but it appears that they were largely ignored, based on their low prevalence in policy debates.
- Last but not least, there has been substantial progress on several recommendations that were *not* made in *A Nation at Risk*. For

example, per pupil spending has risen sharply and class size has fallen significantly. Such changes have occurred because they are popular with powerful interest groups in education. Although they were not recommended by *A Nation at Risk*, their proponents used the climate of urgency created by *A Nation at Risk* to get their own preferred policies enacted.

Progress on Content

A Nation at Risk argued that public schools' curricula were poor in content, not because advanced classes were not offered, but because it was too easy for students to avoid advanced academic work. For example, the authors claimed that too few students enrolled in the college-preparatory track and too many enrolled in the vocational track. Figure 1 shows that in 1982 about 42 percent of American high school students took an academic track and 23 percent took a vocational track. By 1998, substantial apparent progress had been made toward getting students into the academic track—71 percent of students were in the academic track and only 4 percent took a vocational track.

A Nation at Risk also argued that students were earning too few credits in core subjects such as English, math, science, and history. The authors suggested that nonacademic and frivolous courses were especially common among students from impoverished educational backgrounds.

In Figure 2, we can see that American high school students were taking about 3.7 years of English in 1982 (this was a substantial increase over the 1970 level). Nevertheless, in the wake of *A Nation at Risk*, English course–taking rose by more than one semester (about 0.7 of a year). We can see that students from different backgrounds did *not* have significantly different patterns of English course–taking in 1982. Nor do they have different patterns today.

Between 1982 and today, math course–taking has risen more than

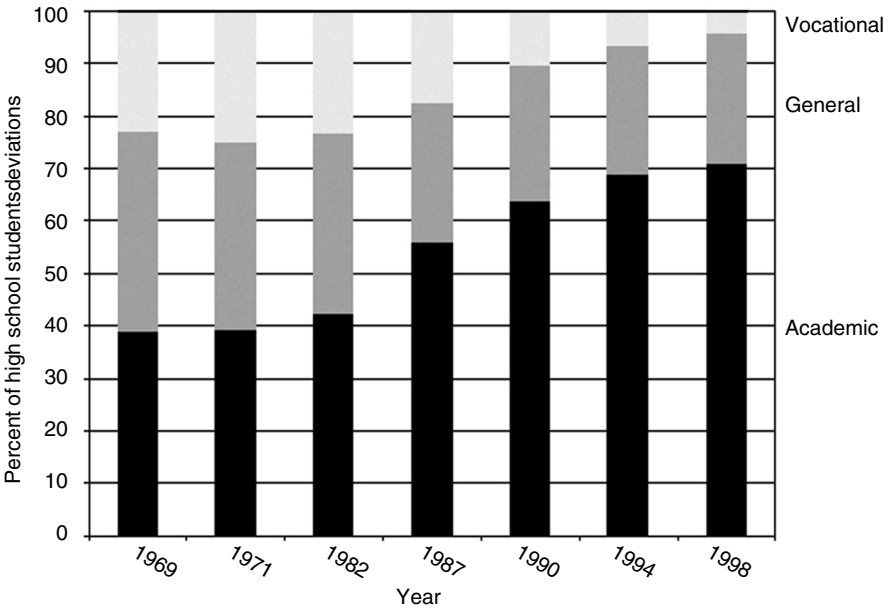

Fig. 1. American high school students taking academic, general, and vocational tracks

Notes: High school curriculum tracks are generally categorized into academic (college preparatory), vocational, and a series of other tracks. The academic and vocational tracks are consistently defined, and the general track absorbs all other tracks, including mixed tracks. The 1969 and 1971 numbers come from the High School Principals and Counselors portion of the *National Longitudinal Study of the High School Class of 1972* (United States Department of Education, 1994). The 1982 numbers come from the School Survey portion of the *High School and Beyond* study, Sophomore Cohort (United States Department of Education, 1995). The 1987, 1990, 1994, and 1998 numbers come from the relevant year's Transcript Study conducted as part of the relevant year's *National Assessment of Educational Progress* (United States Department of Education, 1990, 1993, 1998, 2001). In each case, the correct weights were used to generate nationally representative numbers.

English course–taking. For example, white students' math–taking has increased from 2.4 years to 3.4 years—an additional year of math. The gains were similar for Asians, and even larger for groups with the fewest math courses initially (Hispanics, Native Americans, African Americans). All racial/ethnic groups now take between 3.1 and 3.6 years of math in high school.

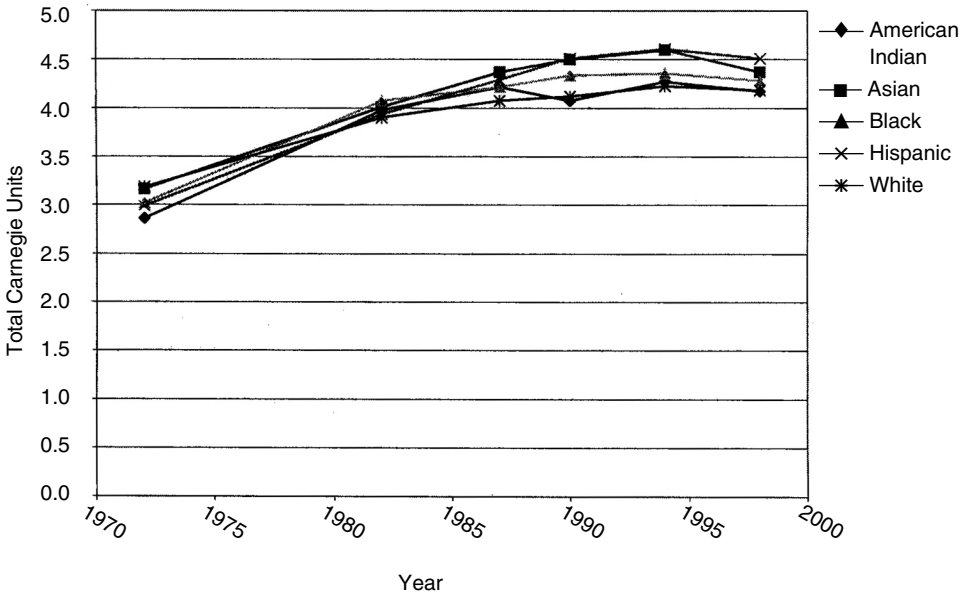

Fig. 2. English Units earned by U.S. high school graduates of various races/ethnicities

Notes: Courses are measured by Carnegie Units. A Carnegie Unit is one full school year of study in a course that meets at least 3 hours and 3 days per week during the school year. The 1972 numbers come from the Transcript portion of the *National Longitudinal Study of the High School Class of 1972* (United States Department of Education, 1994). The 1982 numbers come from the Transcript portion of the *High School and Beyond* study, Sophomore Cohort (United States Department of Education, 1995). The 1987, 1990, 1994, and 1998 numbers come from the relevant year's Transcript Study conducted as part of the relevant year's *National Assessment of Educational Progress* (United States Department of Education, 1990, 1993, 1998, 2001). In each case, the correct weights were used to generate nationally representative numbers.

Science course–taking rose by a little less than a year between 1982 and 1998. For example, in 1982, a typical white student took at 2.3 years of science in high school; by 1998, he was taking 3.2 years of science. Racial/ethnic groups that initially took fewer science courses did not catch up with other groups: All groups took about one more course.

A *Nation at Risk* recommended a specific high school curriculum,

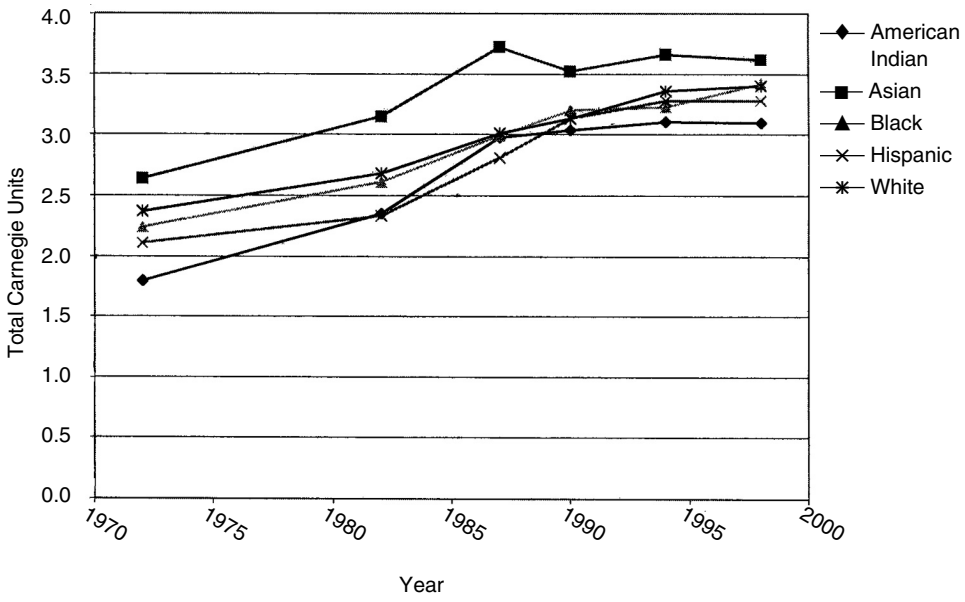

Fig. 3. Math Units earned by U.S. high school graduates of various races/ethnicities

Notes: Courses are measured by Carnegie Units. A Carnegie Unit is one full school year of study in a course that meets at least 3 hours and 3 days per week during the school year. The 1972 numbers come from the Transcript portion of the *National Longitudinal Study of the High School Class of 1972* (United States Department of Education, 1994). The 1982 numbers come from the Transcript portion of the *High School and Beyond* study, Sophomore Cohort (United States Department of Education, 1995). The 1987, 1990, 1994, and 1998 numbers come from the relevant year's Transcript Study conducted as part of the relevant year's *National Assessment of Educational Progress* (United States Department of Educational Progress, 1990, 1993, 1998, 2001). In each case, the correct weights were used to generate nationally representative numbers.

termed the New Basics: at least 4 years of English, 3 years of math, 3 years of science, 3 years of history (and/or social studies), and half a year of computer science. The report also recommended, though less strongly, 2 years of foreign language.

Figure 5 shows that only 2 percent of 1982 American high school graduates were meeting these standards when the recommendations

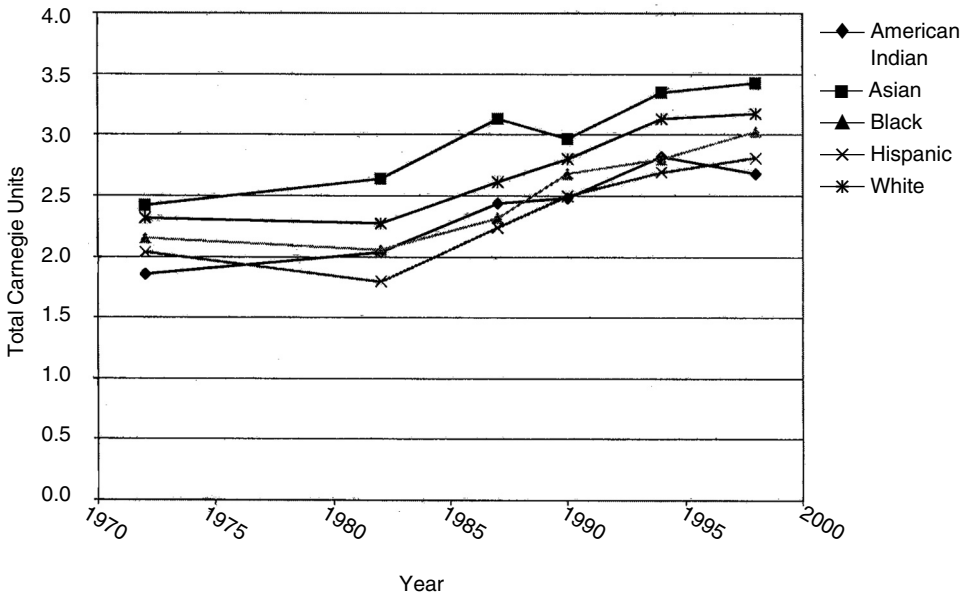

Fig. 4. Science Units earned by U.S. high school graduates of various races/ethnicities

Notes: Courses are measured by Carnegie Units. A Carnegie Unit is one full school year of study in a course that meets at least 3 hours and 3 days per week during the school year. The 1972 numbers come from the Transcript portion of the *National Longitudinal Study of the High School Class of 1972* (United States Department of Education, 1994). The 1982 numbers come from the Transcript portion of the *High School and Beyond* study, Sophomore Cohort (United States Department of Education, 1995). The 1987, 1990, 1994, and 1998 numbers come from the relevant year's Transcript Study conducted as part of the relevant year's *National Assessment of Educational Progress* (United States Department of Education, 1990, 1993, 1998, 2001). In each case, the correct weights were used to generate nationally representative numbers.

were made (the share rises to 10 percent if the computer science requirement is excluded). By 1998, many more students were taking the recommended set of courses, although American schools were far from achieving *universal* compliance with the recommendations: 29 percent of 1998 graduates met all of the requirements, 44 percent met

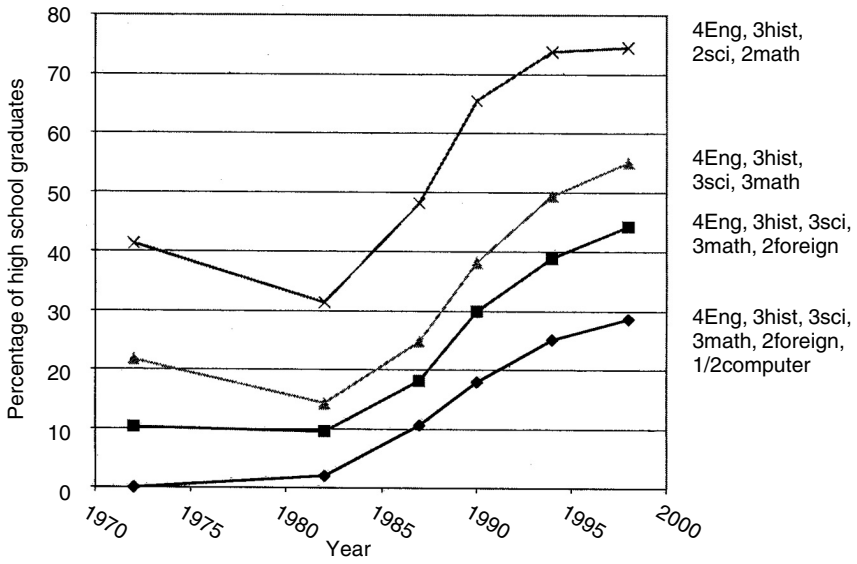

Fig. 5. Percentage of U.S. high school graduates whose course-taking meets various curricular standards

Notes: Courses are measured by Carnegie Units. A Carnegie Unit is one full school year of study in a course that meets at least 3 hours and 3 days per week during the school year. The 1972 numbers come from the Transcript portion of the *National Longitudinal Study of the High School Class of 1972* (United States Department of Education, 1994). The 1982 numbers come from the Transcript portion of the *High School and Beyond* study, Sophomore Cohort (United States Department of Education, 1995). The 1987, 1990, 1994, and 1998 numbers come from the relevant year's Transcript Study conducted as part of the relevant year's *National Assessment of Educational Progress* (United States Department of Education, 1990, 1993, 1998, 2001). In each case, the correct weights were used to generate nationally representative numbers.

all but the computer science requirement, and 55 percent met all but the computer science and foreign language requirements.

The authors of *A Nation at Risk* suggested that their course-taking recommendations be implemented through state-level standards for graduation. Most states considered adopting the recommendations, but only twenty-two had done so by 2001 (as shown in table 1). This is not primarily because states objected to the recommendations per

Table 1. States' graduation requirements

Meet ANAR *recommendations in English, math, science, and history*	*Currently have a minimum competency test for graduating*	*Future minimum competency test for graduating is planned*	*No minimum competency test for graduating*
22 of 45 "states"	15 of 51 "states"	16 of 51 "states"	20 of 51 "states"

Notes: The 51 "states" include the District of Columbia. In the first column, we consider graduation requirements in only 45 "states" because the other 6 rely exclusively on district-level requirements. The source for table 1 is the *Digest of Education Statistics: 2001* (United States Department of Education, 2002).

se, but because many states have a strong tradition of allowing local districts to set curriculum. In such "local control" states, the state government generally does not set curricular standards that are meant to be optimal; it sets only minimal curricular standards. This does not mean that districts in local control states have low curricular standards. In fact, students in local control states are *more* likely to satisfy the *Nation at Risk* recommendations. They do so in order to meet their local districts' graduation requirements.[1]

Progress on Raising Expectations

The authors of *A Nation at Risk* wanted students to master more advanced material. They argued that American schools sent students the wrong signals—signals that set expectations too low. For example, they argued, juniors and seniors were offered a wide range of elective courses, which encouraged them to think that variety was more important than mastering advanced material in core subjects. Also, they argued, American grades were excessively relative. Grades, rather than being indicators of mastery on an absolute scale, simply showed a student his relative standing in his own school. As a result, able students who obtained grades of A or B saw little room for greater achieve-

ment, even though many failed to master—or did not even attempt to master—material suitable for high school students.

Thus, *A Nation at Risk* recommended that students take *advanced* courses in core subjects rather than electives and repeated surveys of basic material (such as "general math for seniors"). The spirit of this recommendation was clearly mastery of material, but schools could comply with the *form* of the recommendation simply by specifying advanced material for courses taken by juniors and seniors. For example, a school could specify that senior math courses contain calculus and senior science courses contain physics without ensuring that students master the material.

American students have increasingly complied with at least the form of the recommendation: they are taking more courses said to cover advanced material. Figure 6 shows that the rate of calculus-taking almost tripled between 1982 and 1998 (from 6.6 percent to 17.7 percent) and the rate of trigonometry-taking doubled over the same period (from 14.2 percent to 32.0 percent).

Similarly, figure 7 shows that the rates at which students took physics and chemistry courses nearly doubled, and the taking of honors science courses also increased significantly.

The correlation between students' grades and their scores on standardized achievement tests has traditionally been low in the United States. Since both grades and standardized scores are meant to measure achievement, their correlation should differ from 100 percent only because grades measure performance on a wider variety of tasks than standardized tests do. When grades measure absolute (not relative) mastery of material, their correlation with standardized scores is 85 percent or higher.[2] Yet, in 1982, the correlation between grades and standardized test scores was only 49 percent. By 1998, the correlation had risen very slightly, to 56 percent. As long as the correlation between grades and achievement tests is in the 50 percent range, grading in American high schools remains largely relative and does not inform students about their absolute level of mastery. Recent survey

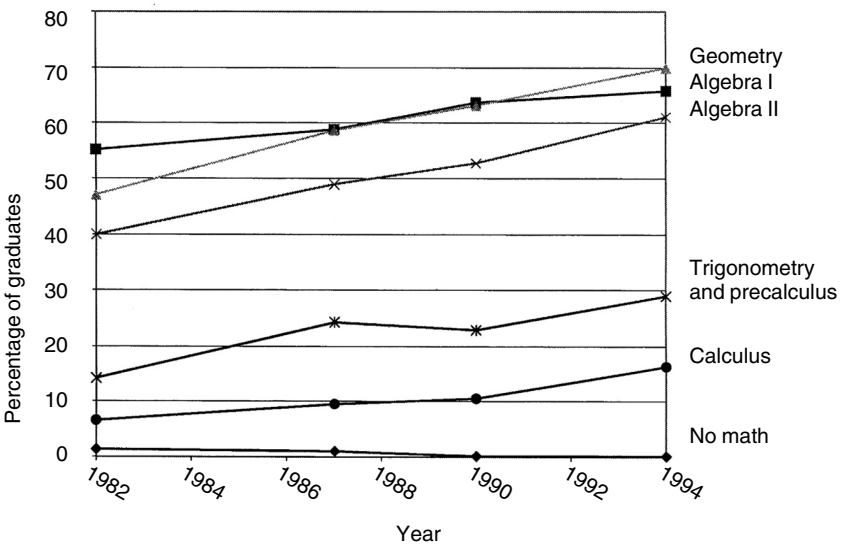

Fig. 6. Level of math taken by U.S. high school graduates

Notes: The sources for this figure are the same as the sources for figures 2, 3, 4, and 5. A student is recorded as having taken a mathematics or science course if a course with the relevant content appears on his transcript, regardless of the length of the course. The correct weights were used to generate nationally representative numbers.

data show that some A students from low-performing schools perform worse on standardized achievement tests than D and F students from high-performing schools.[3]

In order that students might know their absolute level of mastery, *A Nation at Risk* recommended that schools employ tests that indicated students' proficiency, rather than just their place in the national distribution. Today, such tests are known as "criterion-referenced" exams. In order that students form higher expectations, *A Nation at Risk* also recommended that tests be aligned to challenging curricula. Today's tests are frequently aligned to a state's curriculum, but these are not all equally challenging (see the chapter 10 essay by Herb Walberg, "Real Accountability"). Districts may also employ criterion-referenced tests aligned to a challenging curriculum designed by col-

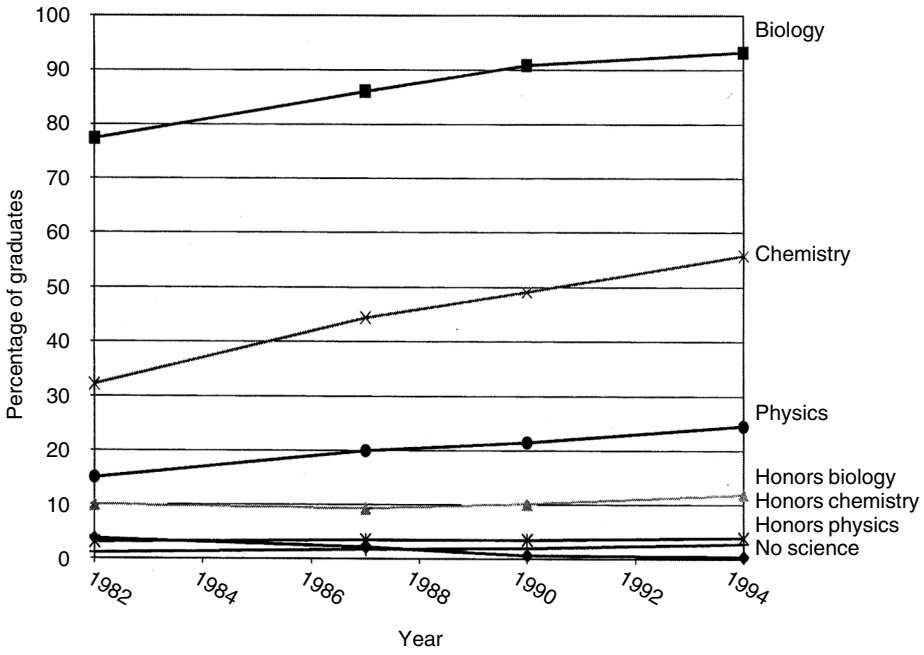

Fig. 7. Level of science taken by U.S. high school graduates

Notes: The sources for this figure are the same as the sources for figures 2, 3, 4, and 5. A student is recorded as having taken a mathematics or science course if a course with the relevant content appears on his transcript, regardless of the length of the course. The correct weights were used to generate nationally representative numbers.

leges (the College Board's Advanced Placement tests are an example) or written to an international standard (the International Baccalaureate exams). Very recently, schools have made a good deal of progress toward the recommendation that they employ criterion-referenced tests. This is primarily owing to state governments' initiatives in English and mathematics, as shown in table 2.

The authors of *A Nation at Risk* did not merely want students to know their level of mastery. They wanted student grouping, promotion, and graduation to be based on mastery. Schools have made very little progress in this direction. As shown in tables 1 and 3, only fifteen

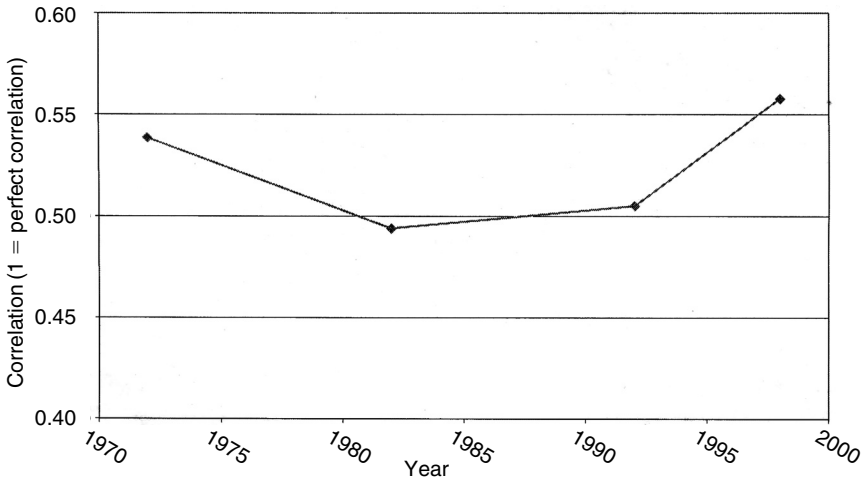

Fig. 8. Correlation between grade point average and standardized test scores, American high school students

Notes: The figure shows simple correlation coefficients between a student's grade point average and his average standardized score on a battery of achievement tests (in English, mathematics, science, and history). The grade point average variable is coded in categories: 8 for "mostly As," 7 for "As and Bs," 6 for "mostly Bs," 5 for "Bs and Cs," 4 for "mostly Cs," 3 for "Cs and Ds," 2 for "mostly Ds," and 1 for "mostly grades below D." The 1972 number uses the standardized tests administered by the National Center for Education Statistics to respondents of the *National Longitudinal Study of the High School Class of 1972* (United States Department of Education, 1994). The 1982 number uses the standardized tests administered by the National Center of Education Statistics to respondents of the *High School and Beyond* study, Sophomore Cohort (United States Department of Education, 1995). The 1992 number uses the standardized tests administered by the National Center of Education Statistics to respondents of the *National Education Longitudinal Study* (United States Department of Education, 1996). The 1998 number uses the 1998 *National Assessment of Educational Progress* tests (United States Department of Education, 2001). In each case, the correct weights were used to generate nationally representative numbers.

states require students to pass a minimum competency test in order to graduate from high school, and the minimum competency tests never come close to the challenging standards envisioned by *A Nation at Risk*. Sixteen more states plan to require tests for graduation, but it remains to be seen whether these politically unpopular requirements are enforced at more than a minimal level.

Table 2. Percentage of states with criterion-referenced tests aligned to a curriculum, 2001

	English/ lang. arts	*Mathematics*	*Science*	*History/social studies*
Elementary grades	92.2	82.4	37.3	29.4
Middle school grades	88.2	78.4	41.2	31.4
Secondary grades	88.2	82.4	47.1	39.2

Notes: Some schools use criterion-referenced tests that are not aligned to a state curriculum. These schools are not included in the table. The source for table 2 is the *Digest of Education Statistics: 2001* (United States Department of Education, 2002).

Progress on Time Use

Time was the subject of several key findings and recommendations in *A Nation at Risk*. The report argued that America's school day and school year were too short and should be lengthened to, respectively, seven hours and between 200 and 220 days. No progress has been made on either of these recommendations, perhaps because there is no way to comply with the form of the recommendations without complying with the spirit. The average school day in the United States was six hours in 1982 and remains six today. Between 1982 and today, the length of the average school year has actually fallen by a couple of days, from 180 days to 178 days, and even that understates the loss of instructional time because an increasing number of hours has been set aside for teacher training. Such days are included in the official school year, but students are sent home for at least part of the school day.[4]

On a more positive note, American students are spending more of their school day on academic coursework, as recommended by *A Nation at Risk*. This is not surprising, given the increase in academic course-taking that we have already recorded. The changes in time use are not great, however: The average high school student spends forty

Table 3. State requirements for high school graduation in Carnegie Units, 2001

State	*English*	*Math*	*Science*	*History*	*First graduating class to which requirements apply*	*Minimum competency test required to graduate*
Alabama	4	4	4	4	2000	Yes
Alaska	4	2	2	3	1978	Yes (class of 2004)
Arizona	4	2	2	2.5	1996	Yes (class of 2002)
Arkansas	4	3	3	3	2004	No
California	3	2	2	3	1989	Yes (class of 2004)
Colorado	Local	Local	Local	Local	N/A	No
Connecticut	4	3	2	3	2004	Yes
Delaware	4	3	3	3	2000	Yes
Dist. of Columbia	4	3	3	3.5	1995	No
Florida	4	3	3	3	2003	Yes (class of 2003)
Georgia	4	4	3	3	2001	Yes
Hawaii	4	3	3	4	1997	No
Idaho	4.5	2	2	2.5	2001	No
Illinois	3	2	1	2	1988	Yes
Indiana	4	2	2	2	2004	Yes
Iowa	Local	Local	Local	Local	N/A	No
Kansas	4	2	2	3	2001	No
Kentucky	4	3	3	3	2002	No
Louisiana	4	3	3	3	2003	Yes
Maine	4	2	2	2	1989	No
Maryland	4	3	3	3	1997	Yes (class of 2007)
Massachusetts	Local	Local	Local	Local	N/A	Yes (class of 2003)
Michigan	Local	Local	Local	Local	N/A	No
Minnesota	5	3	2	4		Yes
Mississippi	4	3	3	3	2002	Yes (class of 2002)
Missouri	3	2	2	2	1988	No
Montana	4	2	2	2	1993	No
Nebraska	Local	Local	Local	Local	1991	No
Nevada	4	3	2	2	2003	Yes
New Hampshire	4	2	2	2	1989	No

Table 3. (*continued*)

State	*English*	*Math*	*Science*	*History*	*First graduating class to which requirements apply*	*Minimum competency test required to graduate*
New Jersey	4	3	3	3	2005	Yes (class of 2004)
New Mexico	4	3	2	3	1990	Yes
New York	4	3	3	4	2005	Yes
North Carolina	4	4	3	3	2004	Yes (class of 2005)
North Dakota	4	2	2	3	N/A	No
Ohio	4	3	3	3	2004	Yes (class of 2005)
Oklahoma	4	3	3	3	2003	Yes
Oregon	3	2	2	3	2001	No
Pennsylvania	Local	Local	Local	Local	N/A	Yes (class of 2003)
Rhode Island	4	3	2	2	1990	No
South Carolina	4	4	3	3	2001	Yes
South Dakota	4	2	2	3	2004	No
Tennessee	4	3	3	3	1998	Yes
Texas	4	3	2	3	2001	Yes
Utah	3	2	2	3	1997	Yes (class of 2005)
Vermont	4	3	3	3	2002	No
Virginia	4	3	3	3	2002	Yes (class of 2004)
Washington	3	2	2	2.5	2008	Yes (class of 2008)
West Virginia	4	3	3	3	2003	No
Wisconsin	4	2	2	3	2004	Yes (class of 2004)
Wyoming	4	3	3	3	2003	Yes (class of 2003)

Notes: The state requirements in English, mathematics, science, and history are measured in Carnegie Units. The word "Local" in the requirements columns indicates that the curricular requirements for a high school diploma are set by the Local district. Some of the "Local control" states do require districts to submit to the state their curricular requirements for a diploma. "N/A" indicates that the question of state curricular requirements is not applicable because districts set their requirements Locally. The tests required for graduation vary in difficulty. The source for table 3 is the *Digest of Education Statistics: 2001* (United States Department of Education, 2002).

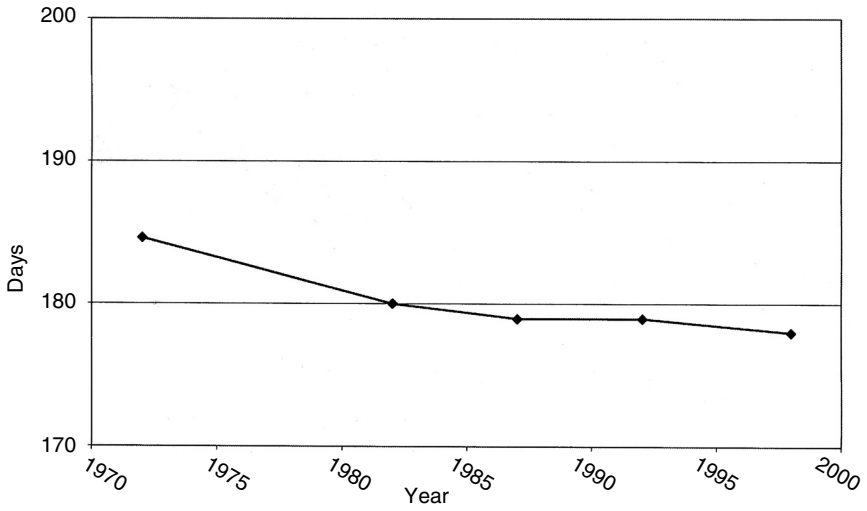

Fig. 9. Length of school year, in days

Notes: The 1972 number comes from the High School Principals and Counselors portion of the *National Longitudinal Study of the High School Class of 1972* (United States Department of Education, 1994). The 1982 number comes from the School Survey portion of the *High School and Beyond* study, Sophomore Cohort (United States Department of Education, 1995). The 1987, 1992, and 1998 numbers come from the relevant year's *Transcript Study* conducted as part of the relevant year's *National Assessment of Educational Progress* (United States Department of Education, 1990, 1993, 1998, 2001). In each case, the correct weights were used to generate nationally representative numbers.

more minutes per school day in academic classes, and nineteen of those extra minutes are devoted to math and science classes.

Homework is a crucial part of learning advanced material, and the authors of *A Nation at Risk* argued that American students were assigned too little homework and insufficiently challenging homework. It is difficult to assess how challenging homework is, but it is clear that no progress has been made toward the recommendation of more homework. In 1982, the average American tenth-grader was assigned just under one hour of homework per day (in all subjects combined). The amount is nearly the same today—indeed, a few minutes less.

Absenteeism was another time problem highlighted by *A Nation*

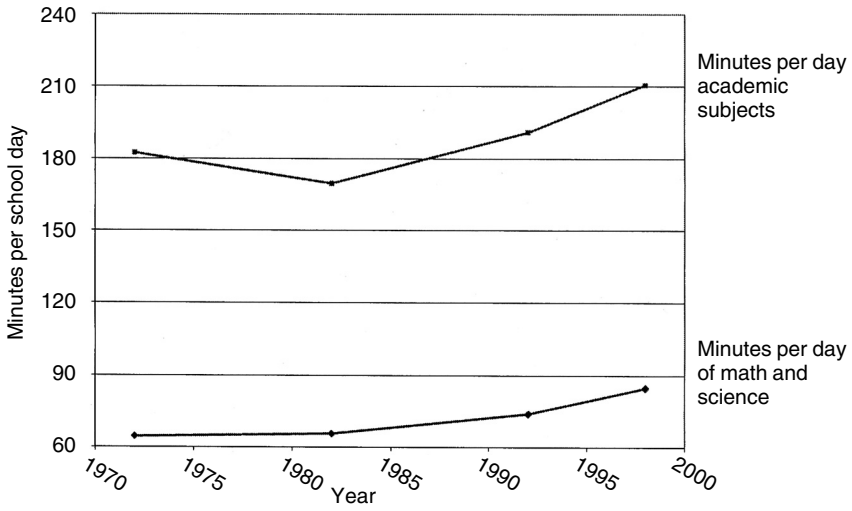

Fig. 10. Minutes per school day on math, science, and academic subjects, American public high school students

Notes: Minutes per day are calculated using the length of a class period and the number of days a class meets during a typical week. The 1972 numbers come from the Transcript portion of the *National Longitudinal Study of the High School Class of 1972* (United States Department of Education, 1994). The 1982 numbers come from the Transcript portion of the *High School and Beyond* study, Sophomore Cohort (United States Department of Education, 1995). The 1992 numbers come from the Transcript portion of the *National Education Longitudinal Study* (United States Department of Education, 1996). The 1998 numbers come from the *Transcript Study* conducted as part of the 1998 *National Assessment of Educational Progress* (United States Department of Education, 2001). In each case, the correct weights were used to generate nationally representative numbers.

at Risk. The authors argued that absent or tardy students forced teachers to waste much of the school day, delaying the presentation of material or requiring that material be repeated. In fact, American students were absent no more often in 1982 than they had been in 1972: On an average school day, 8 percent were absent. Today, a little progress has been made on this front: On an average school day, 7 percent are absent.

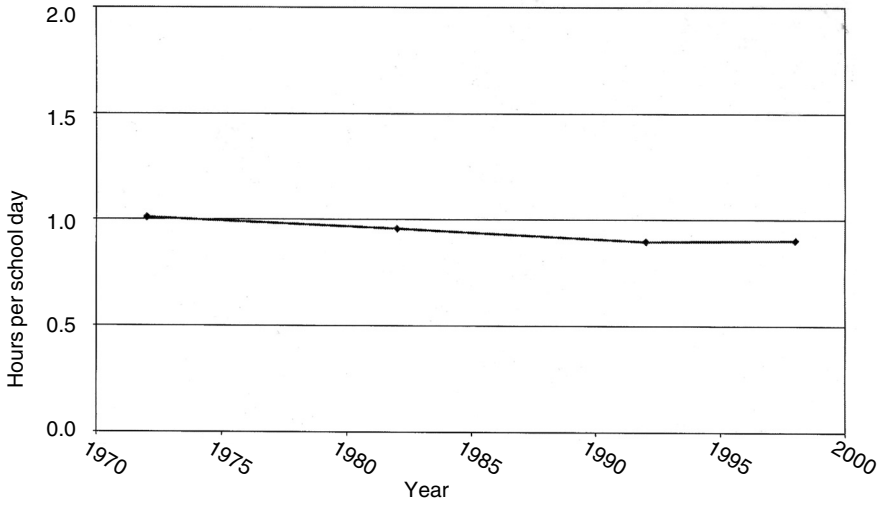

Fig. 11. Hours of homework per school day, average American high school student

Notes: Homework in all subjects is counted, including homework actually performed at school during a study period. The 1972 number comes from the student portion of the *National Longitudinal Study of the High School Class of 1972* (United States Department of Education, 1994). The 1982 number comes from the Transcript portion of the *High School and Beyond* study, Sophomore Cohort (United States Department of Education, 1995). The 1992 number comes from the Transcript portion of the *National Education Longitudinal Study* (United States Department of Education, 1996). The 1998 number comes from the *Transcript Study* conducted as part of the 1998 *National Assessment of Educational Progress* (United States Department of Education, 2001). In each case, the correct weights were used to generate nationally representative numbers.

Finally under the heading of time, *A Nation at Risk* argued that schools spent too little time teaching study skills and should arrange more hours of specialized instruction for students with special needs, including gifted students. It is difficult to assess how the teaching of study skills has changed, but specialized instruction has been on the decline, owing to schools' increasing tendency to mainstream disabled students and dismantle ability tracking.[5]

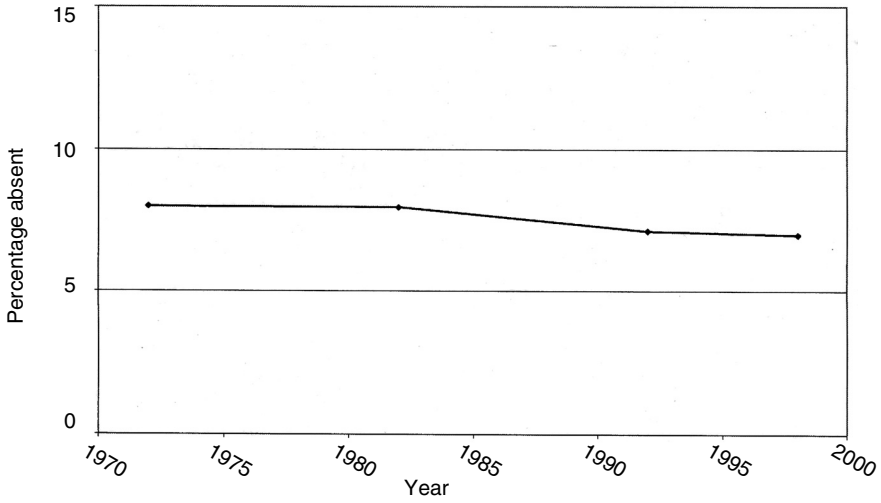

Fig. 12. Percentage of U.S. high school students absent on an average day

Notes: The percentage-absent numbers are reported by school administrators for high school students. The 1972 number comes from the High School Principals and Counselors portion of the *National Longitudinal Study of the High School Class of 1972* (United States Department of Education, 1994). The 1982 number comes from the School Survey portion of the *High School and Beyond* study, Sophomore Cohort (United States Department of Education, 1995). The 1992 number comes from School Survey portion of the *National Education Longitudinal Study* (United States Department of Education, 1996). The 1998 number comes from the survey conducted as part of the 1998 *National Assessment of Educational Progress* (United States Department of Education, 2001). In each case, the correct weights were used to generate nationally representative numbers.

Progress on Teaching

The authors of *A Nation at Risk* recognized the importance of teaching and argued that American schools had been watered down partly because teachers were not able or prepared enough to teach challenging material. Teachers, they argued, ought *not* to be drawn from the bottom third of American college graduates.

A superficial look would suggest that progress has been made toward this goal: Figure 13 shows that more teachers have master's

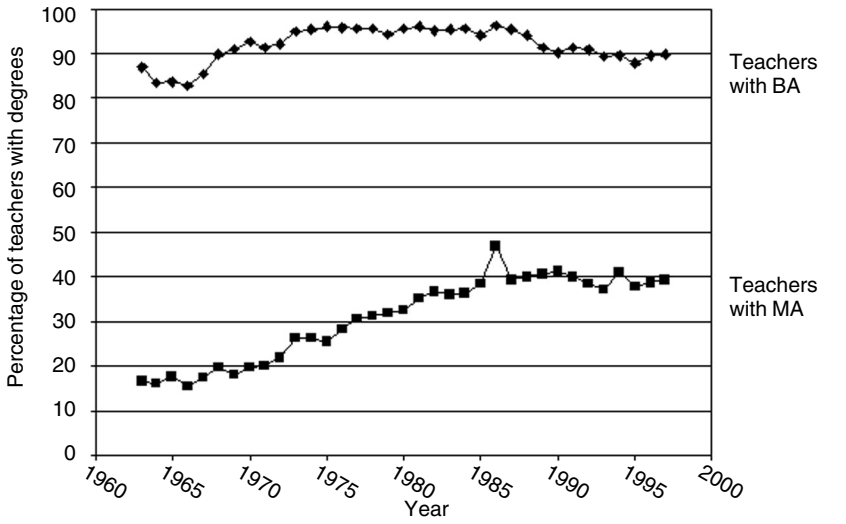

Fig. 13. College degrees of U.S. teachers

Notes: The numbers are based on public school teachers' self-reports of their educational attainment. Each year's number comes from the relevant year's *Current Population Survey of United States* (United States Bureau of Labor Statistics, 1964, 1966–2001), which is the 1-in-1,000 survey of the American population. It is the survey used to generate nearly all official labor market statistics for the United States. For each year, the March survey, which records the previous year's earnings, is used. For each year, the correct weights were used to generate nationally representative numbers.

degrees today (39 percent) than in 1982 (31 percent). However, the share of teachers with baccalaureate degrees has actually fallen slightly (from 94 to 90 percent); this reflects the granting of emergency certificates to teachers in areas with class-size reduction or rapidly growing student populations.

Moreover, today's new teachers are still drawn disproportionately from the bottom third of American college students. Figure 14 shows the distribution of college students by the decile of their score on high school achievement tests (English, math, science, and history combined). For example, students in decile 1 scored in the bottom 10 percent of college students, students in decile 10 scored in the top 10

percent of college-going students, and so on. Thus, the bottom third of college students is in deciles 1, 2, 3, and part of 4. The top third is in deciles 10, 9, 8, and part of 7.

Figure 14 shows that a college student's probability of majoring in education peaks in decile 2 and is generally high for students in deciles 1 through 4. Similarly, a college student's expected probability of becoming a teacher peaks in decile 3 and is generally high in deciles 1 through 4. The figure is based on recent longitudinal data (*National Education Longitudinal Study*, third follow-up, 2000), so it indicates that teachers are still being drawn disproportionately from the lowest third of college students.[6]

It is difficult to teach advanced material with little knowledge of the subject in question. Thus, it is not surprising that *A Nation at Risk* recommended that prospective teachers take more subject area courses and fewer courses in educational methods. Moreover, prospective teachers need to earn a degree in their subject area if we are to ensure that they master the material at a challenging level. For example, a mathematics major must master math at the level necessary for someone who wishes to use it. But there is no guarantee that one who majors in *mathematics education* attains such mastery.

No progress has been made toward the recommendation that American teachers take more subject area courses. The share of teachers with a baccalaureate degree in a subject area fell from 28 percent to 23 percent between 1982 and 1999. The share of teachers with a master's degree in a subject area fell even more sharply—from 17 percent to 5 percent between 1982 and 1999.

Because they foresaw today's demand for workers who can analyze information and handle technology, the authors of *A Nation at Risk* were particularly concerned about the paucity of math and science knowledge among American teachers. They recommended that prospective teachers take more college-level math and science courses. This is particularly important for the 10 percent of teachers whose

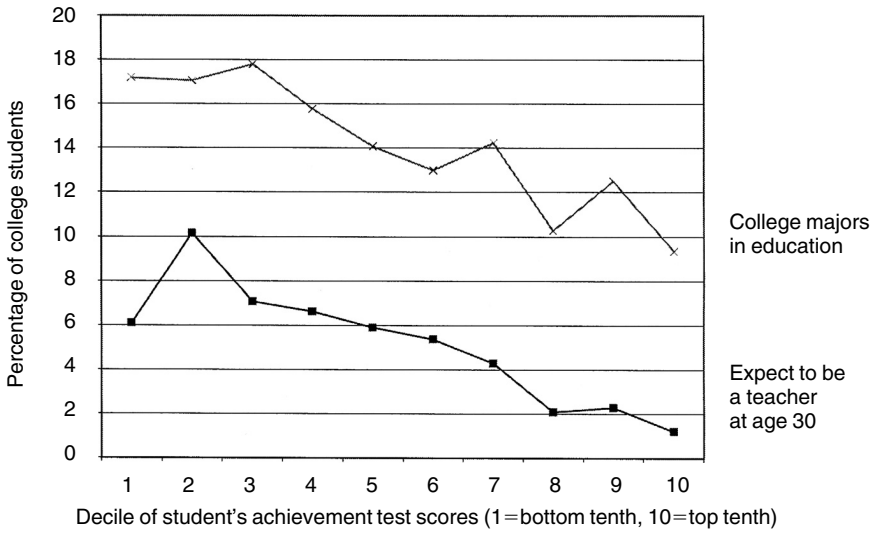

Fig. 14. From where in the distribution of college students are teachers drawn?

Notes: The numbers are based on all respondents of the *National Education Longitudinal Study* (United States Department of Education, 2002) who enrolled in college at some time before late spring 1994 (that is, within two years of their high school graduation). The college-going survey respondents reported their most recent (final) college major and their expected occupation at age 30. The respondents are categorized into achievement deciles based on the standardized achievement tests (English, mathematics, science, history) administered to them in the tenth and twelfth grades by the National Center for Education Statistics.

primary teaching assignment is secondary school mathematics or science.

We can see that U.S. teachers have moved away from, not toward, fulfilling this recommendation. The percentage of teachers who have a degree (either a baccalaureate or a master's) in math or science fell from about 7 percent to 5 percent between 1982 and 1999. In 1982, the average teacher had taken almost six semesters of math and science in college; by 1999, the average teacher had taken only four semesters.

In order to attract able people to the teaching profession, *A Nation at Risk* recommended that teachers be paid on the basis of their

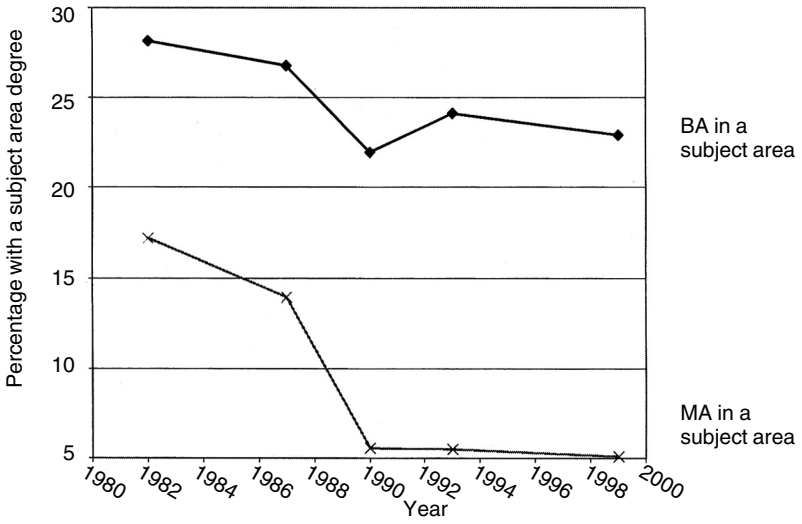

Fig. 15. Teachers with college degrees in a subject area (as opposed to educational methods)

Notes: Subject area degrees are all degrees that are not in educational methods. Although the vast majority of education degrees are in elementary education, degrees in secondary education, English education, and so on are also counted as education degrees. The 1982 numbers come from the Teacher Surveys conducted as part of the *High School and Beyond* study (United States Department of Education, 1995). The 1987, 1990, 1993, and 1999 numbers come from the teacher portions of the relevant year's *Schools and Staffing Survey* (United States Department of Education, 1998, 1998, 1998, 2001). For each year, the correct weights were used to generate nationally representative numbers.

performance and that teachers be paid more. The recommendation for performance pay has been much discussed but almost never practiced. In 1982, less than 1 percent of all teacher pay was associated with performance, as opposed to seniority and degree-based salary scales. Today, the percentage of teacher pay associated with performance is still less than 1 percent.

By contrast, the level of teacher pay has, however, risen since 1982, a year that was close to the nadir for teacher pay in recent U.S. history. In 1982, the average full-time teacher earned $33,884; in 2000, it was $37,865. These numbers (and all of figure 17) are in inflation-adjusted

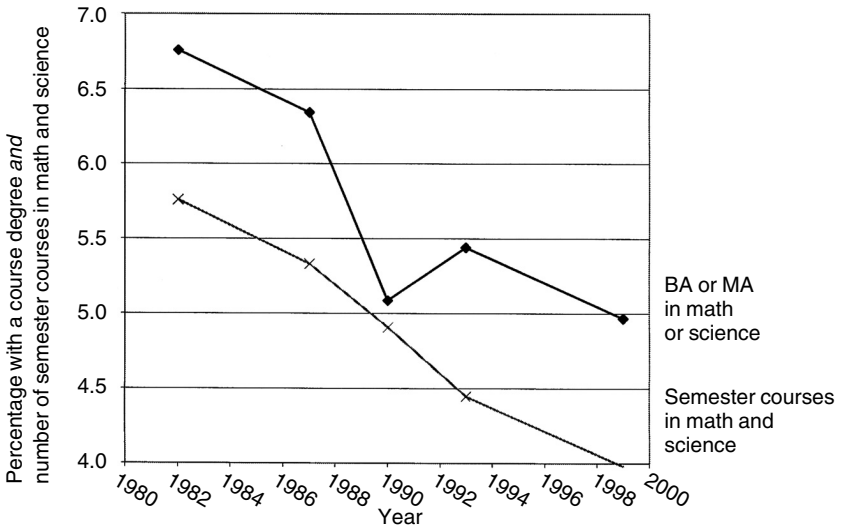

Fig. 16. Math and science qualifications of U.S. public school teachers

Notes: Math and science qualifications are based on the responses of middle and high school teachers only. Quarter courses in math and science are converted into semester courses on a three-to-two basis. The data sources are the same as the sources for figure 15.

dollars (2001 dollars). Thus, *real* teacher pay has risen 12 percent since 1982.

How does this compare with the earnings of other workers? Figure 18 shows that the average teacher salary kept pace with the average worker's earnings in wages and salaries from 1982 to 1994. After that, the average teacher salary lagged behind, not because teacher salaries rose at a rate that was low compared to history, but because the increase in *other college graduates*' earnings was unusually rapid between 1994 and 2000. Indeed, a large number of studies have demonstrated that the earnings of particularly able and well-educated workers have risen most quickly over the past two decades, presumably because such workers are best equipped to meet employers' demands for people who can analyze information and handle new technology.

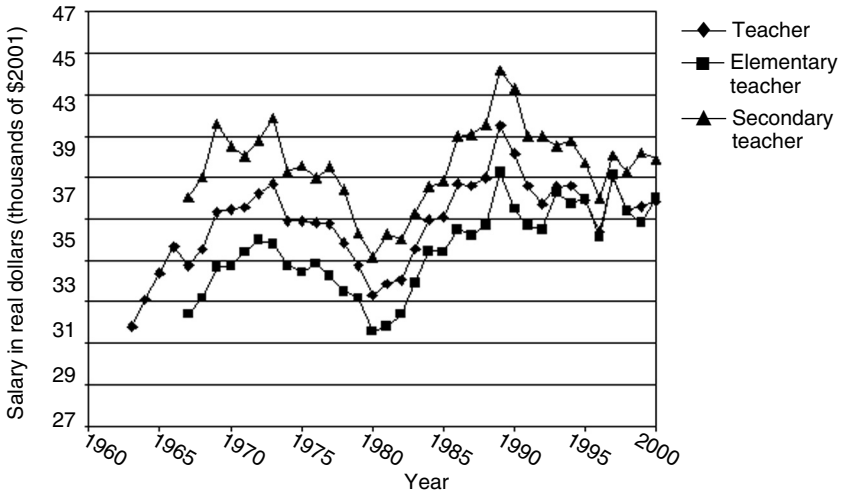

Fig. 17. Average teacher salary in the United States (in inflation-adjusted 2001 dollars)

Notes: The numbers are based on public school teachers' self-reports of all earnings from wages and salaries on their teaching jobs in the previous year. Part-time teachers, such as substitute teachers, are not included. Each year's number comes from the relevant year's *Current Population Survey of United States* (United States Bureau of Labor Statistics, 1964, 1966–2001), which is the 1-in-1,000 survey of the American population used to generate nearly all official labor market statistics for the United States. For each year, the March survey, which records the previous year's earnings, is used. For each year, the correct weights were used to generate nationally representative numbers. Dollars of the day are converted into inflation-adjusted 2001 dollars using the Consumer Price Index. The *Current Population Survey* records a teacher's occupation at a detailed level and also records whether a teacher works in the public or private sector. It is therefore an excellent source of national earnings data for teachers, especially because its sampling is accurate, highly scrutinized, and comparable with all other earnings data commonly used for U.S. labor statistics. We have decided not to rely on the often-publicized earnings reports from the National Education Association's *Status of the American Public School Teacher*. Details of the sampling and imputation methods used for the National Education Association survey are not published, and its statistics appear to substantially overstate actual teacher earnings. This may be because the National Education Association oversamples its own members, who are disproportionately likely to be urban, unionized teachers (whose earnings tend to be higher than those of nonurban, nonunionized teachers).

The slower rise in teacher salaries is related to the fact that they are drawn disproportionately from the bottom third of college graduates. Because they are the less able college graduates, they can get fewer alternative job offers that would put upward pressure on their teaching salaries; because teaching salaries are not based on performance and are lower than the average college graduate's, able college graduates tend not to join the teaching profession.

The authors of *A Nation at Risk* argued that too few math and science teachers were qualified to teach their subjects and that math and science salaries ought to be high enough to attract teachers into these fields, where vacancies are a chronic problem. We have seen that, compared with teachers in 1982, today's teachers are less likely to have a degree in math or science and have taken fewer courses in math and science. This may be because the salary premium for math and science teachers remains small. It was 3.4 percent in 1982 and 3.9 percent in 1999. In the private sector, the earnings premium associated with math and science skills is significantly larger.

Nevertheless, the percentage of math and science teachers who claim to be certified in their subject area declined only slightly, from 89.4 percent in 1982 to 86.3 percent in 1999. These certification rates are similar to those for other teachers. Taken in conjunction with the numbers on college training in math and science, the certification rates suggest that a teacher can be certified to teach secondary math or science with relatively little mastery of college-level material in her subject.

Along with its recommendation that students have a longer school year, *A Nation at Risk* recommended that teachers be employed for 11 months of the year, rather than 9. Both recommendations have been unpopular with the teachers' unions, and teacher salaries are still based on 9 months of work.[7]

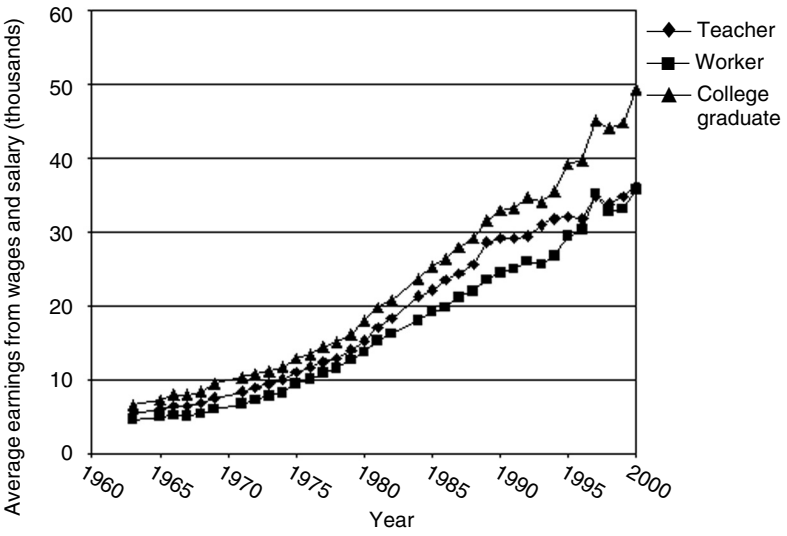

Fig. 18. Average teacher salary in the United States (in dollars of the day)

Notes: The sources for this figure are same as those for figure 17. For the average worker numbers, the wage and salary earnings of all full-time wage and salary workers are included. For the average college graduate numbers, the wage and salary earnings of all full-time wage and salary workers with at least 16 years of education (a baccalaureate degree) are included. The numbers shown in the figure are in dollars of the day.

Recommendations That *A Nation at Risk* Did *Not* Make

Although *A Nation at Risk* exhorted Americans to rise to the challenge of improving their public schools, its authors did not recommend higher spending. On the whole, *A Nation at Risk* was an argument for *refocusing* American schools on academics and *reallocating* resources toward teachers and away from other staff and activities. With the exception of the longer school year and school day (which would have required more resources), its authors did not argue for *more of the same resources*, but argued that American schools must concentrate their existing resources on an academic mission.

Table 4. Incentives and certification for teachers in math and science (main areas of shortage)

	1982	*1987*	*1990*	*1993*	*1999*
Percent by which math and science teachers' salaries exceed other teachers'	3.40	3.53	5.92	4.27	3.88
Percent of math and science teachers certified in their teaching area	89.4	88.8	90.5	87.9	86.3
Percent of all other teachers certified in their main teaching area	89.5	89.3	91.4	90.3	89.5

Notes: The first row records the percentage by which the average American math or science teacher's salary exceeds that of the average teacher who is not a math or science teacher. Nearly all math and science teachers are secondary school teachers, and secondary school teachers typically earn slightly more than elementary school teachers. Thus, some of the salary "premium" for math and science teachers is shared by other secondary school teachers. Teacher certification is based on teachers' self-reports of whether they have normal state certification (not emergency or provisional certification) in the main area in which they teach. The 1982 numbers come from the Teacher Surveys conducted as part of the *High School and Beyond* study (United States Department of Education, 1995). The 1987, 1990, 1993, and 1999 numbers come from the teacher portions of the relevant year's Schools and Staffing Survey (United States Department of Education, 1998, 1998, 1998, 2002). For each year, the correct weights were used to generate nationally representative numbers.

Nevertheless, because *A Nation at Risk* created an atmosphere of urgency and did not explicitly recommend against spending increases, it was used by advocates of higher spending to trigger the decade of fastest per-pupil spending growth in recent American history. Between 1982 and 1992, *real* (inflation-adjusted) per-pupil spending grew from $5,930 to $8,008. This is an increase of 35 percent in 10 years, in excess of inflation. Although spending did not rise as quickly in the next 8 years, it reached $9,230 in 2000. In short, from *A Nation at Risk* until today, per-pupil spending has risen by 60 percent.

The increase in spending has occurred disproportionately in schools that were initially low-spending, so that the distribution of U.S. per-pupil spending has narrowed. In 1982, spending at the 10th percentile was only 0.67 of median per-pupil spending. By 1999, spend-

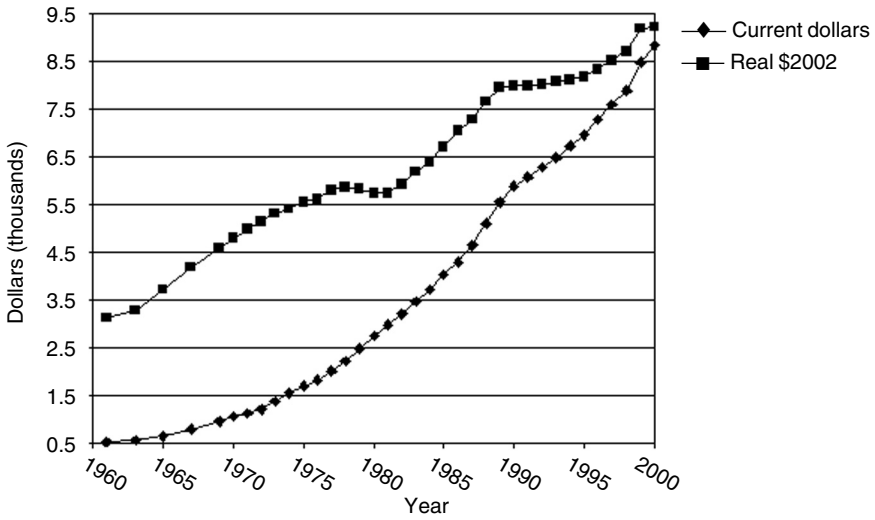

Fig. 19. Per-pupil expenditure in the United States, current dollars and real 2002 dollars

Notes: Per-pupil spending is calculated by dividing the total expenditure of public elementary and secondary schools by average daily attendance. (Dividing by enrollment is an inferior method because enrollment numbers systematically overstate the actual school population of the United States, owing to double-counting of students who are switching schools.) The sources of the data are several publications of the National Center for Education Statistics: *Statistics of State School Systems*, *Statistics of Public Elementary and Secondary School Systems*, and the *Common Core of Data* (all United States Department of Education, 2002). Dollars of the day are converted into inflation-adjusted 2002 dollars using the Consumer Price Index.

ing at the 10th percentile had risen to 0.80 of median per-pupil spending. The spending distribution also narrowed because schools that were initially high-spending raised their spending more slowly than other schools. In 1982, spending at the 90th percentile was 1.6 times the median per-pupil spending. By 1999, it had fallen to 1.47 times the median per-pupil spending.

In short, the major increase in per-pupil spending between *A Nation at Risk* and today occurred disproportionately at the schools most likely to need extra resources to meet the report's recommendations.

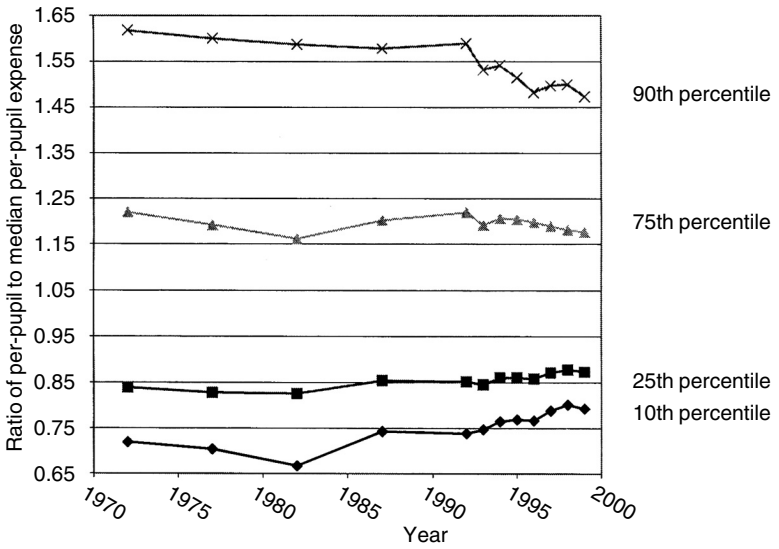

Fig. 20. Variation in per-pupil expenditure in the United States

Notes: Per-pupil spending is calculated in the same manner as for figure 19. However, the numbers were computed using administrative, district-level data. For each year, the national percentiles of per-pupil spending are computed in a manner that treats all pupils equally. In other words, the percentile computations account for the enrollment differences among public school districts. The sources of data are several publications of the United States Bureau of the Census: the 1972, 1977, 1982, and 1987 *Censuses of Governments* (United States Bureau of the Census, 1975, 1980, 1985, and 1992) and the 1992 through 1999 *School Finance* censuses (United States Department of Education, 2001).

Where did all of the additional spending go? We have already seen that real teacher salaries rose by 12 percent between 1982 and today, so they account for only part (about a fifth) of the 60 percent increase in real per-pupil spending. The policy that accounts for the single largest share of the spending increase is a substantial decrease in the pupil-teacher ratio, which fell from 18.6 in 1982 to 15.0 in 1999. Reducing the pupil-teacher ratio is expensive: A 10 percent reduction in the pupil-teacher ratio raises per-pupil costs by about 10 percent. Yet a 10 percent reduction in the pupil-teacher ratio represents only 2 fewer students per teacher, which does not sound like a major

change. The reduction in the pupil-teacher ratio from 1982 to 1999 accounts for about a third of the 60 percent increase in real per-pupil spending.

Given the decrease in the student-teacher ratio, it is not surprising that the size of regular U.S. classrooms also fell from 1982 to 1999. The size of the average self-contained class fell from 23 to 21; the size of the average departmentalized class fell from 23 to 19. Middle schools and high schools tend to use departmentalized classes (For example, English class); elementary schools tend to use self-contained classes where children learn most subjects from the same teacher.

Parents often puzzle over the fact that the pupil-teacher ratio and class size are not identical. If every teacher were to teach the entirety of every school day, the pupil-teacher ratio and class size *would* be identical. But most teachers do not teach the entire school day. This is particularly true of teachers who teach departmentalized classes. However, even elementary school teachers who have self-contained classrooms typically turn over their students to other teachers (gym teachers, music teachers, art teachers) for some part of each week. They also turn over particular students to specialized teachers. For example, many disabled students receive pull-out instruction, one on one or in a very small group.

When parents think about class size, they rarely account for the fact that some reductions in the teacher-student ratio are absorbed by reductions in teachers' hours of teaching or by the tiny classes used for pull-out instruction. It is difficult to measure teaching hours of teachers who have self-contained classrooms, but the teaching hours of departmentalized teachers can be measured exactly because their classes meet in periods, on well-defined schedules. In 1982, the average departmentalized teacher taught 4.5 hours per school day; by 1999, she taught only 3.8 hours per school day. For this reason, the pupil-teacher ratio fell faster than the size of regular classrooms.

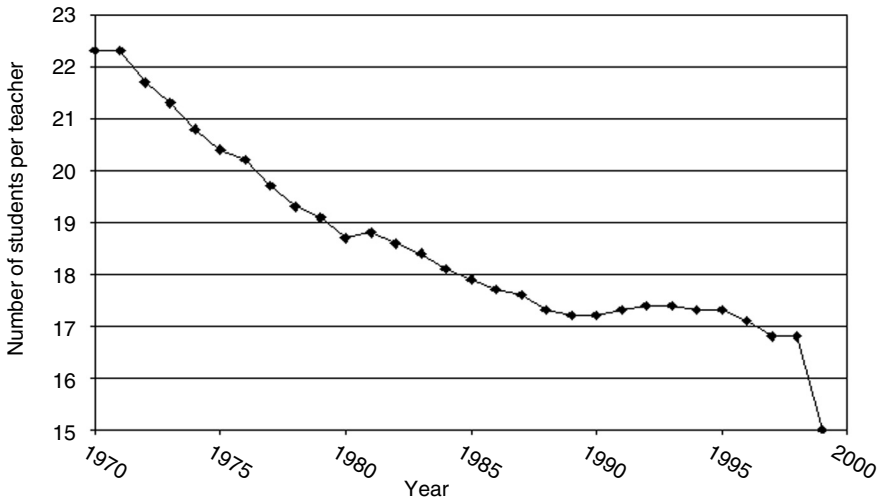

Fig. 21. The student-teacher ratio in U.S. public schools

Notes: The student-teacher ratio is calculated by dividing average daily attendance in the United States by the number of full-time-equivalent teachers in the United States. (Using enrollment is an inferior method because enrollment numbers systematically overstate the actual school population of the United States, owing to double-counting of students who are switching schools.) The sources of the data are same as those for figure 19. The 1999 number is based on preliminary estimates.

Why Such Uneven Progress?

A Nation at Risk was something of a shock to Americans, awakening them to the mediocrity of their schools. Nonetheless, the nation sensed the essential truth of the report's central claims and were energized by it to change public schools. The report enjoyed very widespread support among parents and employers. Why, then, do we see the uneven progress described above? Indeed, as we suspected and as Paul Peterson demonstrates in chapter 2, even the uneven progress was largely superficial: Achievement could have risen unevenly; in fact, it has not risen at all.

The reason that progress has been so uneven and superficial is that

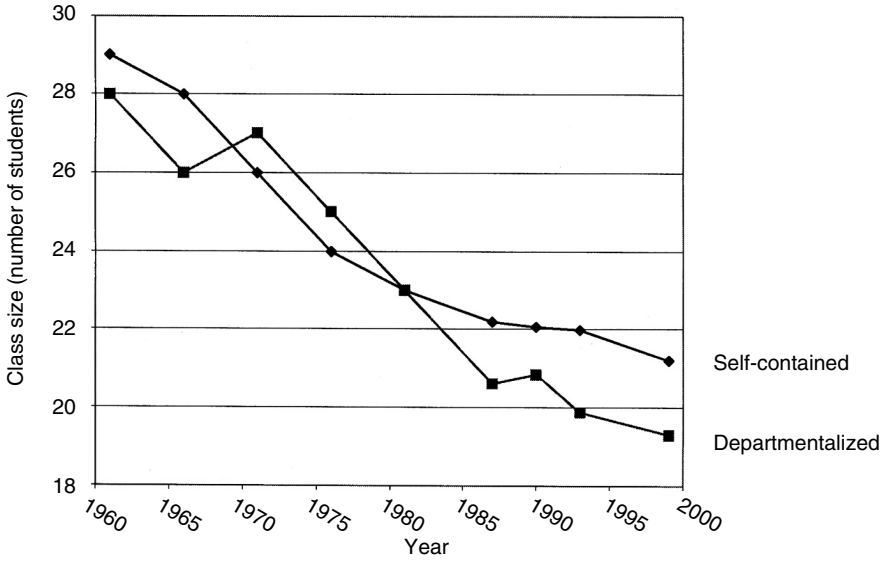

Fig. 22. Class size in regular U.S. public elementary and secondary classrooms

Notes: Class size numbers are based on teachers' reports. The 1961 through 1981 numbers are based on the National Education Association's *Status of the American Public School Teacher*. It appears that this source is not representative of the United States, but it is the only large-scale source of teacher self-reported class size before 1987. See the notes to figure 17 for comments on the problems associated with this source. The 1987, 1990, 1993, and 1999 numbers are based on the relevant year's *Schools and Staffing Survey* (United States Department of Education, 1990, 1993, 1998, 2002), which is representative of the United States when the correct weights are applied, as they are here.

the authors of *A Nation at Risk* were good at recognizing the symptoms of mediocrity in American schools, but bad at identifying the underlying reasons for the mediocrity. They assumed, naively, that schools had *accidentally* fallen into mediocrity, which could be eliminated by a commission that showed schools where the pitfalls lay. In fact, as upcoming chapters in this volume show, the same interest-group politics that made American schools mediocre in the first place would control the implementation of the report's recommendations.

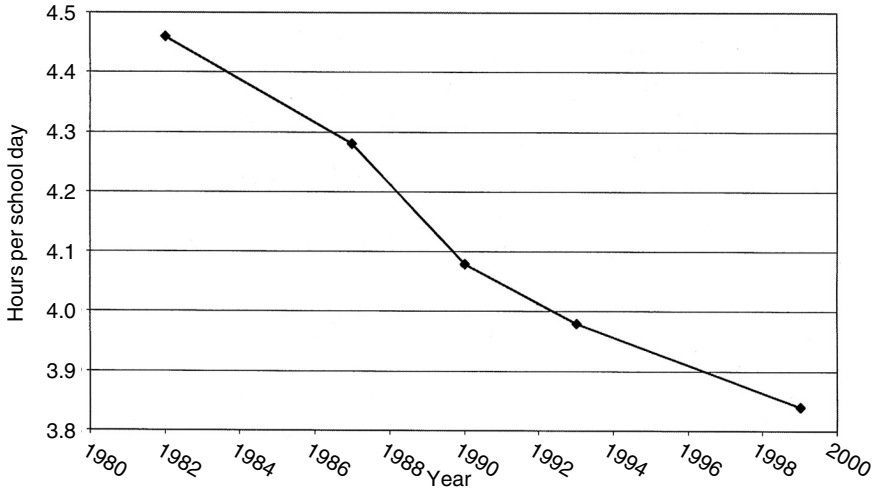

Fig. 23. Hours of teaching per school day, teachers in departmentalized settings

Notes: Teaching hours per day for departmentalized teachers are based on the following information: Each teacher reports all of the classes that she teaches and the number of periods that each class meets each week. The length of the teacher's class periods is reported by her principal. The 1982 numbers come from the Teacher Surveys conducted as part of the *High School and Beyond* study (United States Department of Education, 1995). The 1987, 1990, 1993, and 1999 numbers come from the teacher portions of the relevant year's *Schools and Staffing Survey* (United States Department of Education, 1990, 1993, 1998, 2002). For each year, the correct weights were used to generate nationally representative numbers.

Notes

1. The claim regarding students in local control states being more likely to satisfy the curricular recommendations of *A Nation At Risk* is based on two recent sources: the Transcript survey that was part of the National Education Longitudinal Study (United States Department of Education, 1996) and the Transcript Study that was part of the 1998 National Assessment of Education Progress (United States Department of Education, 2001).
2. The claim regarding the correlation between standardized test scores and grades that measure absolute performance can be substantiated using any of several longitudinal surveys, converting grades to an absolute scale

by controlling for schools' systematic differences in the level of grades (eliminating a school-fixed effect). The most suitable longitudinal surveys are the *National Longitudinal Study of the High School Class of 1972* (United States Department of Education, 1994), the study *High School and Beyond* (United States Department of Education, 1995), and the *National Education Longitudinal Study* (United States Department of Education, 1996).

3. The claim regarding A and D and F students is based on the *National Education Longitudinal Study* (United States Department of Education, 1996). The participants' grades are recorded, as are their scores on four subject tests (English, mathematics, science, history) administered by the National Center for Education Statistics.
4. The key sources for information on teacher training days are the 1987–88, 1990–91, 1993–94, and 1999–2000 versions of *The Schools and Staffing Survey* (United States Department of Education, 1998, 1998, 1998, and 2002).
5. Information on placement of special education students (more precisely, students with individual education programs) and ability tracking may be garnered from the following federal sources: the *National Longitudinal Study of the High School Class of 1972* (United States Department of Education, 1994), the *High School and Beyond* study (United States Department of Education, 1995), and the *National Education Longitudinal Study* (United States Department of Education, 1996). In addition, the administrative data of individual states often include detailed placement statistics. Maintaining consistent definitions of special education and ability tracking is challenging when comparing data from different periods of time.
6. The figure is based on the *National Education Longitudinal Study* (United States Department of Education, 2002). See also the notes associated with the figure.
7. Contract length is described by 1987–88, 1990–91, 1993–94, and 1999–2000 versions of *The Schools and Staffing Survey* (United States Department of Education, 1998, 1998, 1998, and 2002).

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