DOCUMENT RESUME

ED 346 619 EA 024 075

AUTHOR	Medrich, Elliott A.; And Others
TITLE	Overview and Inventory of State Requirements for School Coursework and Attendance. Research and Development Report.
INSTITUTION	MPR Associates, Berkeley, CA.
SPONS AGENCY	National Center for Education Statistics (ED), Washington, DC.
REPORT NO	ISBN-0-16-037957-1; NCES-92-663
PUB DATE	Jun 92
NOTE	118p.
AVAILABLE FROM	U.S. Government Printing Office, Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402-9328.
PUB TYPE	Reports - Research/Technical (143)
EDRS PRICE	MF01/PC05 Plus Postage.
DESCRIPTORS	*Academic Achievement; Class Size; Course Selection (Students); Databases; Educational Assessment; *Educational Change; Educational Trends; Elementary Secondary Education; Extracurricular Activities; Government Publications; Graduation Requirements; High School Students; Mathematics Achievement; Minimum Competency Testing; *Outcomes of Education; Public Schools; Reading Achievement; Research Needs; *School Attendance Legislation; School Schedules; *School Statistics; State Action; State School District Relationship; *State Standards

ABSTRACT

The substance and impact of state-level reforms related to student standards are presented by: (1) providing information on the currrent state of educational reforms aimed at raising student standards; (2) summarizing research designed to identify linkages between higher standards and student outcomes; (3) exploring the strength of relationships between higher standards and student outcomes; (4) examining trends among indicators associated with higher student standards; and (5) discussing data and methods available to those concerned with the relationship of higher educational standards to student outcomes. The first of four chapters briefly describes the range of state initiatives designed to achieve higher student standards and the problems associated with assessing their impacts, as well as the data available for examining student outcomes. Chapter 2 discusses the great variety of reform activities that have occurred at the state level between 1983 and 1990 and places them in a historical context. Chapter 3 looks at research on trends in student outcomes and linkages to school reform such as student course-taking patterns, the proportion of school time devoted to academic subjects, student achievement, and high school completion rates. The last chapter discusses issues associated with studying the impact of state reforms and suggests some analytical strategies that might be used to describe linkages between reforms and student outcomes. Three appendixes provide the following information: (1) minimum high school graduation requirements for standard diplomas: 1980 and 1990; (2) an overview of researching reform and student outcomes using selected databases; and (3) standard error tables. (53 references) (MLF)

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Research and Development Report June 1992

Overview and Inventory of State Requirements for School Coursework and Attendance

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Research and Development Report June 1992

Overview and Inventory of State Requirements for School Coursework and Attendance

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National Center for Education Statistics

"The purpose of the Center shall be to collect, and analyze, and disseminate statistics and other data related to education in the United States and in other nations."—Section 406(b) of the General Education Provisions Act, as amended (20 U.S.C. 1221e–1).

June 1992

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For sale by the U.S. Government Printing Office
Superintendent of Documents, Mail Stop: SSOP, Washington, DC 20402-9328
ISBN 0-16-037957-1

Foreword

The National Center for Education Statistics (NCES) collects and publishes information on the condition of education in the United States. The Hawkins-Stafford Elementary and Secondary School Improvement Amendments of 1988 (Public Law 100-297) mandated that NCES conduct a study on

> **the effects of higher standards prompted by school reform efforts on student enrollment and persistence. The study shall examine academic achievement and graduation rates of low-income, handicapped, limited English proficient, and educationally disadvantaged students.**

In responding to this mandate, NCES focused on describing and presenting statistical information about reform efforts, rather than on undertaking a separate evaluation of the effects of reforms on schools or students. In deciding which reforms to examine, NCES chose those that have been most widely adopted across the states. The inventory of state reforms and student outcomes is current as of spring 1990.

Three factors powerfully constrained the direction of this report. First, during the course of the study it became clear that most states, as well as other data collectors, had not made plans to assess the impacts of reforms that were proposed and adopted. Consequently, sparse data were available for analysis. Until recently, there has been little effort to conduct statistically controlled evaluations of state changes in student standards.

Second, ascribing causal relationships between reforms and student outcomes is a difficult, if not treacherous, practice without carefully controlled studies. State reforms of student standards take place in a variety of contexts, at different points in time, and under different conditions from state to state. Thus, a reader should be mindful throughout this report that linking programmatic inputs to student outcomes after the fact is highly speculative.

Finally, there is a problem of definition. Over the past 12 years, a number of state initiatives have aimed to raise standards in the conduct of education. The term "higher standards," as a result, has become a catch-all for a variety of reforms that affect students, teachers, and school policies, and other school-related issues. Therefore, no single reform (or set of reforms) exists that can be used to identify a state's engagement with existing student standards, and no single moment marks the beginning of the reform movement.

These factors, in combination, represent the major theme of this report, which is presented as a question rather than a conclusion. Can policymakers and evaluators ascribe student outcomes to state legislation or practices that do not gather data on pre-existing conditions, study the program's implementation, or assess the results? Resolving this issue represents a critical challenge to those committed to improving school programs through state-level initiatives.

Emerson J. Elliott
Acting Commissioner of
Education Statistics

Acknowledgments

The initial draft of this document was prepared by Cynthia Brown and Robin Henke of MPR Associates, Berkeley, California, and Lisa Ross, formerly of the National Center for Education Statistics. The final report was written by Elliott A. Medrich, Senior Research Associate, of MPR Associates.

The project was coordinated and directed by Edith McArthur and John Ralph of the Data Development Division, National Center for Education Statistics, which is under the direction of Associate Commissioner Dr. Jeanne E. Griffith. Mary J. Frase of the Data Development Division read and commented on several drafts of this report. In the U.S. Department of Education, Susan Ahmed, NCES Chief Statistician, Andrew Kolstad, and Mary Rollefson reviewed and critiqued this report, while Francie Alexander, Sharon Bobbitt, John Burkett, James Fox, Steven Gorman, Anne Hafner, Paula Knepper, and John Sietsema commented on specific sections. A number of individuals outside of the Department of Education also reviewed the entire report including Susan Fuhrman, Jim Guthrie, Joseph Murphy, and Gary Natriello.

Executive Summary

Since the early 1970s, policymakers and educators at all levels of government have shown increasing interest in developing ways to improve and strengthen student standards. After the National Commission for Excellence in Education issued its well-regarded report, *A Nation at Risk* in 1983, the states became particularly active in this domain of school reform.

This report describes state mandates affecting student standards; the evolving role of the states in the school reform process; trends in related student performance outcomes; and the role that federal agencies such as the National Center for Education Statistics (NCES) can assume in monitoring the impact of state school reform efforts. It also examines problems associated with organizing research intended to link reforms to student outcomes.

Reform of Student Standards: State-Level Initiatives

The areas of reform of student standards most commonly mandated by the states include the following:

- *High school graduation requirements.* The most common state reform strategies mandate increases in both the total number of courses and in the number of courses in specific academic subjects that students must pass in order to earn a high school diploma. Since 1984, 42 states have established higher coursework standards for high school graduation.

- *Competency testing.* States are administering competency tests in order to make decisions about students' educational futures or to evaluate the performance of schools. Twenty states use competency tests to identify students in need of remedial education, and 23 states use these tests to evaluate students for grade promotion or graduation. Although only five states initiated new testing programs between 1984 and 1990, one-half of all states expanded the scope of tests they require to include more grade levels, subject areas, or higher order skills. In all, 47 states have used statewide competency testing for one purpose or another.

- *Minimum grade-point averages.* Only two states currently prescribe minimum grade-point averages that students must achieve in order to graduate from high school. Thirteen states require that students maintain a certain minimum grade-point average or that students make satisfactory progress toward completing graduation requirements as a prerequisite for participating in extracurricular activities.

- *Instructional time and intensity.* Forty-four states require schools to hold classes a minimum number of hours each day, and all states have mandated a minimum number of school days each year. Twenty states limit class size in public schools. While teacher–student contact time is an issue of increasing interest among policymakers, there has been little change in state policies in this area from 1984 through 1990.

- *State-standardized curriculum.* Six states mandate course content (specific topics that must be covered) in either elementary or secondary school. Nineteen more

states are establishing learning objectives for most subject areas and are requiring local school districts to incorporate these objectives into locally developed curricula. Eight states set subject areas and the number and types of courses that must be taught in elementary and secondary schools. Sixteen states are creating model curricula or curricular guides that local school districts may use at their discretion.

Linking Reforms to Student Outcomes

Even though the states are increasingly active in defining student standards, linkages between these initiatives and student outcomes are difficult to measure for a number of reasons:

- States have adopted different reforms at different times, and no two states have adopted the same exact requirements;
- Even in cases where similar types of reforms can be identified among several states, there is much variation in how these initiatives have been implemented from state to state;
- While some reform activity occurs at the state level, far more occurs at the school district, school, and classroom levels; and
- Over time, demographic shifts have been dramatic in many states, and it is difficult to control for the effects of reform, over time, on different populations.

Although it may be possible to ascertain whether changes in student outcomes have occurred in a positive direction over time, this only suggests that state reforms may be associated with these outcomes. Given the caveats noted above, linkage in a statistical sense cannot be substantiated.

Trends In Student Outcomes: Course-Taking Patterns, Mathematics and Reading Achievement, and High School Completion and Dropping Out

An indirect way of looking at the relationship between state reforms and student outcomes is to examine particular student outcome measures that are thought to be associated with the objectives of state reforms.

- *Course-taking patterns.* During the 1980s, course-taking patterns among high school students changed. On average, students completed more course credits overall and more academic course credits, while their vocational course credits declined slightly. As compared with 1982, by 1987 many more graduates of all racial–ethnic backgrounds completed "Basics" programs, consisting of 4 years of English, 3 years of social studies, 2 years of science, and 2 years of mathematics.
- *Achievement.* The National Assessment of Educational Progress (NAEP) periodically tests nationally representative samples of 9-, 13-, and 17-year-old students and provides a reliable indicator of student achievement.

  In **mathematics**, at the level of "beginning skills and understanding" (150 level), 9- and 13-year-olds showed considerable improvement between 1978 and 1990. Most 17-year-olds were able to perform at this

level. As early as age 9, however, there was some variation across racial–ethnic groups in the percentage of students attaining at even the lowest level of proficiency. Even so, trends in mathematics proficiency indicate considerable progress over the last 12 years for racial–ethnic minorities, with most of the improvement occurring in the lower range of proficiency.

In **reading**, at the level of "partially developed skills and understanding" (200 level), the performance of 9-year-olds declined between 1980 and 1990, and the proportions of 13- and 17-year-olds attaining this level remained constant. Trends across racial–ethnic groups differed, and disparities were found at all achievement levels. For instance, 25 percent of black and 23 percent of Hispanic 17-year-olds attained the "understanding complicated problems" (300 level) on the 1988 reading assessment, compared with 45 percent of white 17-year-olds. In 1980, the comparable estimates for 17-year-olds were 7 percent for black students, 17 percent for Hispanic students and 43 percent for white students.

Relatively few studies have attempted to link achievement and the reform agenda. One study conducted in the Northeast found that in several states with high school exit examinations, reading and mathematics achievement generally improved between 1984 and 1988. Other small-scale case studies show some evidence of at least coincidental improvements in student achievement in circumstances where state testing programs and increased academic coursework requirements are in place.

- *High school completion and dropping out.* Currently, there are higher completion rates and lower dropout rates than was the case a decade ago. In particular, dropout rates have decreased for black youths, and differences between black and white youths have narrowed. Few efforts have been made to link completion and dropout rates to state reforms. Although some have been concerned that higher student standards may increase the tendency for marginal students to drop out, there is little substantive evidence that this has occurred.

Issues for Further Investigation

The relationship between state school reform and student outcomes is indirect, mediated also by many other factors and conditions. Documenting national trends on outcome measures will provide some indirect indications that reforms, among other factors, are associated with student progress. A number of NCES data sets can support such studies. In addition, in order to establish linkages between state reforms and student outcomes, it will be necessary to examine in more detail the ways in which states implement reforms (the translation from policy to practice) and the extent to which reforms change practice; the impact of specific reforms on local school districts and classrooms; and changes in curriculum content and the quality of instruction associated with, or resulting from, reforms of student standards.

National Center for Education Statistics
Research and Development Reports

The Research and Development (R&D) series of reports has been initiated:

1) To share studies and research that are developmental in nature. The results of such studies may be revised as the work continues and additional data become available.

2) To share results of studies that are, to some extent, on the "cutting edge" of methodological developments. Emerging analytical approaches and new computer software development often permit new, and sometimes controversial, analysis to be conducted. By participating in "frontier research," we hope to contribute to the resolution of issues and improved analysis.

3) To participate in discussion of emerging issues of interest to educational researchers, statisticians, and the federal statistical community in general. Such reports may document workshops and symposiums sponsored by NCES that address methodological and analytical issues; may summarize or synthesize a body of quantitative research; or may share and discuss issues regarding NCES practice, procedures, and standards.

The common theme in all three goals is that these reports present results or discussion that do not reach definitive conclusions at this point in time, either because the data are tentative, the methodology is new and developing, or the topic is one in which there are divergent views. Therefore, the techniques and inferences made from the data are tentative and are subject to revision. To facilitate the process of closure on the issues, we invite comment, criticism, and alternatives to what we have done. Such responses should be directed to:

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Chapter 1

School Reforms and Student Outcomes: Perspectives and Overview

We cherish the promise of our schools, more than the promise of any other social institution, and we demand much from them. Schools and educators have been charged repeatedly with a great variety of responsibilities. These range from inculcating particular sets of values and defining a common culture to eliminating poverty; from helping new immigrants assimilate to bridging (and mediating) differences among ethnic and racial groups; from teaching basic skills in reading and mathematics to preparing our youth for the challenge of new technologies; and much more. Few are ever satisfied with the "product." Furthermore, the notion of what individuals expect the schools to accomplish changes over time, creating a climate favorable to reform agendas.

Recent school reforms are often associated with the work of the National Commission on Excellence in Education. In the Commission's report, *A Nation at Risk* (1983), it was argued that the United States was losing its competitive edge and that the source of skilled workers and managers for a technologically advanced future was uncertain.

While *A Nation at Risk* served as a benchmark—articulating concerns over societal needs that had to be addressed, in part, by the schools—the report's publication came at a time of significant change. Many states and school districts were already implementing a variety of new instructional standards and student performance requirements (Firestone 1990), for example. Added to this were minimum competency testing, increasing rigor of the curriculum, expanded course requirements for high school graduation, and a lengthening of the school day and year to provide for more instructional time and subject teaching intensity.

Since the early 1970s as the states have begun to provide more funds to schools, relative to other sources, they have also become more concerned with educational policy and practice.[1] Evidence of the evolving state role through the 1970s and into the 1980s is clearly demonstrated by the wide variety of reforms that were proposed and implemented at both the elementary and secondary school levels during this period. Legislation initiated by the states has been intended to enhance the leadership abilities of school administrators, upgrade teachers' instructional skills, improve the quality of basic skills instruction, create environments conducive to academic achievement, and provide information and technical assistance to educators.

State policy and practice has been changing rather rapidly since 1983, although many initiatives designed to improve school and teacher effectiveness were mandated earlier. Prior to 1984, 16 states had been administering competency or proficiency exams to teachers, 19 had established programs to train administrators, 23 had created programs to develop new curricula, and 26 had instituted effective schooling programs identifying

[1] In 1979–80, the federal government provided 9.1 percent of funding for elementary and secondary schools (public and private combined), the state government provided 43.3 percent, and the local government provided 40.3 percent. By 1986–87, the federal contribution declined to 5.9 percent, the state contribution increased to 45.5 percent, and the local contribution stayed nearly the same at 40.2 percent.

model educational practices (Dougherty and Odden 1982). With respect to developments between 1984 and 1987, 23 states had enacted legislation requiring tests for teachers before they were initially certified (Education Commission of the States 1987).

While the states were actively pursuing reform agendas, change at the school district level was equally vigorous. Across a nationally representative sample, a study of reform of high schools at the school district level, conducted by the National Center for Education Statistics (NCES) between 1979–80 and 1980–81, found that 69 percent of districts had established or enhanced policies designed to increase high school student attendance; 53 percent had raised the number of units in core subject areas required for high school graduation; 48 percent had made efforts to improve study skills; 27 percent had established or increased minimum competency testing for high school graduation; 19 percent had increased the amount of homework expected of high school students; and 7 percent had increased instructional time by lengthening the high school day or year. Reforms aimed at raising teachers' qualifications were also substantial during the same short period, 1979–81. In the NCES survey, 36 percent of districts established or increased requirements for in-service training of high school teachers for subject-matter competence, and 9 percent established or increased minimum competency testing of teachers (U.S. Department of Education 1983).

Thus, the current school "reform movement" at both state and local levels, focusing on elementary and secondary education, has been under way for some time. A number of reports issued in the early 1980s on the condition of public education (Haskins, Lanier, and MacRae 1988; Stedman and Jordan 1986) captured the spirit of the reform effort by arguing that educators must accomplish the following:

- Strengthen and focus graduation requirements and curriculum standards;
- Set goals for student achievement;
- Improve the working conditions, preparation, compensation, and certification requirements of teachers to enhance the quality of teaching;
- Improve the abilities of teachers and principals to exercise leadership roles in their schools; and
- Integrate the educational enterprise more tightly with the community as a whole, especially with business.

Other reports—*A Nation at Risk* (National Commission on Excellence in Education 1983), *Making the Grade* (Twentieth Century Fund 1983), *Action for Excellence* (Education Commission of the States 1983), and *Educating Americans for the 21st Century* (National Science Board 1983)—citing dropout rates, international comparisons of student performance, standardized achievement test scores, and illiteracy rates, encouraged certain kinds of changes in policy and practice.[2] For example, they proposed longer school days or years and increased numbers of academic courses required for graduation. These reports were the catalyst at the national level for what is commonly called "the first wave of reform in the 1980s"—increased standards for student achievement.

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[2] *A Nation at Risk* reported that 23 million American adults and 13 percent of all 17-year-olds were functionally illiterate; that international comparisons of student achievement completed in the 1970s showed on 19 academic tests that American students were never first or second compared with other

A third set of reports focused on educational processes. In particular, Boyer's *High School* (1983), Goodlad's *A Place Called School* (1984), and Sizer's *Horace's Compromise* (1984) examined teaching and learning environments, especially the classroom. By calling for changes in the organization of schools to increase academic support for students and to improve the quality of interaction between teachers and students, these studies recommended different approaches for looking at the educational needs of children. These recommendations are frequently associated with the "second wave" of reform in the 1980s.

It is, perhaps, interesting to note that the reform agenda is not born out of a significant body of research suggesting that *particular reforms will lead to particular outcomes*. There seem to be assumptions that relationships exist among reform mandates, policies and programs, and results: a common sense expectation that certain actions will produce certain outcomes (a "what works" perspective).

Reform at Different Levels of Government

The reports mentioned above view the strengths of schools differently; hence, they do not share a common strategic perspective. Goodlad and Sizer, for example, advocated that schools and school districts become the centers of reform. In *A Nation at Risk* and *Action for Excellence*, it was recommended that action be taken at the state level, while the National Science Board Commission and the Twentieth Century Fund Task Force argued for national efforts.

In fact, all three levels of government have been active in the reform movement. For example, the federal government responded by implementing the School Recognition program and the Small School Improvement program (Stedman and Jordan 1986). Further, Congress made a number of commitments: a program to support teacher preparation in mathematics and science under the Education for Economic Security Act; the Excellence in Education program, recognizing improvement in secondary education; the Carl Perkins Scholarship program, supporting students' college education in exchange for service as teachers; and the funding of leadership centers, enabling local administrators to improve their leadership skills, under the Leadership in Education Administration Development Act. The September 1989 "Education Summit," which culminated in articulating national education goals, and the President's *AMERICA 2000* initiative indicate that education reform continues to receive considerable attention at the national level.

School districts have become active participants in the reform movement through implementing their own changes in student standards, curriculum, instructional methods and time, school organization, class size, standards for teachers, funding procedures, and principal, teacher, and parental control over decision making. Thus, district-level reforms are an important, although less studied, locus of reform. Recent research suggests that this situation may be changing, and that the role of districts in the reform process is receiving closer scrutiny (Murphy 1990).

During the 1980s, states became increasingly active in school reform, and began to prescribe requirements for students (for example, coursework required for high school graduation). States also changed standards for teaching credentials, mandated school funding levels, set school curriculum guidelines, and earmarked resources for specific purposes, such as reducing class size. While some state action established minimum

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industrialized nations, and, in fact, were last seven times; and that average achievement of high school students on most standardized tests was lower than it had been in 1957.

guidelines, many school districts exceeded the standards proposed. In these circumstances, while state reforms had little impact on local educational practice—because the districts had set standards that were higher than those required by the new initiatives—the states provided a backdrop that supported and promoted change.

Purpose of This Report

This report focuses on the substance and impact of state-level reforms related to student standards. In 1988, Congress passed the Hawkins-Stafford Elementary and Secondary School Improvement Amendments (Public Law 100-297) that, among many other things, mandated that NCES conduct a study

> on the effects of higher standards prompted by school reform efforts on student enrollment and persistence. The study shall examine academic achievement and graduation rates of low-income, handicapped, limited English proficient, and educationally disadvantaged students.

Within the limitations of existing data, this report represents an effort to fulfill that mandate by

- Providing information on the current state of educational reforms aimed at raising student standards;
- Summarizing existing research designed to identify linkages between higher standards and student outcomes;
- Exploring issues essential to understanding the strength of relationships between higher standards and student outcomes;
- Examining trends among indicators associated with higher student standards; and
- Discussing data and methods available to those concerned with the relationship of higher educational standards to student outcomes.

This report overviews data that are currently available. Whenever possible, data that may be associated with reforms (documenting changes over time) are described. In some instances, no comparative information can be found. The report does not attempt any new data analysis or reanalysis. The sources of information are many and varied, and by no means limited to work published by NCES. While these other sources are professionally well respected, it is not possible to assure that the data quality always achieve NCES statistical standards.

State Reform and Higher Student Standards: Targets and Strategies

As a means of improving student outcomes through higher standards, educators and policymakers have focused on

- The total number of course credits required, the number of courses required in specific subjects, or both, in order to graduate from high school;
- Minimum competency tests for grade promotion, graduation, or both;

- Minimum grade-point averages for grade promotion or graduation;
- Increasing instructional time and intensity in particular subjects; and
- Curriculum standards and guidelines to increase the rigor and comparability of courses.

Across these five areas, states and local school districts have assumed a key role. This section briefly describes state efforts in these areas in 1989–90.

High School Graduation Requirements

Perhaps the most common state reform strategy prescribed increases both the total number of courses and the number of courses in specific subjects that students must pass in order to earn a high school diploma. In fact, many states have instituted this kind of reform. Between 1984 and 1990, 42 states had increased the number of courses required for high school graduation (Coley and Goertz 1990), although this reform may or may not have been linked to efforts to improve the quality of course content and instructional practice. In most cases, states have increased graduation requirements in basic academic areas such as mathematics, science, and English. Most states with these standards have also specified the number of history and social studies courses that must be completed prior to graduation, and some have set standards for foreign language, life skills, and fine arts courses.

Competency Testing

A second common reform of student standards is increasing the use of testing to assess and evaluate student progress. Whereas there is great diversity among state testing programs in terms of the scope, purpose, and uses of testing, minimum competency testing (MCT) among the states is increasingly common.

Minimum competency testing differs from norm-referenced achievement testing, which has been used in schools for decades. Whereas achievement tests define student skill levels in particular subject areas, competency tests are designed to assure that students have acquired particular, specified skills. The kinds, amount, and uses of competency testing vary widely among states. Twenty states use these tests to identify students in need of remedial education, while 23 states use them to evaluate students for grade promotion or graduation. Of these 23 states, 20 require that students pass a basic skills test or other competency test assessment before receiving a high school diploma. Further, 8 states use competency tests as a requirement for grade promotion in the elementary grades, or as an exit test from eighth grade (Coley and Goertz 1990). Students are usually given multiple opportunities to pass the tests and extra assistance if they fail. Overall, in 1990, 47 states used some form of statewide testing to assess students or describe student performance.

Minimum Grade-Point Averages

As of 1990, only two states, Florida and Idaho, prescribed minimum grade-point averages that students must achieve in order to graduate from high school (Coley and Goertz 1990). Thirteen states required that students maintain a prescribed minimum grade-point average, or that they make satisfactory progress toward completing graduation requirements as a prerequisite for participating in extracurricular activities (Education Commission of the States 1989). Closely related to minimum grade-point averages are "no

pass-no play" rules, another way for states to define minimum achievement standards. These rules apply only to those students involved in athletics or other extracurricular activities and are designed to motivate them to achieve passing grades in all their courses.

Increased Instructional Time and Intensity

State mandates regarding instructional time, class size, and student/teacher ratios set standards for districts, not students, but can increase the rigor of the educational experience. While 44 states require schools to hold classes a minimum number of hours each day, and all states have mandated a minimum number of school days each year, lengthening the school day or year has not been a primary target of reform. However, two states provide financial incentives for districts that choose to increase instructional time—Michigan, for lengthening the school day for high school, and California, for lengthening the school year (Coley and Goertz 1990).

Reforms designed to increase the intensity of instruction are intended to enable teachers to spend more time interacting with students. In some instances, this has meant reducing class size, buffering classroom instructional time from outside interference, setting maximum pupil/teacher ratios, and adding instructional aides to classrooms. Most states with such regulations cover both elementary and high school students; however, some high school standards require that each teacher instruct no more than a certain number of students per day rather than limit class size. Twenty states limit class size in public schools through state law or accreditation requirements (Education Commission of the States 1990a). Between 1982 and 1989, the pupil/teacher ratio in schools declined in most states and increased in one state (U.S. Department of Education, Office of Planning, Budget, and Evaluation 1990).

State-Standardized Curricula

States have used several methods for achieving curriculum reform: providing funds for local curriculum development, creating guidelines for local educators to use in planning curricula, and aligning state curricular frameworks with assessment instruments.

The state role in curriculum development has shifted in the last decade from technical assistance to defining courses of study, performance objectives, and, increasingly, course content. Six states now mandate minimum course content (specific topics that must be covered) in either the elementary or secondary school curricula. Nineteen more states are establishing learning objectives for most subject areas and are requiring local school districts to incorporate these objectives, as well as any state-prescribed student performance standards, into locally developed curricula. Moreover, eight states are defining subject areas and are setting the number and types of courses that must be taught in all elementary and secondary schools. Finally, 16 states are creating model curricula or curricular guides that local school districts may use at their discretion (Coley and Goertz 1990).

The Problem of Causality: Reforms in Context

Several problems inhibit efforts to link particular state school reform initiatives to student outcomes. First, because states have proposed and adopted various reforms at different times, no two states have enacted identical sets of reforms. In fact, the states vary greatly in terms of the breadth and depth of the reforms they have adopted. As a result, there is no "date" from which to measure change and no single "set" of reforms against

which to measure change. State student standards are not just a product of the reform climate of the 1980s. In fact, many states initiated efforts earlier and, in the 1980s, elaborated on what they were already doing. Much of what we see is a "press-forward"—increasing demands on the system, built on changes that were already under way at the state and district level. Odden and Marsh (1990, 170) write:

> By the 1984–85 school year—that is, within two years after the *Nation at Risk* report—forty-one states had increased coursework requirements for high school graduation, twenty-two states had expanded or implemented student minimum competency testing requirements.... By 1986–87, further progress had been made. Forty-two states had increased high school graduation requirements, forty-four states required student testing for minimum academic competencies....

These requirements were new in some states, but not in others. Further, the nature of the initiatives was significantly different among the states. In effect, they represent such a vast array of policy and programs that evaluating the impact of the particular reforms on students is difficult.

Second, even in cases where similar types of reforms can be identified in a subset of states, there is much variation in how these initiatives have been implemented. Some states carefully manage the implementation process by ensuring that individual school districts act on the mandates in specific ways, while others do not.

Third, as noted above, much reform activity occurs at the school district, school, and classroom level. Many districts have adopted their own student standards reforms, with mandates often exceeding state requirements. And like the states, school districts have conducted various reform activities at different times, and they have implemented their programs in different ways. State and school district reform initiatives are not necessarily linked. In certain situations, state reforms may only help the state keep pace with standards already in place in some districts. In this circumstance, the state mandate may rest only as a benchmark, with little impact on policy or practice at the district level. At the same time, state mandates sometimes exceed school district standards. While this would represent an important area for research, far less information is available about changes that have occurred in district-level standards than about changes in state policy concerning student standards.

At least two other factors make it difficult to establish causal linkages between state reforms and student outcomes. One has to do with demographics. In many states, demographic shifts have been dramatic over time. Among the changes affecting the composition of the in-school population are the breakdown in family structure, rising poverty levels among families with children, and increasing immigration of families for whom English is not the language spoken in the home. In theory at least, in order to determine the impact of any reform, it would be necessary to compare its impact on similar populations at different points in time. Since a state's in-school changes are constantly changing and since it is difficult to control for the effects of these differences, it may not be possible to determine how particular populations, at different points in time, have been affected by a reform initiative.

Another matter inhibits the search for causal relationships between state school reform and student outcomes—the relatively small sample. As a purely analytical issue, 50 states (usually fewer) represent a small number of sampling units. It would be inappropriate to

draw conclusions that generalize beyond these units based upon this small number of cases. Such analyses would, among other things, require controlling for

- The variety of factors distinguishing the number and range of reforms across states;
- Reforms at the school district level within states;
- Differences in implementation policies across states and school districts; and
- Demographic changes and other factors that distinguish school environments.

All of this suggests that efforts to determine *causal linkages* between state reform and student outcomes are unlikely to succeed. A reasonable alternative, and the objective of this report, is to describe the range of state school reforms that are now in evidence and then to define the kinds of student outcomes that are expected to be associated with the new standards (and how these outcomes can be measured). Over time, positive change in these outcome measures may suggest that state reform of student standards is associated with improvements in student performance.

Appraising Impacts: Using NCES Databases

Although a considerable literature describes the various state reforms, limited data are available with which to assess their impacts. A number of NCES databases, along with the Current Population Survey (CPS) of the Bureau of the Census, provide opportunities to explore trends in measures that are expected to be associated with reform of student standards. They are not the only data sets that could be used, and they were not designed specifically for studying issues of school reform and student standards. However, because of their breadth and quality, the following data sets represent analytical opportunities for state reform-related research:

- the High School and Beyond (HS&B),
- the National Assessment of Educational Progress (NAEP),
- the National Education Longitudinal Study of 1988 (NELS:88),
- the Current Population Survey (CPS) October Enrollment Supplement,
- the Schools and Staffing Survey (SASS), and
- the Common Core of Data (CCD).

The ways in which these current databases, along with two forthcoming transcript studies (NAEP in 1990 and NELS in 1992), may inform research on reforms of student standards are described briefly below. In addition, chapter 3 describes other studies, some fairly small in scale, that may also be used to explore the impact of these reforms.

Changes in Course-Taking Patterns

Data from NCES are particularly useful for tracking changes in student course-taking patterns. For instance, the high school transcript studies can be used to examine changes in

the average amount of coursework completed by high school graduates, beginning with the high school class of 1982. The source databases are the HS&B Transcript Study of 1982 seniors; the NAEP High School Transcript Studies (HSTS) of 1987 and 1990 seniors; and NELS:88, in which a collection of transcripts is scheduled to take place in 1992 after most of its eighth-grade cohort completes high school. In the future, there are plans to collect transcripts of students from NAEP using procedures that are very similar to those used in the 1987 HSTS. Beginning with 1990 seniors, transcript studies are planned for the senior cohorts every 4 years. The transcript information currently available can be used to analyze changes in course-taking patterns between 1982 and 1987.

Changes in the courses taken by graduates in different years can be compared for males and females and for students of different racial–ethnic and socioeconomic backgrounds. Comparisons of course-taking patterns can also be made separately for high- and low-achieving students, those with different grade-point averages, those who took a college entrance examination, those who went to college, and students from different high school curriculum tracks (academic, vocational, and general) or from different types of schools. Also, the 1987 HSTS contains a sufficient number of students with disabilities to allow analysis of their course-taking patterns.

Trends in Dropout and Graduation Rates

Since HS&B sampled students in their sophomore year, the database includes students who dropped out of school between the 10th and 12th grades, providing an opportunity for comparisons with dropout data from NELS:88 students after their expected graduation in 1992. Both of these studies will include high school transcripts; therefore, it will be possible to investigate the course-taking patterns, grades, and achievement test scores of students who graduated, as well as those who did not complete high school. (Transcripts will be collected from the NELS:88 student sample who were enrolled in school as of the 10th grade.)

In the future, the CPS Education Supplement and the CCD may also be used to support state analyses of dropout data, grade retention, and graduation trends. Currently, CPS data can be used to determine annual dropout rates, to estimate the proportion of specific age groups that have graduated high school, and to determine the proportion of youth nationally that are behind, at, or above the modal or expected school grade level for their age. Such analyses may be possible in the future at the state level, if a proposed state expansion of the CPS sample takes place. The CCD has developed common definitions for dropout reporting by the states, has pilot-tested state-level collection of dropout data, and will begin collecting such data for dropouts in grades 7 through 12 for the school year 1991–92.

Achievement

NAEP, representing the best available source of information about trends in achievement, conducts regular assessments of skills in reading, mathematics, writing, science, history, and other subjects for students ages 9, 13, and 17 (grades 4, 8, and 12 as of 1988). These studies include data about students that can be used to assess trends in achievement for special populations, such as minorities and disadvantaged students. As of 1990, NAEP collected some state-level data from some states on a trial basis, assessing eighth graders in mathematics. In 1992, a number of states will participate in more trial assessments of fourth and eighth graders in mathematics, and fourth graders in reading.

The HS&B and the NELS:88 surveys included standardized tests. While the HS&B senior cohort was administered cognitive tests measuring verbal and quantitative skills, the sophomore cohort was tested in mathematics, science, writing, and civics. The tests were taken by the HS&B sophomore cohort in both the 10th and 12th grades. Tests have also been administered in both the NELS:88 base-year (8th graders) and first follow-up (10th graders) surveys. The eighth graders were tested in English (reading and writing), science, U.S. history, and civics. In the case of NELS:88, by linking this data with transcript information about the courses students completed between the 9th and 12th grades, researchers will be able to analyze the relationship between coursework in the subjects for which tests were administered and student achievement.

Graduation Requirements and Related School Policies

Begun in 1987, SASS is a state-representative survey of public schools, teachers, administrators, and school districts that will serve as a consistent source of information about the number of credits by field that local districts require for high school graduation. Although SASS cannot link policies to student outcomes (because it contains no information about the performance of individual students), SASS does contain information on school policies and procedures for a national sample of schools, teachers, and administrators, both public and private. In addition, SASS data on teacher qualifications, training, and certification will enable researchers to explore state school reforms associated with these areas.

NAEP and NELS:88 are nationally representative surveys of students and schools that include some information about the policies and student standards at the schools from which the samples of students were drawn. For example, a base-year (fall 1979) and first follow-up (fall 1981) school questionnaire was completed by school administrators at about 1,000 schools from which the HS&B sophomore and senior cohort members were sampled. The data include requirements for competency testing and other information about school course offerings and policies. Further, NELS (1988, 1990, and 1992) and NAEP (1987, 1990, and 1994) provide opportunities to examine the relationship between school policies and student performance (using transcripts and the results of achievement tests).

Taken together, NCES databases—particularly SASS, NAEP, and NELS:88—provide a number of ways of looking at trends in student outcomes and policies expected to be associated with the implementation of various reform initiatives. The last chapter of this report considers ways to bolster linkages between these data sources and studies of reform, with particular reference to documenting trends related to reform policies and programs, and to identifying data-gathering needs that can be achieved as part of the ongoing cross-sectional and longitudinal research efforts of NCES.

Organization of This Report

This report is divided into four chapters. This first chapter briefly described the range of state initiatives designed to achieve higher student standards and the problems associated with assessing their impacts, as well as the data available for examining student outcomes. Chapter 2 discusses the great variety of reform activities that have occurred at the state level between 1983 and 1990 and places them in historical context. Chapter 3 looks at measures thought to be associated with reform initiatives—both schooling inputs and student outcomes—and at related research. Recognizing that state-level reforms represent only one dimension of the schooling equation, in this chapter it is noted that researchers will always have difficulty linking reforms directly to student outcomes, because there are many

schooling processes operating simultaneously. The last chapter discusses issues associated with studying the impact of state reforms, and suggests some analytical strategies that might be used to describe linkages between reforms and student outcomes.

Chapter 2

States and the Reform of Student Standards in the 1980s

The idea of school reform is as old as schooling itself. Education historians document patterns to these movements, which surface periodically, sometimes with significant impacts on education policy or practice, sometimes not. In the early 1840s, the common school movement changed the nature of education in America dramatically. During the Progressive Era in the early 1900s, schooling and school administration were professionalized and, to a degree, depoliticized. In the 1960s and 1970s, reformers focused on equalizing opportunities in the classroom and increasing access to quality schooling for all children without regard to background or economic circumstance, especially through school finance reform. These and other less dramatic initiatives reflect the historical context within which current reform activities must be viewed. The decade of the 1980s represents another stage in school reform—one in which a shift occurred toward outcome accountability and prescribing educational excellence, distinctly centered on state-level programs.

The Three Waves of Reform in the 1980s

Joseph Murphy (1990) describes three waves of reform that took place in the 1980s. Briefly, the first wave (1982–85) focused on "top-down" efforts (particularly at the state level), defining student requirements and system standards in an effort to improve student outcomes. "This approach assumes that the conditions of schooling contributing to poor student outcome measures are attributable to the poor quality of the workers and to the inadequacy of their tools, and that they are subject to revision through mandated, top-down initiatives—especially those from the state" (Murphy 1990).

This report focuses on the subset of reforms during this first wave that are related to curriculum, time, monitoring, testing, and accountability. While the report is principally concerned with developments since 1983, it is understood that many states had initiated reforms associated with the first wave before that time. Table 2.1 describes the array of initiatives that characterize the first wave of state reform in the 1980s and that have been passed into law by some states.

Table 2.1—Initiatives from the first wave of education reform

Teachers and teaching

- salaries—establishing or raising minimums
- career advancement
  - merit pay
  - career ladders
  - supervision of beginning teachers
- recruitment
  - higher standards
  - scholarships and loans (general, minorities and women, critical subject areas)
  - special programs in high schools
- preparation
  - degree structure (liberal arts degree)
  - clinical training
  - changes in coursework
- testing and certification
  - entry tests for degree programs
  - exit tests for degree programs
  - certification test for beginning teachers
  - alternative certification
- beginning teacher induction
- professional development and continuing education
  - peer visits
  - staff development plans
  - sabbaticals
  - fellowships and summer employment
  - teaching methods
  - evaluation

Table 2.1—Initiatives from the first wave of education reform—Continued

Curriculum

- increased requirements for graduation
- core curriculum
- greater academic focus
- more sequenced coursework
- higher order skills
- citizenship component
- computer and technology courses
- better textbooks

Time

- longer school day
- longer school year
- better use of time
- increased student attendance

Monitoring, testing, and accountability

- evaluation of staff (principals and teachers)
- promotion and retention standards for students
- school report cards
- educational bankruptcy programs
- school improvement incentives and awards
- state-centered student testing programs
- state-centered testing programs for professionals

New programs

- gifted students
- at-risk students
- alternative programs
- recapture programs
- substance abuse
- early identification of students with problems
- teenage parents

Table 2.1—Initiatives from the first wave of education reform—Continued

Extended concepts

- exemplary practice schools (key schools)
- demonstration schools
- clinical schools
- curriculum research and development centers
- school–university partnership

SOURCE: Joseph Murphy, "The Educational Reform Movement of the 1980s: A Comprehensive Analysis," in *The Educational Reform Movement in the 1980s*, ed. Joseph Murphy (Berkeley: McCutchan, 1990), 23–25.

As described by Murphy, the second wave of reform (1986–89) represents a "bottom-up" rather than a "top-down" approach to change. It focused on improving teacher efficacy by empowering those closest to students (professionals and parents). This wave has been characterized by efforts to professionalize teaching, develop decentralized school management systems, and enact specific reforms directed at particular constituencies, such as at-risk students. Strategies to enhance professionalism include improving the quality of the work environment, expanding collegial contact, and increasing the authority of teachers relative to administrators (Murphy 1990).

The third wave of reform, which began in 1988, is just now emerging in policy and practice. It seems to involve developing broader policies for children and family and moving toward more comprehensive thinking about the service needs of children and how those services might best be delivered. Murphy writes: "... [third wave] reformers are interested in replacing the uncoordinated and unconnected series of approaches for taking care of children with an integrated intergovernmental, inter-professional service model...with both the family and the school at the hub of the service wheel.... The underlying philosophy is that children should be empowered to contribute successfully to the needs of a rapidly changing society" (Murphy 1990, 29).

Within the sweep of 1980s reform rests a series of state-level initiatives, mostly associated with the first wave, designed to encourage higher student standards:

- Changes in minimum credits and course-taking requirements for graduation;
- Implementation of minimum competency testing for promotion and graduation;
- Implementation of minimum performance standards; and
- Increasing minimum student contact time and intensity by mandating minimum numbers of school days per year, minimum hours per school day, maximum class size, and attendance policies.

These initiatives—the building blocks of the education excellence movement closely associated with student standards reform in the 1980s—are described in the sections below.

Course-Taking Requirements for High School Graduation

Of all state reform initiatives, increased course-taking requirements for high school graduation are most common. In *A Nation at Risk*, the National Commission on Excellence in Education recommended that all students be required to study five "New Basics" for a standard high school diploma (National Commission on Excellence in Education 1983). These requirements were

- Four years of English;
- Three years of mathematics;
- Three years of science;
- Three years of social studies; and
- One-half year of computer science.

The Commission proposals were consistent with recommendations proposed in other studies. For example, in *Educating Americans for the 21st Century*, the National Science Board recommended that students take 3 years of math and 3 years of science and technology, including 1 year of algebra and 1 semester of computer science. In *Making the Grade*, the Twentieth Century Fund recommended a core secondary curriculum of reading, writing, calculating, computers, science, foreign languages, and civics. Finally, the Education Commission of the States in *Action for Excellence* recommended strengthening the curriculum in elementary and secondary school not only in mathematics and science but in all disciplines to provide richer substance and greater motivational programs, while eliminating "soft" or nonessential courses.

Table 2.2 summarizes changes that took place from 1980 to 1990 in state-mandated course-taking requirements for a standard high school diploma by subject. Most often, states called for increases in the number of mathematics credits required for graduation, followed by increases in science requirements. A few states mandated separate classes in computer literacy. Finally, some states added other course requirements, such as one-semester courses in fine arts, vocational education, or practical living skills.

Table 2.2—Summary of changes in high school subject area requirements for a standard diploma among the 50 states and the District of Columbia: 1980 to 1990

Between 1980 and 1990, 31 states and the District of Columbia increased their minimum total requirements; 8 others established minimum total requirements; 5 remained without legally mandated minimum requirements; and the remaining 6 states had the same required number of units in 1990 as they had had in 1980. The following provides a summary of changes made in secondary school subject area requirements during this period:

- For *mathematics*, 31 states and the District of Columbia increased existing requirements; 9 states that previously had no established minimum requirements set them; 6 states continued to have no established legal requirements; 2 states kept the same requirements; and 2 states decreased their requirements.

- For *science*, 24 states and the District of Columbia increased requirements; 9 states previously without minimum requirements established them; 6 states continued to have no established legal requirements; 10 states kept the same requirements; and 1 state decreased its requirements.

- For *language arts*, 14 states increased existing requirements; 5 states previously without minimum requirements established them; 6 states continued to have no established legal requirements; 25 states kept the same requirements; and 1 state decreased the required number of units.

- For *social studies*, 19 states increased existing requirements; 7 states previously without minimum requirements established them; 19 states kept the same requirements; 2 states continued to have no established legal requirements; and 4 states decreased the required number of units.

- For *health and physical education*, 3 states increased existing requirements; 9 states previously without minimum requirements established them; 9 states continued to have no established legal requirements; 28 states kept the same requirements; and 2 states decreased their requirements.

SOURCE: Education Commission of the States, *Clearinghouse Notes. Minimum High School Graduation Requirements: Standard Diplomas* (Denver, CO: July 1990).

Table 1 in appendix A shows high school graduation requirements in 1980 and 1990 by state. Although the current mandates are generally more demanding than they were in 1980, only 3 states, Florida, Louisiana, and Pennsylvania, currently require 4 years of English and 3 years of social studies, mathematics, and science per the recommendations of the National Commission on Excellence in Education. However, an additional 6 states now require 4 years of English, 3 years of social studies and mathematics, and 2 years of science (table A.1).

Since most of the changes in state requirements were enacted in the early 1980s, the new standards applied only to classes of students graduating in the late 1980s and afterwards. More recently, states have continued to revise and increase their minimum

graduation requirements. For example, since 1986, 16 states have made changes in their requirements, and the majority of these new standards will affect classes graduating in 1989 and beyond. Another six states have enacted changes that did not or will not affect students until 1990, 1991, or 1992.

Figure 2.1 shows the total number of credit units required by states for a standard high school diploma as of 1990. The range of units required by those states that have minimum course requirements is between 13 and 24 units, with an average minimum of 19.78 units. Five states have no statewide mandates regarding the total number of units required for a standard diploma. This represents a considerable change from 1980 at which time only 1 state required 21 units (and no states required more than 21 units); 8 states required 20 units; 2 states required 19 units; 1 state required 18.5 units; 9 states and the District of Columbia required 18 units; 3 states required 17 units; 11 states required 16 units; 2 states required 15 units; 2 states required 13 units; 1 state required 11.5 units; 8 states left these standards to local school boards; and 3 states defined no standard whatsoever. In 1990, clearly more states required more credit units for graduation than had done so in 1980 (Education Commission of the States 1990b).

Increasing the Rigor of the Curriculum

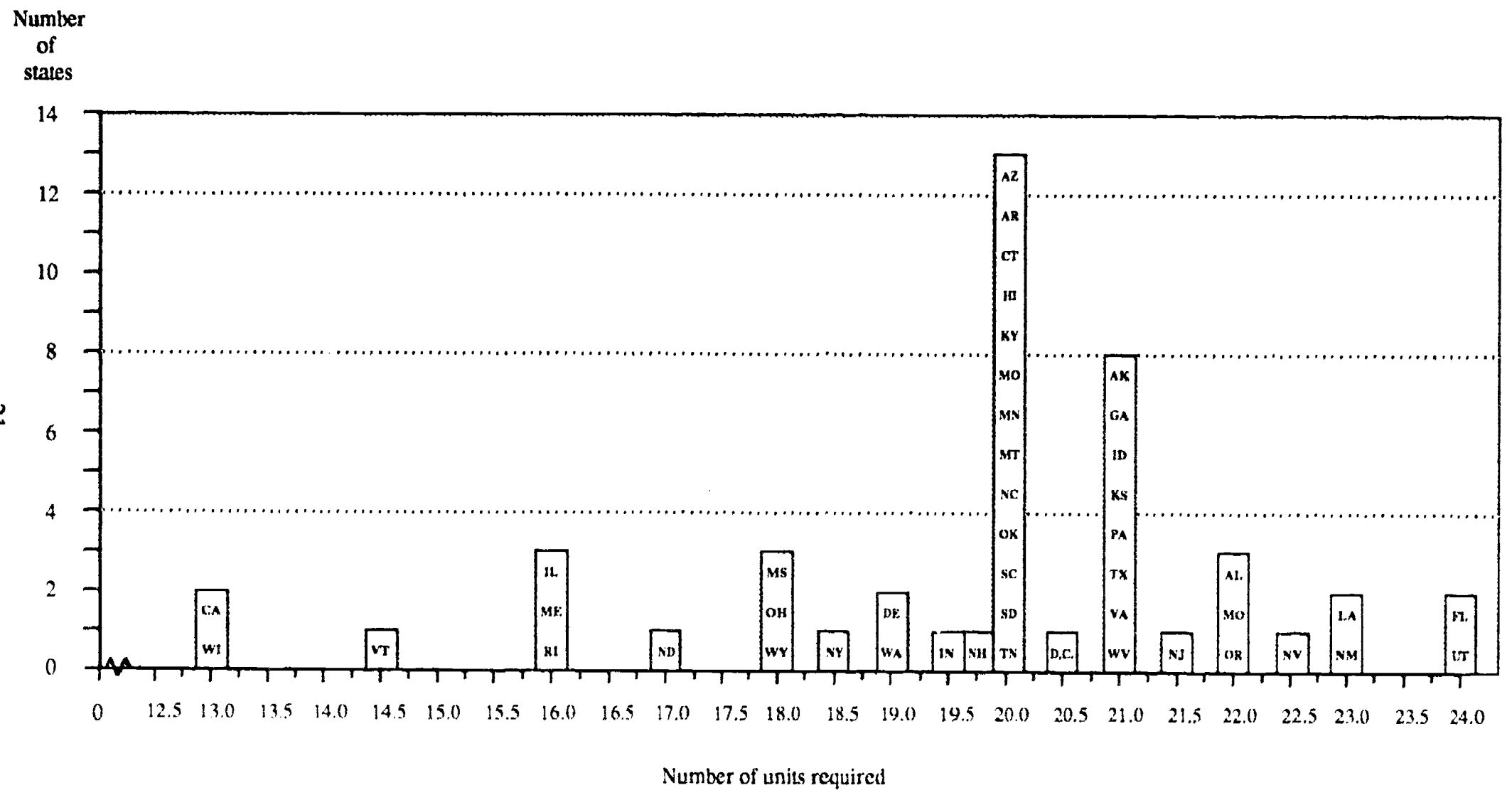
Almost all states have established policies concerning the rigor of the curriculum, and these policies are being strengthened through reform initiatives. While the policies are too diverse to describe, there are some general strategies that states employ to enhance the curriculum. The most common approach is to define a general course of study. This may involve identifying learning objectives or competencies that students must acquire in each grade or the course offerings that all schools must provide. Colorado, for example, defines the subject areas that must be included in the curriculum of all schools. In addition, Maryland has produced kindergarten through 12th-grade curriculum frameworks in many subjects, and Florida has adopted frameworks for all courses offered in grades 6 through 12 (Coley and Goertz 1990). Curriculum-related reforms have taken place over several decades, and it has not been possible to determine exactly how much of the activity is associated with the movement since 1983.

Some states also specify the competencies that must be included in each course, or course content goals. Such course-level requirements are described in course content guides. Some states link course content requirements to state minimum competency testing programs—the minimum competency tests assess students' mastery of the competencies in the course guides. Florida, for example, requires that all districts adopt student performance standards for each academic course required for high school graduation and has state-adopted minimum student performance standards for grades 3, 5, 8, and 11 (Coley and Goertz 1990).

Some states provide more general guidelines for district-level curriculum development, sometimes establishing learning objectives for the high school curriculum as a whole. In Connecticut, the State Board of Education has adopted a "Common Core of Learning," which defines particular objectives in areas such as self-concept, motivation, and responsibility; reading, writing, and quantitative ability; and arts, careers, history, mathematics, and technology (Coley and Goertz 1990). These general learning objectives may be tied to state student assessments. In Illinois, "State Goals for Learning" were established in 1985. Districts are required to develop "Learning Objectives" consistent with these goals and to assess students on the objectives at grades 3, 6, and 11. Based on the results of the student assessments, districts revise programs in order to bring the curriculum in line with learning objectives.

Another general strategy states use to improve curriculum content is providing model curricula that districts *may* use if they choose to do so. Because curriculum development is time consuming and expensive for districts, an incentive exists to use state model curricula. A few states provide grants to districts that adopt optional state curriculum guidelines or model curricula. In particular, Michigan provides additional state aid to school districts that require high school students to complete 4 years of English and 3 years of mathematics, science, and social studies; 2 years of any combination of foreign language, fine or performing arts, vocational education, or practical arts; 1 year of health and physical education; and 1 semester of computer education (Coley and Goertz 1990). Other states have provided one-time implementation funding to encourage schools to adopt new state-level curricula.

Figure 2.1—Distribution of the total units required for a standard diploma among 50 states and the District of Columbia: 1990



NOTE: Five states had no minimum unit requirements mandated at the state level.

SOURCE: Education Commission of the States, *Clearinghouse Notes. Minimum High School Graduation Requirements: Standard Diplomas* (Denver, CO: July 1990).

Student Testing

Student testing is another area of reform that has received considerable attention at the state level. Mandated minimum competency testing became quite common in the 1970s, and a flurry of revisions in state testing policy occurred during the early 1980s. One of the findings from *A Nation at Risk* was that minimum competency examinations, required in 37 states at the time, "fell short of what was needed, because the minimum tends to become the maximum, thus lowering educational standards for all." Although minimum competency tests might undermine the goal of excellence in education, there is little evidence that this happens. Increases in such testing are often associated with the reform agenda. The National Commission's recommendation was as follows:

> Standardized tests of achievement should be administered at major transition points from one level of schooling to another and particularly from high school to college or work. The purposes of these tests would be to: (a) certify the student's credentials; (b) identify the need for remedial intervention; and (c) identify the opportunity for advanced or accelerated work. The tests should be administered as part of a nationwide (but not Federal) system of state and local standardized tests. This system should include other diagnostic procedures that assist teachers and students to evaluate student progress (28).

State testing takes many forms and is designed to achieve a variety of objectives. For instance, with regard to high school graduation, some states have created minimum competency tests that all seniors must pass with a state-determined minimum score in order to receive a basic diploma. Other states have state-developed tests for high school seniors, but allow districts to set the standards for passing. Still others have state-developed tests that are used to award students with high scores special advanced or honors diplomas, but are not used to deny diplomas. Some states have chosen to define the competencies on which students must be tested, but allow districts to choose the method of assessing competency. This may mean that districts have created their own tests or that they are allowed to use satisfactory performance in core courses as the method of assessing competency. Generalizations about the nature of graduation testing are further complicated by the nonstandardized nature of graduation tests—which may be as straightforward as a simple reading test, or as complicated as competency tests in specific subject areas, as well as those that test general verbal and quantitative skills.

It appears that a substantial proportion of state-mandated tests are designed to assess minimum competency (Michigan Department of Education 1990). However, a significant amount of additional testing is called for by school districts. A survey in 1986–87 of officials from all 50 state departments of education, the District of Columbia school district, and 56 sample school districts in 38 states estimated that standardized achievement, competency, and basic skills tests were administered to 38.9 million students to fulfill *state and local testing* mandates (Medina and Neill 1990).

Table 2.3 summarizes and compares student testing policies in 1983 and 1990. Even in 1983, state-mandated student testing was common, with 38 states requiring some sort of student testing. By 1990, the number of states requiring some kind of student testing had risen to 47.

Table 2.3 also shows the objectives of the student tests mandated by states in 1990. Among the 47 states with state-mandated student testing it was found that

- Monitoring student, school, or district performance was the most frequent purpose of state-mandated tests; and
- Screening students for promotion or graduation was the second most common purpose.

A study by Coley and Goertz (1990) attempted to characterize the purposes of state testing programs. Among 23 states with mandated testing,

- Eighteen required students to pass a basic skills test or some competency assessment before receiving a high school diploma;
- Eight used test results as a requirement for grade promotion in the elementary grades or as an exit test from eighth grade;
- Twenty used test results to identify students in need of remedial education. Some states or the schools within these states used the tests to place students in remedial education, while others used them to qualify students for special services, such as tutoring or special education; and
- Nine used performance on state-mandated tests to allocate state compensatory education aid.

Table 2.3—States with testing policies in 1990 (and comparison with policies in those states in 1983) and the purpose of testing in 1990

State	Any state test 1983	1990 Any state test	1990 No test	Purpose of student testing in 1990: Monitor student or school	Identify remediation needs	Promotion or graduation	Fund distribution
Total	38	47	3	39	19	24	8
Alabama	X	X			X	X	
Alaska		X		X			
Arizona	X	X		X		X[1]	
Arkansas	X	X		X	X	X	
California	X	X		X		X[2]	X
Colorado	X	X		X			
Connecticut	X	X		X	X		X
Delaware	X	X				X[3]	
Florida	X	X		X	X	X	X
Georgia	X	X		X	X	X	
Hawaii	X	X				X[1]	
Idaho		X		X	X		
Illinois		X		X			
Indiana	X	X		X	X	X	
Iowa			X				
Kansas	X	X		X			
Kentucky	X	X			X		
Louisiana	X	X		X	X	X[4]	
Maine		X		X			
Maryland	X	X			X	X	
Massachusetts	X	X		X	X		
Michigan	X	X			X		X
Minnesota		X		X			
Mississippi	X	X			X		
Missouri	X	X		X			
Montana		X		X			
Nebraska	X	X		X[2]			
Nevada	X	X			X[3]	X	
New Hampshire	X	X		X[3]	X		
New Jersey	X	X		X	X	X	X

Table 2.3—States with testing policies in 1990 (and comparison with policies in those states in 1983) and the purpose of testing in 1990—Continued

State	Any state test 1983	1990 Any state test	1990 No test	Purpose of student testing in 1990: Monitor student or school	Identify remediation needs	Promotion or graduation	Fund distribution
New Mexico	X	X		X		X	
New York	X	X		X	X	X	X
North Carolina	X	X		X	X	X	X
North Dakota			X				
Ohio	X	X		X[2]		X[2,5]	
Oklahoma		X		X			
Oregon	X	X		X[3]		X[3]	
Pennsylvania	X	X		X		X	
Rhode Island	X	X		X			
South Carolina	X	X		X	X	X	
South Dakota		X		X			
Tennessee	X	X		X		X	
Texas	X	X		X		X	
Utah	X	X		X			
Vermont	X	X		X[6]		X[6]	
Virginia	X	X		X		X	X
Washington	X	X		X			
West Virginia		X		X			
Wisconsin	X	X		X[2]			
Wyoming			X				

[1]Students must meet minimum performance requirements in selected competency areas. Districts select method of assessment.
[2]State requires assessment, but districts choose the test and set competency standards.
[3]State specifies competencies tested, but districts set performance standards.
[4]Effective with the Class of 1991.
[5]Effective with the Class of 1994.
[6]Developing a new assessment program that will include nontraditional assessment methods. Competency tests for eighth-grade promotion will become optional.

NOTE: The fourth column of this table, "monitor student or school," is intended to indicate that these states provide for a testing link between students and the state and that this requires involvement of localities in the testing process. In some cases, localities may simply administer tests; in others they may determine which test they use.

SOURCE: Data from Richard J. Coley and Margaret E. Goertz, *Educational Standards in the 50 States: 1990* (Princeton, NJ: Policy Information Center, Educational Testing Service, June 1990). Data for 1983 from V. Dougherty, *State Programs of School Improvement 1983: A 50-State Survey* (Denver, CO: Education Commission of the States, 1983).

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Despite the difficulties associated with identifying the purpose of state testing programs, Coley and Goertz found that in 1990, 18 states required that students pass competency tests specifically for high school graduation (table 2.4). It was not possible to determine when these testing programs were adopted. Further, the policies are very diverse. Arizona, for example, tests proficiency in reading during high school, but requires only ninth-grade level proficiency for graduation and tests no other skill areas. South Carolina policy establishes the level of competency that must be achieved in grades 1 through 8, but leaves to school districts the responsibility for establishing standards for grades 9 through 12. Arkansas has a complicated program. For instance, all students in grades 3, 6, and 8 are tested in reading and mathematics, and in the latter two grades in language arts, social studies, and science. The State Board of Education sets minimum performance goals for diagnostic and monitoring purposes. The state-developed tests are used as diagnostic tools in grades 3 and 6 and as a promotion exam for students in grade 8. Furthermore, the tests are used to monitor school performance and to identify schools that must participate in a state-administered school improvement program (Coley and Goertz 1990).

Table 2.4—State requirements for passage of minimum competency test for graduation: 1990

State	Required for 1990 graduates	State	Required for 1990 graduates
Alabama	yes	Montana	no
Alaska	no	Nebraska	no
Arizona	yes	Nevada	yes
Arkansas	no	New Hampshire	no
California[2]	yes	New Jersey	yes
Colorado	no	New Mexico	yes
Connecticut	no	New York	yes
Delaware[3]	yes	North Carolina	yes
Florida	yes	North Dakota	no
Georgia	yes	Ohio[5]	no
Hawaii[1]	yes	Oklahoma	no
Idaho	no	Oregon[3]	yes
Illinois	no	Pennsylvania	no
Indiana	no	Rhode Island	no
Iowa	no	South Carolina	yes
Kansas	no	South Dakota	no
Kentucky	no	Tennessee	yes
Louisiana[4]	no	Texas	yes
Maine	no	Utah	no
Maryland	yes	Vermont	no
Massachusetts	no	Virginia	yes
Michigan	no	Washington	no
Minnesota	no	West Virginia	no
Mississippi	no	Wisconsin	no
Missouri	no	Wyoming	no

[1]Students must meet minimum performance requirements in selected competency areas. Districts select method of assessment.
[2]State requires assessment, but districts choose the test and set competency standards.
[3]State specifies competencies to be tested, but districts set performance standards.
[4]Requirement effective with the Class of 1991.
[5]Requirement effective with the Class of 1994.

SOURCE: Data from Richard J. Coley and Margaret E. Goertz, *Educational Standards in the 50 States: 1990* (Princeton, NJ: Educational Testing Service Policy Information Center, June 1990).

Minimum Performance Standards

Since it is not clear how establishing student performance standards at the state level can be used as a lever to raise overall achievement, this aspect of the reform agenda has received less attention. Policies requiring that students achieve particular grades are often ineffective because of differences in course content across school districts, and because it is easy for schools to "lower the curve"; that is, to award all students slightly higher grades than they would have received without grade standards in order to meet minimum requirements. Further, since many school districts have their own policies about minimum grades required for graduation (such as a passing grade in all required courses), there may be less need for states to mandate minimum grade requirements. Only two states, Florida and Idaho, have established minimum grade requirements for high school graduation.

The one type of achievement-related reform that has been implemented in some states concerns minimum performance required of students participating in extracurricular activities. Commonly called "no pass-no play" rules, such mandates typically set standards, defined in terms of number of courses and grades, or grade-point averages required of students participating in interscholastic sports or other extracurricular activities. The state policies established in this area as of 1989 are described in table 2.5. It is uncertain whether these policies were adopted before or after 1983.

Table 2.5—Statewide mandates on student participation in extracurricular activities: 1989

Alabama	Any junior or senior high school student whose grades in five classes average below a score of 70 is barred from participating in extracurricular activities.
Arizona	In response to 1988 legislation, the State Department of Education will set statewide standards for student participation in extracurricular activities in grades 6 through 12.
California	Requires junior and senior high school students to maintain a "C" average in "all enrolled courses" during the previous grading period in order to participate in extra- or co-curricular activities.
Florida	Students must pass the state competency tests and maintain minimum grade-point averages to participate in extracurricular activities.
Georgia	Students in the sixth grade through high school must have passed five subjects of a required six-subject load in the previous quarter or semester. High school students face added requirements related to the number of accumulated units earned toward high school graduation.
Hawaii	Requires a 2.0 grade-point average for students to participate in extracurricular activities.
Mississippi	Requires high school students to achieve a grade average of at least 70 (100-point scale) each semester in courses leading toward graduation in order to participate in extracurricular activities.
New Mexico	Requires a 2.0 grade-point average or its equivalent for the previous semester to be eligible to participate in interscholastic activities.
North Carolina	Requires students in grades 9 through 12 to pass five courses each semester and meet promotion standards established by the school system in order to participate in extracurricular activities. In grades 7 and 8, the student must meet state and local promotion standards and maintain passing grades each semester.
South Carolina	Requires students to pass at least four academic courses of the required five in the preceding semester to participate in interscholastic activities.
Tennessee	Requires students to maintain a "C" average in order to participate in extracurricular activities.
Texas	Requires students to maintain a "C" average in order to participate in extracurricular activities.
West Virginia	Requires students to maintain a "C" average in order to participate in extracurricular activities.

SOURCE: Data from Education Commission of the States, *Clearinghouse Notes. Statewide Mandates on Student Extracurricular Eligibility* (Denver, CO: 1989).

Minimum Student Contact Time and Intensity

A Nation at Risk devoted considerable attention to issues of "time." The National Commission on Excellence in Education reported that students in the United States spend much less time in school, compared with students from other industrialized nations (180 days typically, compared with 220 days). The Commission also noted that the time spent learning some minor subjects, for example driver's education, count for as much credit toward a high school diploma as chemistry or algebra, and that time on homework is often poorly spent. Some of the recommendations of the Commission were as follows:

- More time should be devoted to teaching and learning basic subjects, and this requires making better use of the school day, a longer school day, and perhaps a longer school year;
- School districts and state legislatures should consider mandating 7-hour school days and a 200- to 220-day school year;
- Attendance policies with clear incentives and sanctions should be used to reduce the amount of time lost through student absenteeism and tardiness; and
- Students in high schools should be assigned more homework.

More recently, Congress adopted Public Law 102-62, the "Education Council Act of 1991." Title I of the Act established the National Education Commission on Time Learning for the purpose of examining "...the quality and adequacy of the study and learning time of elementary and secondary students in the United States, including issues regarding the length of the school day and year, the extent and role of homework, [and] how time is being used for academic subjects...." The Commission report is due within 2 years, and should considerably bolster the arguments for reorganizing school time allocations raised in *A Nation at Risk.*

Length of School Day

Table 2.6 documents state requirements for length of school days in 1990. Forty-three of the 50 states set requirements or accreditation guidelines that establish a minimum length of school day. Of the seven states without requirements, one has recommended minimum daily instructional times, and two provide financial incentives for schools to meet state-specified minimum days. Currently, the 7-hour school day recommended in *A Nation at Risk* is not required by any states. Most states set a minimum high school day of between 5 and 6 hours, and 13 states mandate a minimum 6-hour school day for high school students. Some states such as California offer financial incentives to districts that set longer school days (Coley and Goertz 1990). No information could be found that describes whether or not actual changes have been made in the length of the school day since 1983 in any state.

Table 2.6—State requirements for length of the school day: 1990

State	Grade(s)	Minimum hours per day
Alabama	All	6 hours
Alaska	K–3	4 hours
	4–12	5 hours
Arizona	K	2 hours
	1–3	4 hours
	4–6	5 hours
	7–8	6 hours
	9–12	4 courses
Arkansas	All	5.5 hours
California	Not specified[1]	
Colorado	Not specified[2]	
Connecticut	All	4 hours (instructional)
Delaware	All	6 hours (excluding lunch)
Florida	K	3 hours
	1–3	4 hours
	4–12	5 hours (instructional)
Georgia	1–3	4.5 hours
	4–12	6 hours
Hawaii	All	6 hours
Idaho	1–3	4.5 hours
	4–6	5 hours
	7–12	5.5 hours (instructional)
Illinois	1	4 hours
	2–12	5 hours
Indiana	1–6	5 hours
	7–12	6 hours
Iowa	All	5.5 hours (instructional)
Kansas	All	6 hours
Kentucky	All	6 hours (instructional)
Louisiana	All	5.5 hours (instructional)
Maine	All	5 hours (average per week)
Maryland	1–8	6 hours
	9–12	6.5 hours
Massachusetts	1–6	5 hours
	7–12	5.5 hours

Table 2.6—State requirements for length of the school day: 1990—Continued

State	Grade(s)	Minimum hours per day
Michigan	Not specified[1]	
Minnesota	K	2.5 hours
	1–3	5 hours
	4–6	5.5 hours
	7–12	6 hours (excluding lunch)
Mississippi	All	5.5 hours
Missouri	All	3 hours (7 hours maximum)
Montana	K	2 hours
	1–3	4 hours
	4–12	6 hours
Nebraska	Not specified	
Nevada	1–2	4 hours
	3–6	5 hours
	7–12	5.5 hours
New Hampshire	1	4.5 hours
	2–8	5.3 hours
	9–12	5.5 hours (excluding lunch, recess)
New Jersey	All	4 hours
New Mexico	K	2.5 hours (in school-
	1–6	5.5 hours directed
	7–12	6 hours activities)
New York	K–6	5 hours
	7–12	5.5 hours
North Carolina	All	5.5 hours (instructional) (6 hours total)
North Dakota	1–6	5.5 hours
	7–12	6 hours (excluding lunch)
Ohio	K	2.5 hours
	1–6	5 hours
	7–12	5.5 hours
Oklahoma	K	2.5 hours
	1	5 hours
	2–12	6 hours
Oregon	Not specified	

Table 2.6—State requirements for length of the school day: 1990—Continued

State	Grade(s)	Minimum hours per day
Pennsylvania	K	2.5 hours
	1–6	5 hours
	7–12	6 hours
Rhode Island	K	2.5 hours
	1–6	5 hours (excluding lunch
	7–12	5.5 hours and recess)
South Carolina	K–6	6 hours (including lunch)
	7–12	6 hours (instructional time)
South Dakota	K	2.5 hours
	1–3	4 hours
	4–12	5.5 hours
Tennessee	K	4 hours
	1–12	6.5 hours
Texas	K	3 hours
	1–12	6 hours (instructional time) (7-hour day)
Utah	No mandate[3]	
Vermont	K	2 hours
	1–2	4 hours
	3–12	5.5 hours
Virginia	K	3 hours
	1–12	5.5 hours (excluding lunch)
Washington	K	2.5 hours (average)
	1–3	5 hours
	4–8	5.5 hours
	9–12	6 hours
West Virginia	K	2.6 hours (instructional)
	1–4	5.5 hours
	5–12	5.8 hours
Wisconsin	Not specified	
Wyoming	K	2.5 hours
	1–8	5 hours
	9–12	6 hours

[1]Financial incentives offered.
[2]Total annual instructional time mandated.
[3]State has recommended times.

SOURCE: Data from Richard J. Coley and Margaret E. Goertz, *Educational Standards in the 50 States: 1990* (Princeton, NJ: Educational Testing Service, Policy Information Center, June 1990).

Michigan also provides incentive grants for longer days instead of establishing a state mandate. Incentives are available to school districts that extend the school day to six 50-minute periods, or a total of 300 minutes of classroom instruction a day in grades 9 through 12. Florida requires 5 hours of instructional time for students in grades 4 to 12. In addition, Florida districts receive a financial incentive for offering six 60-minute class periods or seven 50-minute class periods, rather than the mandatory six 50-minute periods. While it may not be clear that these kinds of incentives are directly linked to 1980s reforms, they are certainly based on related concerns.

Minimum School Days and Years

There is little variation in the minimum number of school days states require for a school year and little evidence that as of 1990 states had responded to this issue. (As year-round schools are introduced around the country, however, changes may become evident.) Virtually no state has adopted the 200–220 day school year recommended in *A Nation at Risk*. Tennessee has a 200-day year—the longest school year mandated by a state—but the 200 days include a minimum of only 180 days for instruction and 5 days for teacher in-service training. Table 2.7 shows the minimum number of pupil–teacher contact days required by states and the District of Columbia as of August 1989. Ohio requires 182 days, 34 states and the Distri t of Columbia require 180 days, 2 states require 176 days, 12 states require 175 days, 1 state requires 174 days, and 1 state requires 170 days.

Table 2.7—Minimum number of pupil–teacher contact days in a school year: August 1989

State	Minimum number of pupil–teacher contact days	State	Minimum number of pupil–teacher contact days
Alabama	175	Montana	180
Alaska	180	Nebraska[4]	
Arizona	175	Nevada	180
Arkansas	180	New Hampshire	180
California[1]	175–180	New Jersey	180
Colorado	176	New Mexico	180
Connecticut	180	New York	180
Delaware	180	North Carolina	180
District of Columbia	180	North Dakota	180
Florida	180	Ohio[5]	182
Georgia	180	Oklahoma	180
Hawaii	175–180	Oregon[6]	
Idaho	180	Pennsylvania	180
Illinois[2]	176	Puerto Rico	180
Indiana	180	Rhode Island	180
Iowa	180	South Carolina[7]	180
Kansas[3]		South Dakota	175
Kentucky	175	Tennessee[8]	180
Louisiana	175–180	Texas	175
Maine	175	Utah	180
Maryland	180	Vermont	175
Massachusetts	180	Virginia	180
Michigan	180	Washington	180
Minnesota	170	West Virginia	180
Mississippi	180	Wisconsin	180
Missouri	174	Wyoming	175

[1]California allows individual schools that participate in certain staff development–school improvement programs to use up to 8 days per year for staff development with students not in attendance.

[2]By resolution of the district's board, any district may operate one or more schools within the district on a full-year school plan approved by the State Board of Education. Any board operating under this resolution must devise a plan so that the minimum term of 180 days for actual attendance is filled, including not more than 4 in-service institute days during a 12-month period, but not to exceed 185 days. The State Board of Education provides grants to those qualifying districts that apply, to be used for gifted–talented programs or summer remediation.

Table 2.7—Minimum number of pupil–teacher contact days in a school year: August 1989—Continued

[3]Kansas law requires 180 six-hour days or 1,080 hours of flexible time.

[4]The actual statute provision in Nebraska is in hours: 400 hours for kindergarten, 1,032 for elementary school, and 1,080 for high school. For comparative purposes, the number is equal to 180 days of 6-hour days for high school.

[5]In Ohio, schools must be open for 182 instruction days each year, which may include up to 2 days for parent–teacher conferences and 2 days for staff development.

[6]In 1989, Oregon approved a statute change to instructional hours instead of days to allow more flexibility for the districts. The state now requires 450 hours for kindergarten (equivalent of 2.5 hours per day); 810 hours for grades 1–3 (equivalent of 4.5 hours per day); and 990 hours for grades 9–12 (equivalent of 5.5 hours per day).

[7]South Carolina requires teachers to be employed 190 days.

[8]In Tennessee, districts' calendars are to include 180 days for teacher–pupil contact, 10 paid teacher vacation days, 5 in-service training days, and 5 days designated by the districts to be used for administrative purposes or emergencies.

SOURCE: Data from Education Commission of the States, *Clearinghouse Notes. School Calendar as of August 1989* (Denver, CO: 1990).

School Attendance Policies

Most policies concerning absenteeism and tardiness are set at the district or school level, but states do play a role. Table 2.8 summarizes state attendance mandates as of 1989. Since 1978, 12 states have changed compulsory attendance requirements. Between 1978 and 1989, 5 states lowered the age at which children begin formal schooling, and 7 states raised the age at which it is permissible to leave school. Although most states simply define the ages of mandatory attendance, two states have gone further. North Carolina requires students to attend school a minimum of 150 days per year (out of a minimum 180-day school year) in order to receive credit for the school year. High school students in South Carolina must attend school 170 out of 180 days. California has no state requirements, but state legislation permits local districts to adopt policies to fail students for excessive absences.

Table 2.8—Ages for compulsory school attendance by state: 1989

State	Age	State	Age
Alabama	7 to 16	Montana[4]	7 to 16
Alaska[1]	7 to 16	Nebraska	7 to 16
Arizona	8 to 16	Nevada	7 to 17
Arkansas	5 to 17	New Hampshire	6 to 16
California	6 to 16	New Jersey	6 to 16
Colorado	7 to 16	New Mexico	6 to 18
Connecticut	7 to 16	New York[5]	6 to 16
Delaware	5 to 16	North Carolina	7 to 16
Florida	6 to 16	North Dakota	7 to 16
Georgia	7 to 16	Ohio	6 to 18
Hawaii	6 to 18	Oklahoma	7 to 18
Idaho	7 to 16	Oregon	7 to 18
Illinois	7 to 16	Pennsylvania	8 to 17
Indiana	7 to 16	Rhode Island	6 to 16
Iowa	7 to 16	South Carolina[6]	5 to 17
Kansas	7 to 16	South Dakota[4]	7 to 16
Kentucky[2]	6 to 16	Tennessee	7 to 17
Louisiana	7 to 17	Texas[7]	7 to 17
Maine	7 to 17	Utah	6 to 18
Maryland	6 to 16	Vermont	7 to 16
Massachusetts	6 to 16	Virginia	5 to 17
Michigan	6 to 16	Washington	8 to 18
Minnesota[3]	7 to 18	West Virginia	6 to 16
Mississippi	6 to 14	Wisconsin	6 to 18
Missouri	7 to 16	Wyoming	7 to 16

[1]Ages 7 to 16 or high school graduation.
[2]Must have parental signature for leaving school between ages 16 and 18.
[3]Takes effect in the year 2000. Currently ages 7 to 16.
[4]May leave after completion of eighth grade.
[5]The ages are 6 to 17 in New York City and Buffalo.
[6]Permits parental waiver of kindergarten at age 5.
[7]Must complete academic year in which 16th birthday occurs.

SOURCE: U.S. Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics, *Digest of Education Statistics: 1990* (Washington, D.C.: Feb. 1991), table 139.

Class Size

In 1990, 24 states had maximum class sizes. Twelve of these states set maximums for all grades through the 12th grade; the remainder set limits for some grades, mostly at the elementary level (table 2.9). It is not known whether changes have occurred since 1983.

Table 2.9—Class size: State mandates in 1990

State	Grade	Class size	Exceptions & notes
Arkansas	K	20	
	1–3	Average 23; max. 25	
	4–6	Average 25; max. 28	
	7–12	Max. of 150 students per teacher per day	
California	K	Max. 33	Recommended 31.
	1–3	Max. 32	Recommended 30.
	4–8	Max. 28	District penalized if above in grades 4–12.
	9–12	Max. 25	
Georgia	K	Max. 28 with aide; 21 without	Also have district-wide average limitations.
	1–3	Max. 33 with aide; 25 without	
	4–8	Max. 33	
	9–12	Max. 35	
Hawaii	K–12	Max. 20	Grades K, 1, and 2 only.
Indiana	K–12	30/1 building ratio	Student/teacher ratio.
Kentucky	K	Max. 28 with aide	Applies to academic classes only (all grades).
	1	Max. 24	
	2–3	Max. 25	
	4	Max. 28	
	5–6	Max. 29	
	7–8	Max. 31	
Louisiana	K–3	Max. 26	
Maine	K–3	Max. 25	
Minnesota	K	Max. 30	
	7–12	Max. of 160 students weekly avg. max.	
Mississippi	K–4	Max. 27	
	5–8	Max. 30	For self-contained academic classes.
	5–12	Max. 33	For departmentalized academic classes.

Table 2.9—Class size: State mandates in 1990—Continued

State	Grade	Class size	Exceptions & notes
Missouri	Elementary High school	Max. 35 for accreditation Max. 40 for accreditation	
Montana	K–3 4–6 7–8	Max. 20 Max. 24 Max. 26	For all grades, higher maximum in single room schools.
Nebraska		Max. 25 for accreditation	Permits local option.
New Jersey	K	Max 25 26 to 29 with aide	Recommended 20, over 29 must be split.
North Carolina	K–9 10–12	Max. 29 33	K classes have aides for 27–29 students.
North Dakota	K–3 4–8	Max. 25 Max. 30	For one-grade rooms. For one-grade rooms; lower in all cases if multigrade room.
Oklahoma	K 1–3 4–6	25 22 Max. 25–26	May have new 1990 provisions.
Ohio	K–4	Max. 25 (average)	Limit for districtwide average class size.
South Carolina	K–3 4–6 7–12	Max. 30 Max. 30 Max. 35	Reading and math classes, otherwise 35.
Tennessee	K–3 4 5–6 7–12	25 28 30 35	Commissioner may make 10% exception; may lose state funds for noncompliance.
Texas	K–4	22	
Vermont	K–3 4–6 7–12	Average 20 Average 24 Max. of 150 students per teacher per day	Limit based on school average. English grades 7–12, 100 students per teacher per day.

Table 2.9— Class size: State mandates in 1990—Continued

State	Grade	Class size	Exceptions & notes
Virginia	K	25; 30 with aide	
	1	Average 24; 30 max.	
	2–3	Average 25; 30 max.	
	4–6	Average 25; 35 max.	
West Virginia	K	20	
	1–6	25	Can go above limit by 3 students with permission.

SOURCE: Data from Education Commission of the States, *Clearinghouse Notes. Class Size: State Mandates* (Denver, CO: 1990).

Summary

A review of state reform of student standards indicates that certain issues have received considerable attention. It must be understood that many states began addressing issues of student standards even before the 1980s. Further, from state to state, differences can be seen in the substance of the reforms, although at first glance they might seem quite similar. Equally important, school districts were also active in reforming student standards, and in many cases, without regard to state initiatives, district standards often exceeded state requirements.

During the 1980s, there was substantial state reform of the *requirements for high school graduation.* Most states instituted some increase in graduation requirements during the early 1980s; however, many of these new requirements first applied to the high school graduating classes of the late 1980s or early 1990s. Despite the increases in course requirements, most states' requirements are still lower than those recommended in the report *A Nation at Risk* and other national reform studies.

Testing, for a variety of purposes, was also an area of considerable state reform activity. Much of the increase in competency testing occurred during the 1970s and early 1980s. States use tests for many purposes, including monitoring student progress, screening students for grade promotion or high school graduation, and assigning students to remedial education. States also use minimum competency tests in ways that do not directly affect students—that is, for monitoring school or district performance or for allocating funds to districts.

Minimum performance standards were a less common target of state policy. Only two states require minimum grade-point averages for high school graduation, although about one-fourth of the states mandate a minimum level of performance for participation in extracurricular activities.

Minimum time and intensity goals are addressed by states through policies concerning the length of the school day and year, attendance, and maximum class sizes. Although most states have policies setting standards in these areas, during the past decade few states increased the required length of the school year, mandated attendance policies, or established maximum class size.

Chapter 3

Student Standards and Research on Trends Associated with School Reforms

As noted in the preceding chapter, the substance of reform initiatives differs significantly from state to state, and various reforms have been adopted at different times across the states. Thus, for analytical purposes there is no "moment" representing the "pre-reform era." Some states have been strengthening student standards since the 1970s, whereas others have begun to act only recently. In all circumstances, reforms have been adopted in a piecemeal fashion, rather than comprehensively. Equally important, and another problem confounding this discussion, the states are not alone in enacting reforms. Many school districts have aggressively confronted the issue of higher student standards, often adopting requirements that surpass state mandates. Finally, the complexity of the schooling enterprise (various levels of governance have different powers and authorities on matters relating to schooling across the states); the simultaneous effects of other "inputs" on students; and changing student characteristics and backgrounds all combine to make it difficult to assess the impacts of higher student standards mandated by the states because it is hard to separate such impacts from those of other developments.

This chapter looks at research on trends in student outcomes and linkages to school reform. The first section discusses student course-taking patterns and the proportion of school time devoted to academic subjects—issues frequently associated with state reform of student standards. These are the "tools" of reform, mechanisms intended to improve student outcomes. The focus of the second section is on two outcomes that are among the objectives of reform—enhancing student achievement and high school completion rates—outcomes that are expected to improve as a new generation of students pass through schools under more rigorous standards. First, some nationally representative data are presented to describe where students stand on these outcome measures. Then, research concerned with the links between outcomes and reforms is examined. Given the diverse character of the reform movement and the confounding elements noted above and in chapter 1, the research cited in this chapter should be viewed less for products (which are far from definitive) and more for hypotheses and models necessary for defining the role of reform.

Trends in Credits and High School Course-Taking Patterns

High school course-taking patterns are changing. A number of studies sponsored by NCES between 1969 and 1987 document this trend.

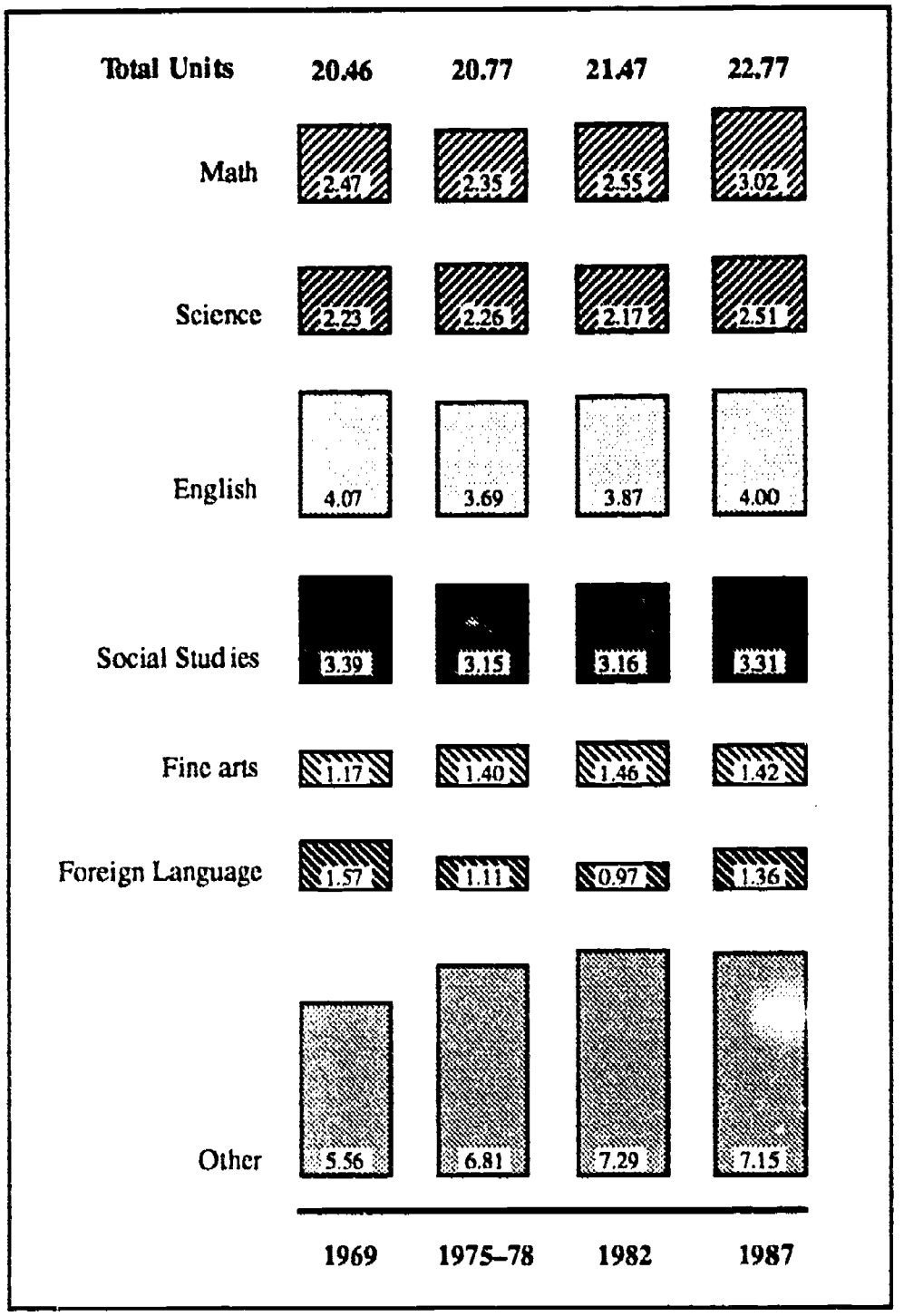
Figures 3.1 and 3.2 show high school course-taking patterns for selected years from 1969 to 1987. The data are drawn from different studies, but the samples from each cohort are nationally representative and comparable for public high school graduates. Similarly, the courses taken by students in each cohort were classified according to the same taxonomy.

Figure 3.1 shows the average total number of credits and average number of course credits in academic subjects completed by each sampled cohort.[3] The total number of course credits earned by high school graduates increased slightly, from 20.5 in 1969 to 22.8 in 1987 (a difference of approximately 2.3 credits, or about 10 percent). Increases in the number of academic credits earned accounted for much of the total increase that occurred between the 1982 and 1987 cohorts. In mathematics, the number of credits completed by graduates was about 2.5 between 1969 and 1982, and increased by the equivalent of a one-semester course between 1982 and 1987. In science, graduates completed about 2.2 credits between 1969 and 1982, but science credits completed increased from 2.2 in 1982 to 2.5 in 1987.

The average number of English credits completed was slightly less for the 1975–78 cohort than for the 1969 cohort, but increased from 3.7 in 1975–78 to 4.0 in 1987 (about the same level as in 1969). Social studies credits earned by graduates declined between 1969 and 1982, but increased from 3.2 in 1982 to 3.3 for the 1987 cohort (nearly the same level as in 1969). The fine arts credits that graduates completed were higher in 1975–78 than in 1969, but were stable for the years 1975–78 through 1987, at about 1.4 credits. Between 1982 and 1987, the number of foreign language credits completed increased, following a decline between the 1969 and 1982 cohorts. In general, the number of credits completed by graduates in most academic subject areas increased between the 1982 and 1987 graduate cohorts.

[3] A credit is equivalent to a standard 1-year high school course.

Figure 3.1—Average total number of course credits earned by public high school graduates and credits earned in specific academic subjects: 1969, 1975–78, 1982, and 1987



NOTE: Course categories have been standardized for all databases.

SOURCE: Data from J. Tuma, A. Gifford, L. Horn, and E.G. Hoachlander, *Enrollment Trends in Vocational and Academic Education in American Public High Schools, 1969 to 1987* (Berkeley: MPR Associates, 1989); U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress 1987 High School Transcript Study, and High School and Beyond Sophomore Cohort 1982 Transcript Study; U.S. Department of Labor, National Longitudinal Survey of Labor Force Experience–Youth Cohort (1975–78 and 1979–82); and Educational Testing Service, Study of Academic Prediction and Growth (1969).

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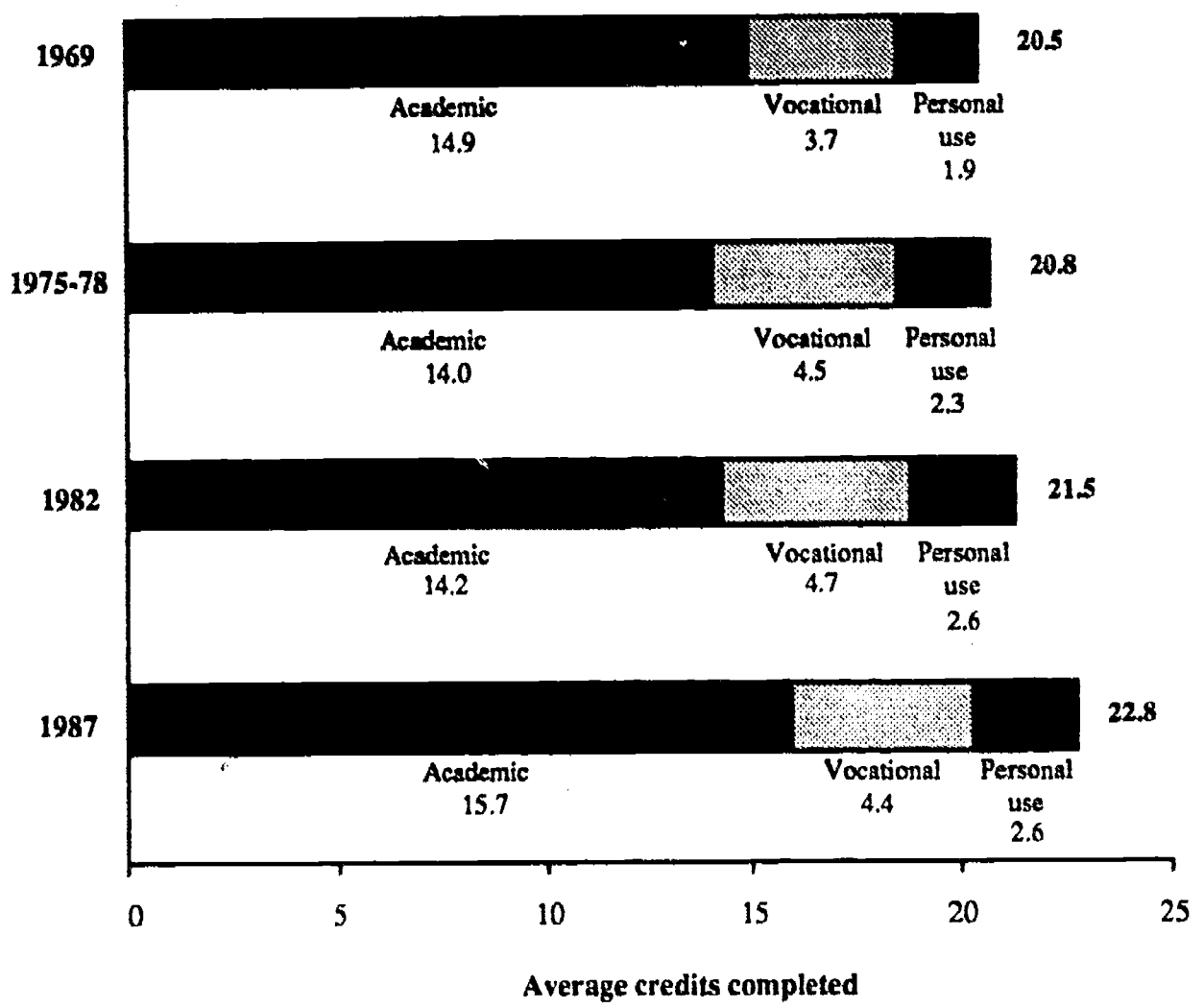
Figure 3.2 shows the average number of credits and the proportion of all credits completed by high school graduates in academic, vocational, and personal use curricula for selected years from 1969 to 1987. The figure is based upon a taxonomy developed by Tuma et al., using codes of the Classification of Secondary School Courses (CSSC) from the Center for Education Statistics (now NCES). The academic curriculum is composed of mathematics, science, English, social studies, fine arts, and foreign languages. The vocational curriculum includes courses in consumer and homemaking education, general labor market preparation, and specific labor market preparation. Personal use includes such courses as student government, religion, and physical education. In figure 3.2, the general course-taking pattern seen for academic courses in figure 3.1 is repeated. The total number of academic credits that students took fell between 1969 and 1975–78 from 14.9 to 14.0, and increased between 1982 and 1987 from 14.2 to 15.7. These differences are also reflected in the proportion of academic credits to total credits. For example, academic credits made up about 73 percent of the average student's coursework in 1969, about 66 percent for the 1982 cohort, and about 69 percent in 1987.

The average number of vocational courses completed by high school graduates increased from 3.7 in 1969 to 4.7 for the 1982 cohort. By 1987, the number of vocational credits completed declined slightly to an average of 4.4 vocational credits per graduate. (As a percentage of a student's coursework, vocational education courses increased from about 18 percent to about 23 percent between 1969 and 1982, but decreased to less than 20 percent in 1987.)

The average number of personal use courses taken by high school graduates increased between 1969 and 1982 from 1.9 to 2.6. Graduates took the same number of these courses in 1987 as they had in 1982. (As a percentage of a student's high school program, personal use courses increased from about 9 percent to about 12 percent between 1969 and 1982, and made up 11 percent of the credits completed by the 1987 graduates.)

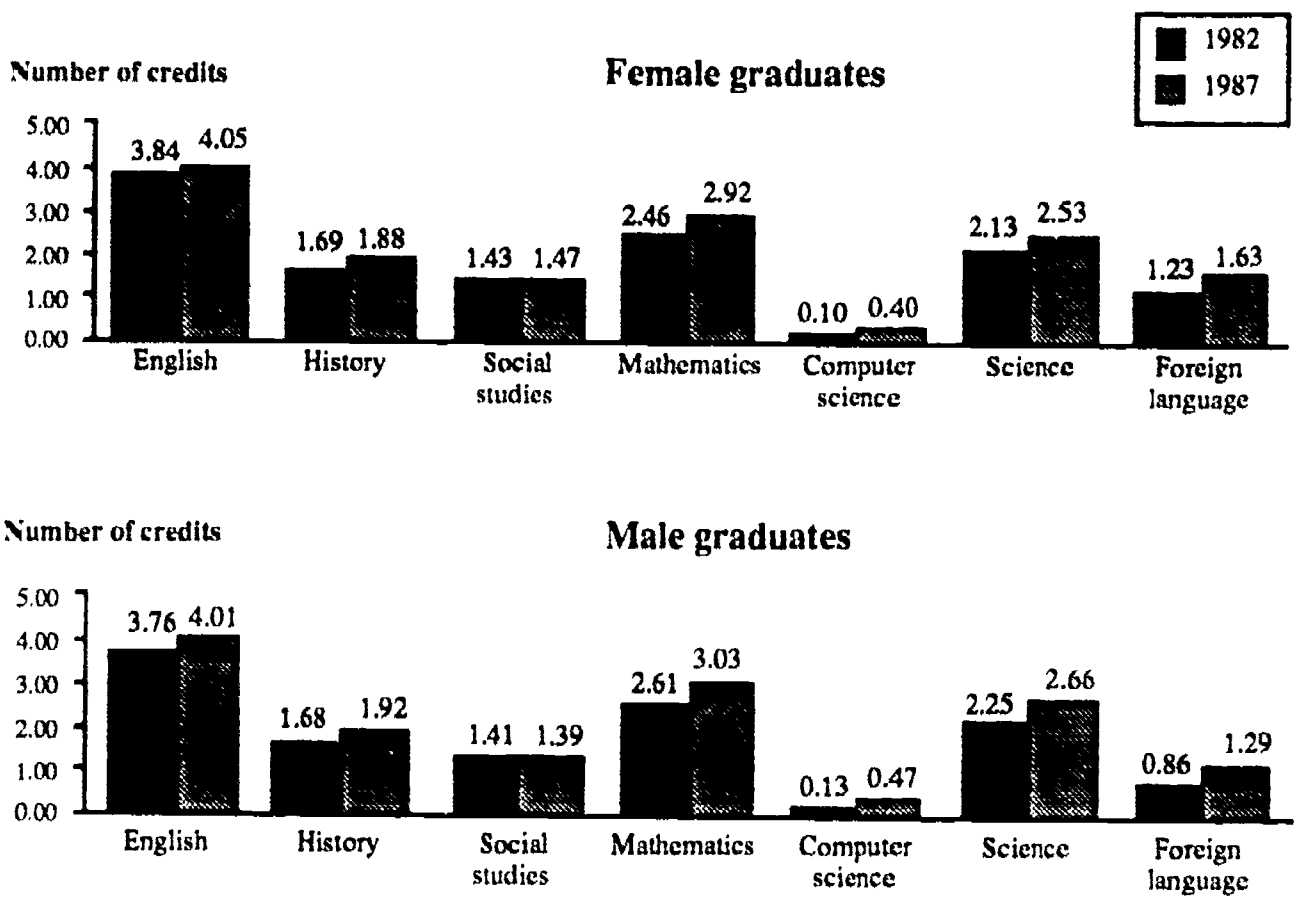
Figure 3.2—Average number of credits completed in 4 years of high school by public high school graduates, by general academic track: 1969, 1975–78, 1982, and 1987



SOURCE; Data from J. Tuma, A. Gifford, L. Horn, and E.G. Hoachlander, *Enrollment Trends in Vocational and Academic Education in American Public High Schools, 1969 to 1987* (Berkeley: MPR Associates, 1989); National Center for Education Statistics (NCES), National Assessment of Educational Progress 1987 High School Transcript Study; NCES High School and Beyond Sophomore Cohort 1982 Transcript Study; Department of Labor National Longitudinal Survey of Labor Force Experience–Youth Cohort (1975–78 and 1979–82); and Educational Testing Service, Study of Academic Growth and Prediction (1969).

Figures 3.3 and 3.4 further describe the academic course-taking patterns of the 1982 (HS&B sophomores) and 1987 (NAEP Transcript) cohorts. Figure 3.3 shows differences in the average number of academic credits earned by female and male high school graduates for the years 1982 and 1987, while figure 3.4 shows the average number of credits earned by graduates from different racial-ethnic backgrounds during these 2 years. Small but statistically significant increases were found among white, black, Hispanic, and Asian high school graduates in the amount of English, history, mathematics, computer science, science, and foreign language credits they completed in 1987, compared with their 1982 counterparts. The increases in the average number of course credits completed by male and female high school graduates were similar.

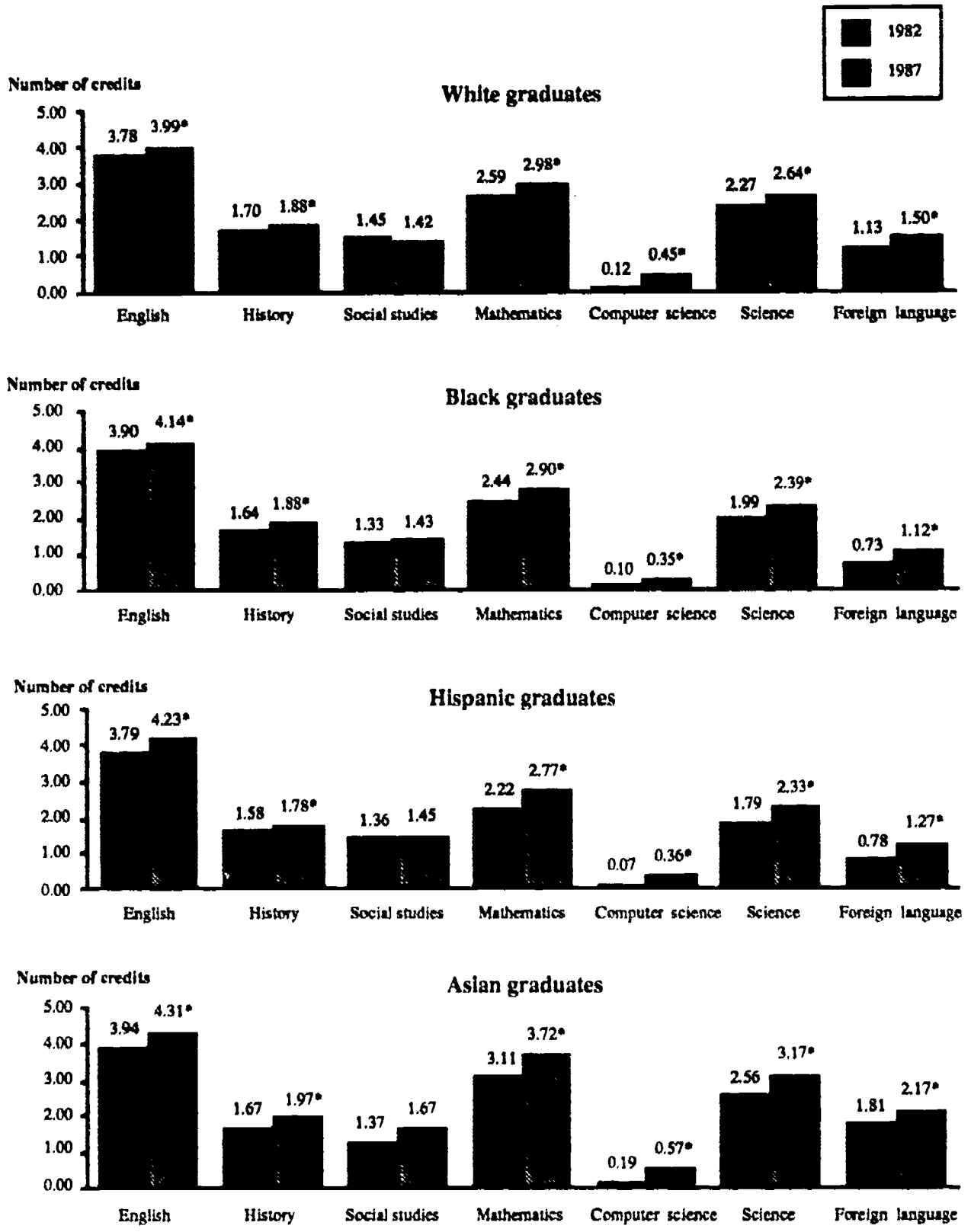
Figure 3.3—Average number of credits earned by high school graduates in academic subjects, by sex: 1982 and 1987



NOTE: Tests of significance were not conducted for male and female subpopulations.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Nation at Risk Update Study as Part of the 1987 High School Transcript Study* (Washington, D.C.: 1988), compiled from 1987 High School Transcript Study and High School and Beyond 1980 Sophomore Cohort Transcript Study data.

Figure 3.4—Average number of credits earned by high school graduates in academic subjects, by race–ethnicity: 1982 and 1987



*Indicates difference between 1982 and 1987 graduates that are significant at the $p \leq .05$ level.

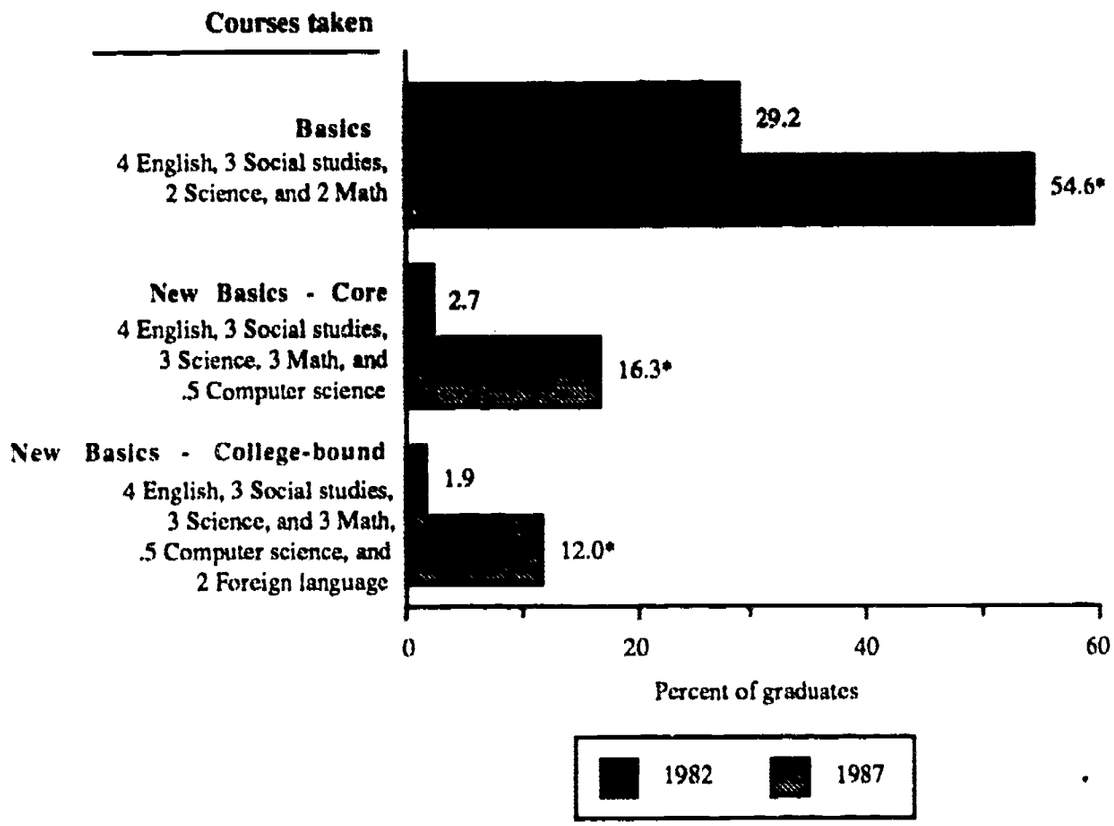
SOURCE: U.S. Department of Education, National Center for Education Statistics, *Nation at Risk Update Study as Part of the 1987 High School Transcript Study* (Washington, D.C.: 1988), compiled from 1987 High School Transcript Study and High School and Beyond 1980 Sophomore Cohort High School Transcript Study data.

Figures 3.5 and 3.6 show course-taking patterns in certain academic subjects among graduates in 1982 and 1987. These data suggest that the kinds of "New Basics" programs recommended for high school students by the National Commission on Excellence in Education in 1983 were at least associated with changes that had begun to take place in course-taking patterns. As noted earlier, these patterns are difficult to interpret. Since it often takes years to disseminate and implement new educational policies, the National Commission's report may not explain changes in course-taking patterns that occurred among students during this period. The changes, no doubt, reflect a more general movement that began before 1983 involving efforts to raise student standards—changes in college entrance requirements and in school resource allocations, among others. Taken together, these factors, along with the attention that the National Commission focused on the issue, have fostered new course-taking patterns. Thus, "New Basics" was part of an emerging trend, not necessarily the cause of that trend.

Under any circumstances, change was taking place during this period. Figure 3.5 demonstrates that 1987 high school graduates were more likely than 1982 graduates to have completed more rigorous academic programs. For example, in 1982, 29 percent of graduates completed at least 4 years of English, 3 years of social studies, 2 years of science, and 2 years of mathematics. In 1987, 55 percent of graduates completed at least these 11 units of academic coursework; the other course-taking patterns shown in figure 3.5 were completed by a smaller proportion of graduates. However, for each standard set of courses, higher percentages of graduates met these minimum course-taking standards in 1987 than in 1982.

Figure 3.6 shows the proportion of white, black, Hispanic, and Asian high school graduates who completed "New Basics" courses of study. Generally, the proportion of students from each racial–ethnic category completing "New Basics" courses increased between 1982 and 1987. Noteworthy are the disparities in course taking among students from different racial–ethnic groups. For example, in 1987, 24 percent of Asian graduates completed the "College Bound" New Basics standard (4 English credits; 3 social studies, science, and mathematics credits; 0.5 computer science credits; and 2 foreign language credits), but only 13 percent of white graduates completed the same program. The proportions of black and Hispanic high school graduates who completed this most rigorous program were even lower (8 percent and 6 percent, respectively). The same pattern holds for the core courses in the New Basics: higher proportions of Asian than white graduates completed at least the minimum credits indicated, and white graduates were more likely than their black or Hispanic peers to meet these standards.

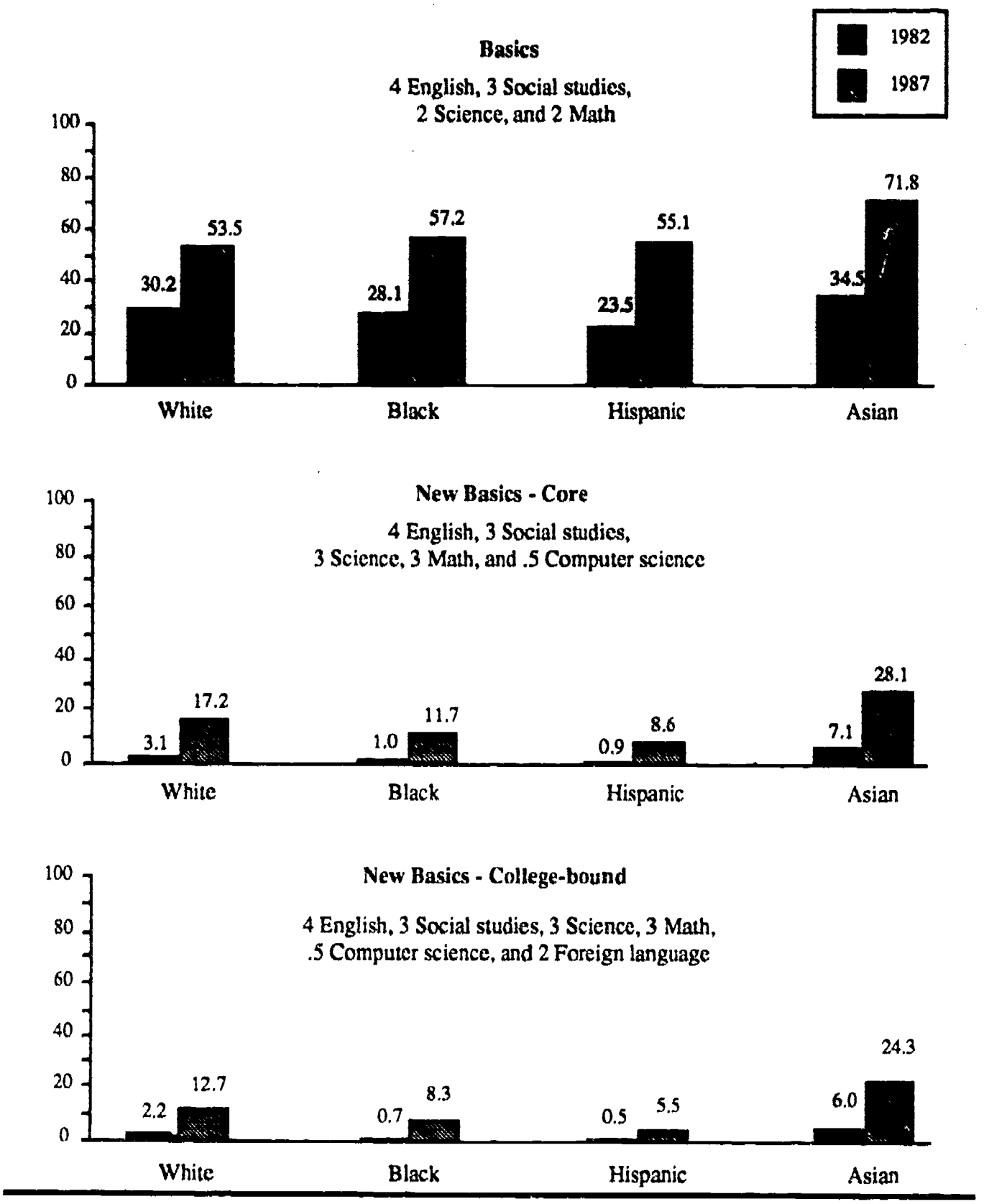
Figure 3.5—Percentage of high school graduates earning indicated minimum credits in "New Basics" courses: 1982 and 1987



*Indicates difference between 1982 and 1987 graduates that are significant at the $p \leq .05$ level.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Nation at Risk Update Study as Part of the 1987 High School Transcript Study* (Washington, D.C.: 1988), compiled from 1987 High School Transcript Study and High School and Beyond 1980 Sophomore Cohort High School Transcript Study data.

Figure 3.6—Percentage of high school graduates earning indicated minimum credits in different combinations of "New Basics" courses, by race–ethnicity: 1982 and 1987



SOURCE: U.S. Department of Education, National Center for Education Statistics, *Nation at Risk Update Study as Part of the 1987 High School Transcript Study* (Washington, D.C.: 1988), compiled from 1987 High School Transcript Study and High School and Beyond 1980 Sophomore Cohort High School Transcript Study data.

Course-Taking Patterns Among Selected Subpopulations

Students with different post-graduation plans. Tuma and Gifford (1989) compared the course-taking patterns of 1982 and 1987 high school graduates who planned to enter the labor market following their graduation with those of graduates who planned to attend college.[4] They found that in 1987 more students were preparing to attend college than had been the case in 1982. In addition, the authors reported that the growth in academic course taking resulted primarily from an increase in the percentage of college-bound graduates, who take more academic courses than non-college-bound graduates, and from an overall increase in the number of academic courses taken by the college-bound sector. Finally, they observed that among students who were bound for 2- or 4-year colleges and non-college-bound students, the average number of total credits completed by graduates was greater in 1987 than in 1982, but that non-college-bound graduates still completed fewer credits than did students who were bound for 2- or 4-year colleges.

Racial–ethnic groups. Goertz (1989) found that the percentage of graduates taking various mathematics and science courses increased among white, black, and Hispanic graduates between 1982 and 1987. Although black and Hispanic students were less likely than white students to take advanced classes in 1987, substantial increases occurred among both black and Hispanic graduates. For example, the percentage of graduates taking algebra I increased from 68 percent to 78 percent among white students, from 58 percent to 71 percent among black students, and from 55 percent to 77 percent among Hispanic students. For geometry, algebra II, trigonometry, and pre-calculus, significant increases were observed among all three racial–ethnic groups, although white graduates' enrollment in these courses remained greater than that of black or Hispanic graduates by 5 percentage points (in pre-calculus) to 20 percentage points (in geometry). In science courses, a similar pattern was observed. In 1982, 34 percent of white students, 21 percent of black students, and 15 percent of Hispanic students took chemistry; by 1987, those percentages had increased to 48 percent, 30 percent, and 32 percent, respectively. Thus, although substantial increases occurred across racial–ethnic groups, white graduates remained more likely to take advanced math and science courses than did black or Hispanic graduates.

Disadvantaged students. The U.S. General Accounting Office (1989) analyzed changes in the course taking of disadvantaged, at-risk students, and other students (not at-risk) in a small study of two school districts. At-risk students were defined as those scoring at or below the 34th percentile on eighth-grade standardized reading tests. In this study it was reported that "post-reform" students (who entered grade 9 in the 1983–84 school year) from both groups took more academic courses and fewer vocational education courses than did "pre-reform" students (who entered grade 9 in the 1982–83 school year). In particular, decreases were found in the number of post-reform students who took vocational education courses concerned with labor market preparation (both general and occupationally specific), but were not found in the number who took consumer and homemaking classes. In one district, post-reform, at-risk students took 1.7 more academic courses and 0.5 fewer vocational education courses than did pre-reform, at-risk students. In another district, post-reform, at-risk students took 0.5 more academic courses and 0.7 fewer vocational courses than did pre-reform, at-risk students. The authors of the report noted that the proportion of students who took five or more vocational courses declined for both groups of students, but that the drop was greater for at-risk students. Whether or not this decline in vocational course taking has had an impact on these students' preparation for the job market or on dropout rates is unknown.

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[4] Data from this research was limited to transcripts of students who graduated from high school with their class. Neither dropouts nor those receiving GED certificates are included.

These course-taking patterns represent important indicators of change over time that may be associated with state reform of student standards. It must be noted, however, that these data say nothing about the content or quality of courses. Similarly, they do not show, for instance, whether increased academic course requirements cause students to learn more—an issue of special interest to analysts of the reform movement. Different data sets may offer various insights into an issue such as this one. With regard to impacts, detailing changes in course-taking patterns may provide one window of opportunity for further research, while achievement assessments like NAEP, quite another one.

Trends in Mathematics and Reading Achievement

At the beginning of this chapter, it was noted that the state reforms described in this report are intended to promote student achievement and improve high school completion rates. For instance, policies designed to increase academic course taking are a means to that end. While data on achievement and high school completion rates do not permit statistical associations with current reform activities, these are the kinds of indicators that over time will assist policymakers at the national level in assessing the degree to which reform outcomes have changed. The next sections describe the current status of achievement and high school completion indicators, as reflected in national data sets and related research.

The periodic National Assessment of Educational Progress (NAEP) achievement tests provide the most reliable indicators of student achievement. These tests are administered on a regular basis to nationally representative samples of 9-, 13-, and 17-year-olds. In most subjects, NAEP measures student performance on a 0 to 500 proficiency scale that provides a basis for describing overall student achievement in the tested curriculum area. To characterize each level of performance, NAEP proficiency scales define levels (150, 200, 250, 300, and 350) that represent progressively more complex skills achievement.

Two of the four subjects tested regularly by NAEP are mathematics and reading.

Mathematics Achievement

NAEP has conducted five national assessments of mathematics performance during the school years 1972–73, 1977–78, 1981–82, 1985–86, and 1989–90. The five mathematics proficiency levels defined by NAEP are the following:

150—Simple arithmetic facts: Knows some basic addition and subtraction facts.

200—Beginning skills and understanding: Can add and subtract two-digit numbers and recognize relationships among coins.

250—Basic operations and beginning problem solving: Can add, subtract, multiply, and divide using whole numbers and solve one-step problems.

300—Moderately complex procedures and reasoning: Can compute with decimals, fractions, and percents; recognize geometric figures; solve simple equations; and use moderately complex reasoning.

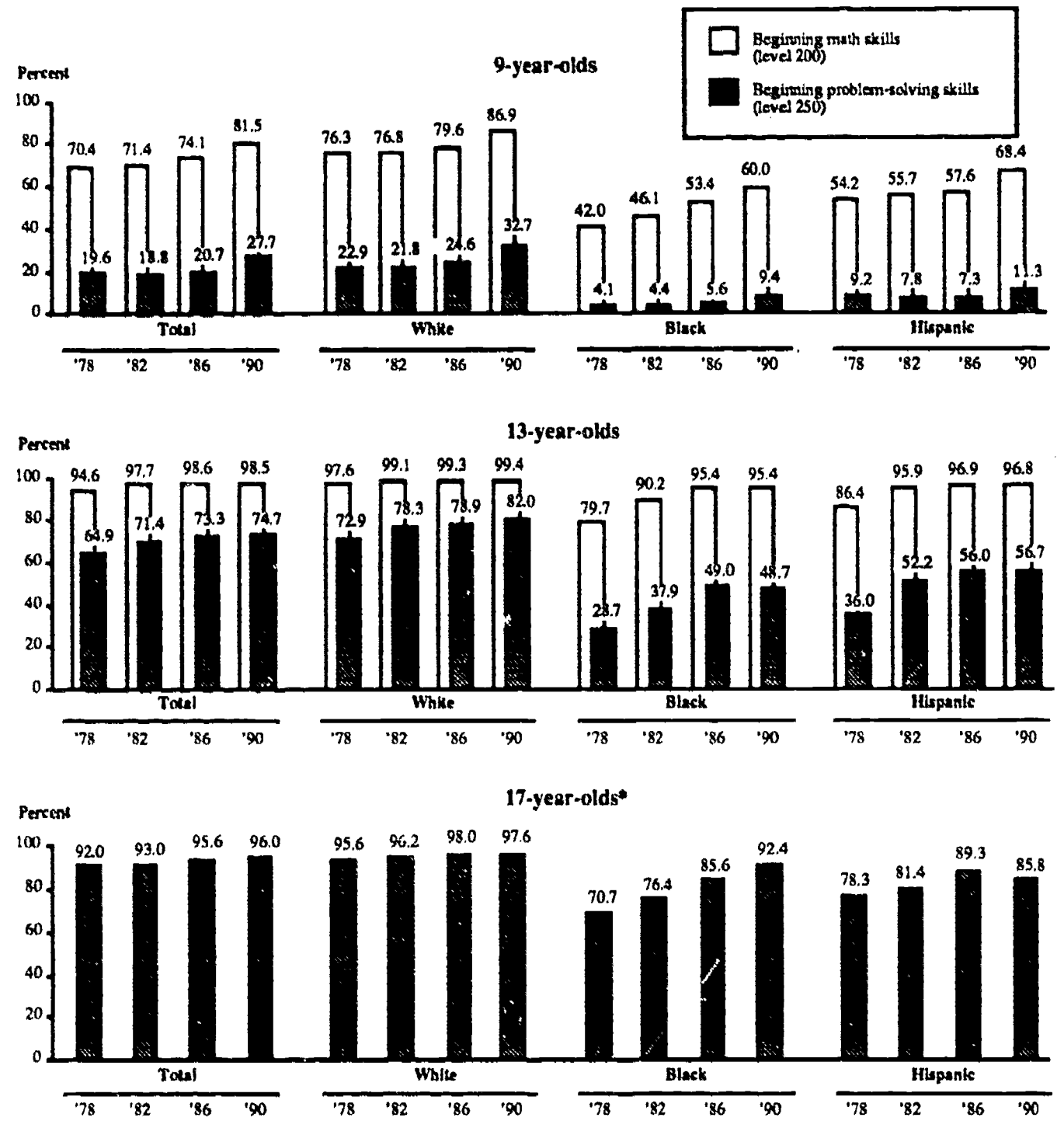
350—Multi-step problem solving and algebra: Can solve multi-step problems and use basic algebra.

The results of the 1977–78 through the 1989–90 assessments are discussed below.

Figure 3.7 shows the distribution of student achievement at the second (200 level) and the third (250 level) of the NAEP mathematics assessment conducted in 1978, 1982, 1986, and 1990. Students performing at the 200 level, "beginning skills and understanding," have a greater range and depth of basic mathematical skills than those performing at the most basic level (150—not shown), and they can conduct simple addition, subtraction, multiplication, and division operations. However, students performing at the 200 level have difficulty with reasoning that requires more than simple numeric computation. Virtually all 13- and 17-year-olds and 82 percent of the 9-year-olds performed at or above this level in the 1990 assessment. These outcomes represented significantly improved performance for students aged 9 and 13 between 1978 and 1990. Still, 18 percent of 9-year-olds in 1990 (third- and fourth-grade students) had not acquired an understanding of mathematics at the 200 level of proficiency.

Students performing at the 250 level, "basic operations and beginning problem solving," have a basic understanding of addition, subtraction, multiplication, and division and are beginning to acquire more developed reasoning skills. As figure 3.7 shows, there are substantial differences in performance across the age groups. Slightly more than 25 percent of the 9-year-olds reached this level in the most recent assessment. Significantly more 13-year-olds performed at or above this level in 1990 than in 1978, and most of the increase occurred between 1978 and 1982. However, the percentage of students achieving at this level in either year was still below 75 percent. The percentage of 17-year-olds performing at or above this level increased from 92 percent in 1978 to 96 percent in 1990.

Figure 3.7—Percentage of 9-, 13-, and 17-year-old students who have attained "beginning skills and understanding" (level 200) or "basic operations and beginning problem-solving skills" (level 250) in mathematics, as measured by NAEP, by race–ethnicity: 1978, 1982, 1986, and 1990



*Virtually all 17-year-olds attained beginning math skills.

NOTE: For a description of skill categories, see the *Mathematics Achievement* section above.

SOURCE: I.V.S. Mullis, J. Dossey, M. Foertsch, L. Jones, and C. Gentile, *Trends in Academic Progress: Achievement of American Students in Science, 1970–90, Mathematics, 1973–90, Reading, 1971–90, and Writing, 1984–90* (Princeton: Educational Testing Service, 1991).

In 1990, 17 percent of 13-year-olds and 56 percent of 17-year-olds were able to perform at or above the 300 level of "moderate complexity." (The material is generally too difficult for 9-year-olds, but is potentially within the skill range of 13- and 17-year-olds.) A larger proportion of both 13- and 17-year-old students achieved at the 300 level in 1990 than had done so in 1986.

Virtually no 9- or 13-year-olds and only a small proportion of 17-year-olds attained the 350 level, "multi-step problem solving and algebra," in the assessments. The percentage of students achieving at this level has remained essentially constant since 1978.

As early as age 9, there was some variation across racial–ethnic groups in the percentage of students attaining even the 200 level of proficiency. A smaller percentage of black and Hispanic 9-year-olds achieved at this level than did white students (figure 3.7). At all higher levels of proficiency (see Appendix C) and for other age groups as well, white students consistently outperformed Hispanic and black students. Further, and especially important, the evidence indicates that the gap in performance between these groups has not narrowed since 1982.

Reading Proficiency

NAEP has conducted six national assessments of reading performance involving nationally representative samples of students ages 9, 13, and 17. These assessments took place during the school years 1970–71, 1974–75, 1979–80, 1983–84, 1987–88, and 1989–90.

The five reading proficiency levels defined by NAEP are the following:

150—Simple discrete reading tasks: Can carry out simple, discrete reading tasks.

200—Partially developed skills and understanding: Can comprehend specific or sequentially related information.

250—Intermediate ideas and make generalizations: Can search for specific information, interrelate ideas, and make generalizations.

300—Understand complicated problems: Can find, understand, summarize, and explain relatively complicated information.

350—Learn from specialized reading materials: Can synthesize and learn from specialized reading materials.

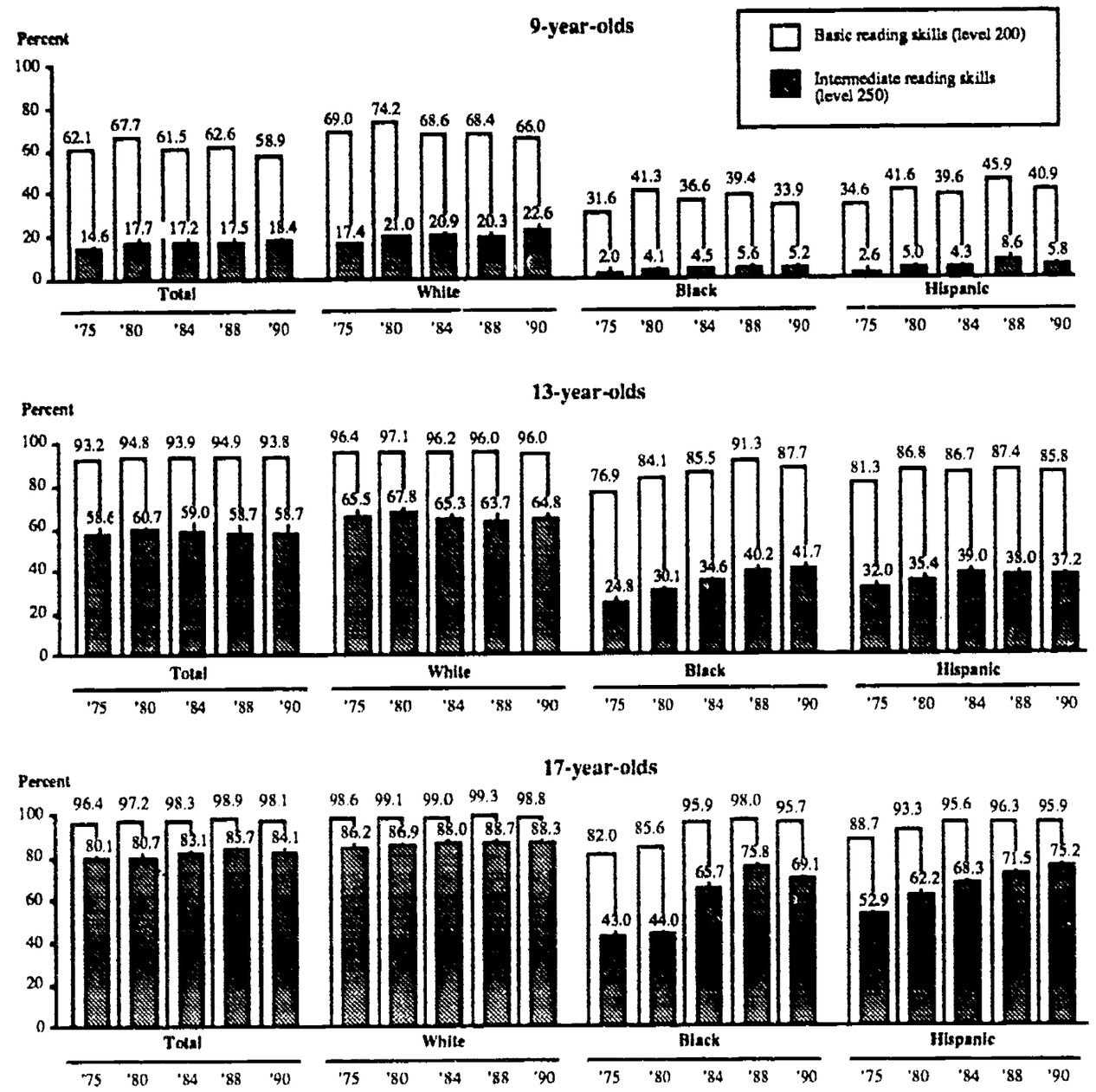
The results of the 1974–75 (1975) through the 1989–90 (1990) assessments are described below.

Figure 3.8 shows the percentage of students reading at the 200 and 250 levels of reading proficiency. Over the years, virtually all students have acquired level 150 skills, characterized by the ability to perform relatively uncomplicated, discrete reading tasks successfully (not shown). At the other extreme, very few students in any assessment have reached the 350 level of reading proficiency, reflecting their difficulty in comprehending passages that are lengthy and complex or that deal with specialized subject matter (Mullis and Jenkins 1990).

Students performing at the 200 level can grasp basic reading skills and strategies, evidenced by their understanding of short stories and expository passages and their capacity to summarize main ideas and distill information. As shown in figure 3.8, at age 9, the proportion of students demonstrating these basic reading skills and strategies has declined since 1980, when 68 percent of the 9-year-old students performed at or above this level. Only 59 percent did so in 1990.

Students reading at the 250 level can interpret, make inferences from, and elaborate on the information and ideas presented in text passages that are more complex than those at the 200 level. The percentage of 9- and 13-year-olds reaching this level has stayed relatively constant over the years. However, the percentage of 17-year-olds reaching this level has increased, from 80 percent in 1975 to 84 percent in 1990.

Figure 3.8—Percentage of 9-, 13-, and 17-year-old students who have attained "partially developed skills and understanding" (level 200) or are able to "interrelate ideas and make generalizations" (level 250) in reading, as measured by NAEP, by race–ethnicity: 1975, 1980, 1984, 1988, and 1990



SOURCE: I.V.S. Mullis, J. Dossey, M. Foertsch, L. Jones, and C. Gentile, *Trends in Academic Progress: Achievement of American Students in Science, 1970–90, Mathematics, 1973–90, Reading, 1971–90, and Writing, 1984–90* (Princeton: Educational Testing Service, 1991).

As in the case of math, higher level skills were achieved infrequently, and this trend has changed little over time. In 1990, 11 percent of students at age 13 and 41 percent of students at age 17 performed at or above the 300 level. Even among 17-year-olds, few students succeeded at the 350 level, with only 7 percent of students reaching this level of performance in 1990.

Trends in reading achievement for white, black, and Hispanic students have differed over time. For example, between 1975 and 1988, the proportion of black 9-year-olds who reached the 250 level increased significantly (from under 2 percent in 1975 to nearly 6 percent in 1988). White students improved somewhat between 1975 and 1990 (from about 18 percent to about 23 percent). Between 1975 and 1990, there was a significant improvement in the proportion of black 13-year-old students who achieved at or above the 250 level. At age 13, 37 percent of Hispanic, 42 percent of black, and 65 percent of white students attained the 250 level on the 1990 reading assessment. At age 17, a significantly higher proportion of black students reached the 300 and 350 levels in 1990 than was the case in 1975, and a significantly higher proportion of Hispanic students reached the 300 level. Disparities remained, however, despite the advances made by minority students. For example, 20 percent of black and 27 percent of Hispanic 17-year-olds attained the 300 level on the 1990 assessment, compared with 48 percent of white 17-year-olds. Generally, despite considerable efforts to improve reading skills during the reform era, at best only marginal gains are apparent at this point, as compared with the pre-reform era.

Linking Reforms and Achievement

Although improving achievement is a recognized objective of more rigorous state student standards, few studies have attempted to identify linkages between the two and little of this research has involved representative samples.

At the national level, there appears to be some evidence of increases in NAEP scores for 17-year-olds between 1982 and 1987 that may be related to changes in course-taking patterns during that period. From 1982 to 1987, mathematics course taking increased from an average of 2.55 to 3.02 credits, and science course taking increased from 2.17 to 2.51 credits. At about the same time (1982 to 1986), NAEP achievement scores of 17-year-olds increased from 299 to 302 points in mathematics and from 283 to 289 points in science on scales that cover a wide range of achievement levels from 4th to 12th grade. Both types of changes are statistically significant. While no causality can be attributed, at least these differences seem to be in the right direction and are consistent with a causal impact of coursework on achievement. The 1990 NAEP data show that the 1982–86 achievement gains were maintained in mathematics. Again, for the many reasons noted, these data must be viewed cautiously, but if indicative of a longer term trend, they may be of considerable importance.

NAEP data have also been used to explore the impact of competency testing programs. Winfield (1990) used 1983–84 NAEP data to study the relationship between minimum competency testing programs and reading achievement among 4th-, 8th-, and 11th-grade students. She found that fourth-grade students who attended schools with minimum competency testing programs scored no differently from their peers who did not attend such schools, which led her to question the value of minimum competency tests for children in elementary grades. Among eighth-grade students, however, white students in schools with minimum competency testing programs scored about six points higher than their counterparts in other schools, and black students who attended schools with minimum competency tests scored eight points higher than black students who did not. No difference in achievement was observed between Hispanic eighth-grade students who attended

schools with minimum competency testing and those who did not. Among 11th-grade students, the findings were complicated by a number of factors. Although both black and Hispanic 11th-grade students who attended schools with minimum competency testing programs appeared to have earned higher scores than those who did not, Winfield noted that these differences are difficult to interpret because of the possibility that more low-achieving black and Hispanic students had dropped out of high school before the tests were administered, thus leaving only higher achieving students in the group tested. Winfield concluded that minimum competency testing programs at the high school level probably affect various populations differently.

Sebring (1987) used data from the 1982 College Entrance Examination Board (CEEB) examinations to explore the relationship between coursework and achievement among college-bound high school students. Among this particular population, she found that students who had taken more courses in American history, French, mathematics, and chemistry scored higher on the corresponding CEEB achievement tests. These improvements occurred not only among students with the highest ability levels but also across a whole range of ability levels. Sebring suggested that increasing the number of academic courses that students of all ability levels take should lead to higher achievement among all students. Goertz (1989) reviewed research on the relationship between course taking and academic achievement and found that the more courses students took, the higher were their achievement test scores.

State data is spotty. In the annual review of education in California conducted by Policy Analysis for California Education (PACE), it was reported that in the 10 years since the California Assessment Program (CAP) began (1979–80 through 1988–89), average achievement scores in reading, writing, spelling, and mathematics among 3rd-, 6th-, and 12th-grade students in California have improved (Guthrie et al., 1990). Testing of eighth-grade students began during the 1983–84 academic year, and average achievement among these students in reading, writing, mathematics, history/social science, and science has also improved. These improvements in achievement cannot be attributed to particular reform initiatives, but they do suggest a positive trend that could be examined in light of reform efforts over the past decade in California.

Biester and Rioux (1988) reviewed trends in student achievement between 1984 and 1988 in the District of Columbia, Delaware, Maryland, New Jersey, and Pennsylvania. This study found that reading achievement trends fluctuated, but generally improved, and that students at all grade levels made gains in mathematics achievement. For example, between 1984 and 1988, ninth-grade students' achievement in reading, writing, and mathematics increased with each administration of the New Jersey High School Proficiency Test. The authors reported that these trends appear to be related to such reforms as the implementation of an exit exam for high school graduation and increased course requirements in mathematics, science, and social studies in New Jersey.

While improving student achievement in academic subject areas such as reading and mathematics remains an acknowledged objective of state reform of student standards, there is little evidence of direct impacts. Presently, NAEP data only enables tracking and monitoring of national achievement trends. In future years, if state data become available for all states and for several time periods, NAEP could represent an important resource with which to compare achievement across states with different approaches to reforming standards. At this time, relying on the strength of case studies across a few states, some researchers have found that improvements in student achievement are at least coincidental with state testing programs and increased academic coursework requirements. These studies, however, do not explore other factors that might lead to these results, nor do they distinguish district-level from state-level reform, which may be influencing performance.

Together, over time state NAEP data and carefully designed state case studies may contribute significantly to defining the relationship between state reform strategies and student achievement outcomes.

Trends in High School Completion and Dropping Out

A third set of outcomes that has been a focus of state reform efforts concerns high school completion. Three indicators of high school completion and dropping out are described here. The first indicator, *the completion rate*, measures the proportion of 19- and 20-year-olds who have completed high school.[5] The second and third indicators measure dropout rates in two ways: the proportion of persons ages 16–24 who are dropouts (the *status dropout rate*);[6] and the proportion of persons in grades 10 through 12, ages 15–24, who have dropped out of school in the last year (the *event dropout rate*). Generally, the data indicate that, contrary to popular perceptions, a high school dropout epidemic does not exist. In fact, over the last 17 years, the high school completion rate has actually increased slightly, and high school dropout rates have decreased, with black–white differences in these rates narrowing over the period.

The high school completion rate for 19- and 20-year-olds is important because this is the age by which most students have finished high school. In 1990, nearly 83 percent of 19- and 20-year-olds had completed high school with either a diploma or an equivalency certificate [7] Between 1973 and 1982, the completion rate remained fairly constant at about 82 percent. However, since 1982 there has been a small but statistically significant *increase* in the high school completion rate, which has risen to about 83 percent (Kaufman, McMillen, and Whitener 1991).

Figure 3.9 shows trends in the percentage of status dropouts. The proportion of persons ages 16–24 who have not completed high school and are not currently enrolled in school has generally declined over the past two decades. Among blacks, status dropout rates have decreased substantially over the last two decades (from 22 percent in 1973 to 13 percent in 1990), while the status dropout rates for whites have decreased less (from 12 percent in 1973 to 9 percent in 1990). Although the estimates for Hispanics are erratic because of small sample sizes, the proportion of Hispanics in this age range who have dropped out of high school has remained relatively constant over the years (Kaufman, McMillen, and Whitener 1991).

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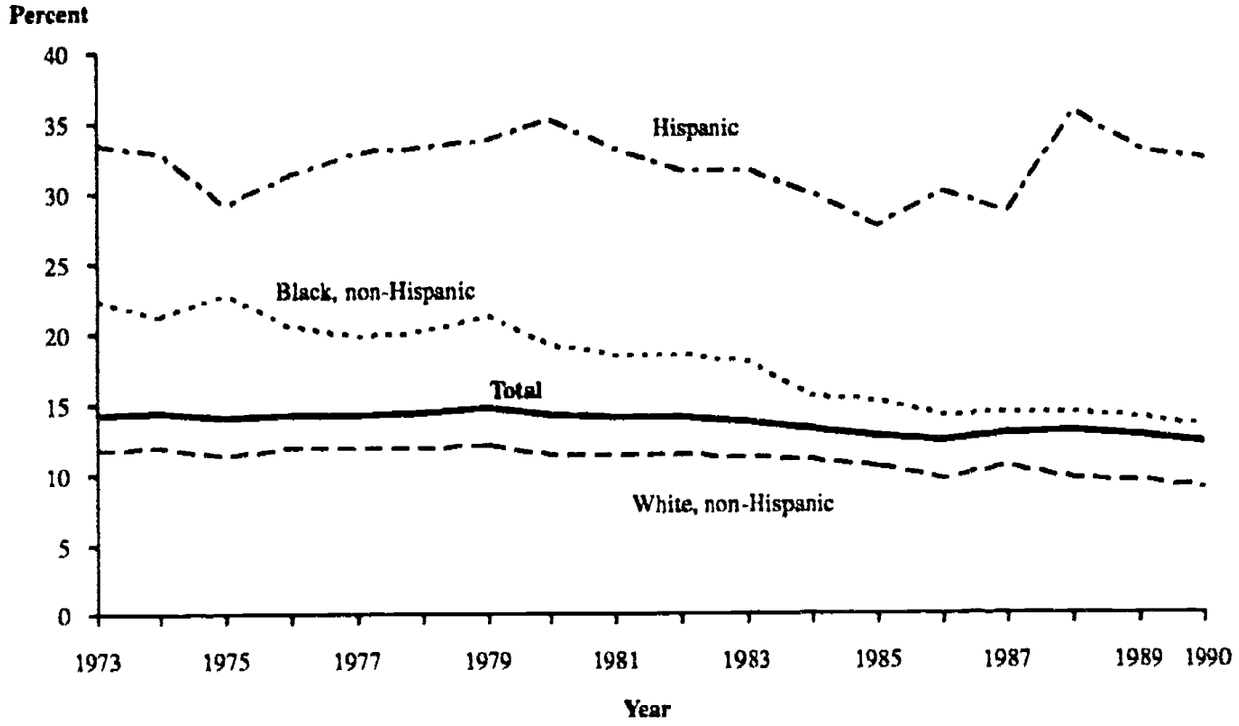
[5] "High school completers" include those persons who have either received a high school diploma or have received an alternative credential, such as a General Educational Development (GED) credential.

[6] Persons who completed high school by earning an alternative credential are not counted here as high school dropouts.

[7] The high school completion rate used here should not be confused with the high school graduation rate used in the Secretary's annual "wall chart" (now discontinued). For a discussion of the differences between these two rates, see Mary J. Frase, *Dropout Rates in the United States: 1988* (Washington, D.C.: U.S. Department of Education, National Center for Education Statistics, 1989).

Figure 3.9—Status dropout rates for persons ages 16–24, by race–ethnicity: October 1973 through October 1990

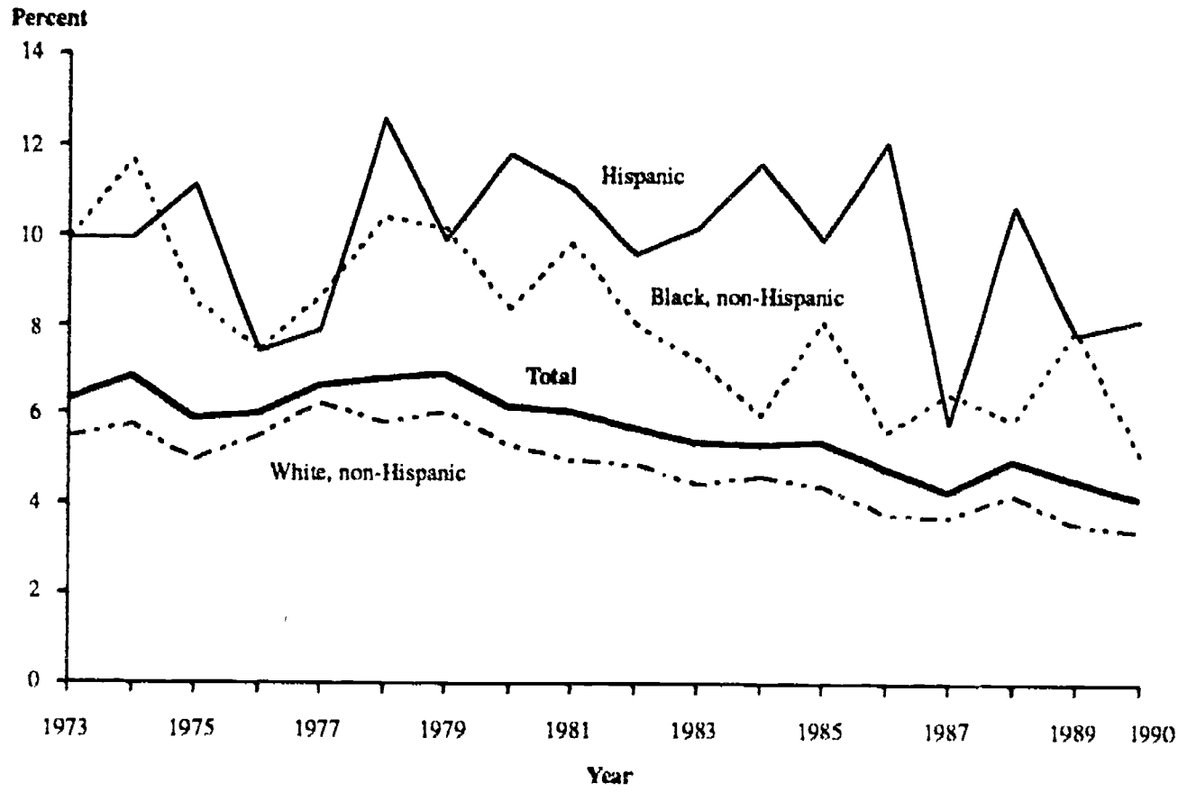


SOURCE: Philip Kaufman, Marilyn M. McMillen, and Summer D. Whitener, *Dropout Rates in the United States: September 1990* (Washington, D.C.: U.S. Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics).

While status dropout rates describe the extent of the dropout problem across the population, event dropout rates reveal how many students are dropping out of high school each year. Figure 3.10 shows the event dropout rate, that is, the proportion of persons ages 15–24 who dropped out of grades 10 through 12 in any single year.[8] The data indicate that the event dropout rate has also fallen over the last decade. In the late 1970s, the annual dropout rate was more than 6 percent. By 1990, the rate was about 4 percent per year. Event dropout rates for white and black students have declined among both males and females. Over the last decade, the event rates for both white male and female students fell, with male rates declining from about 6 percent in 1980 to about 4 percent in 1990, and female rates declining from about 5 percent in 1980 to 3 percent in 1990. Among black males, the rates fell from 8 percent in 1980 to about 4 percent in 1990, and among black females, the rates declined from 9 percent in 1980 to 6 percent in 1990.

[8] Specifically, the numerator of the single-year event rate for 1990 is the number of persons 15 through 24 years old surveyed in 1990 who were enrolled in high school in October 1989, were not enrolled in high school (grades 10–12) in October 1990, and who also did not complete high school (i.e., had not received a high school diploma or an equivalency certificate) between October 1989 and 1990. The denominator of the event rate is th[illegible] of the dropouts (i.e., the numerator) and the number of all persons 15 through 24 years old who w[illegible] in grades 10, 11, and 12 last year and successfully completed the grade.

Figure 3.10—Event dropout rates for grades 10–12, ages 15–24, by race–ethnicity: 1973 through 1990



SOURCE: Philip Kaufman, Marilyn M. McMillen, and Summer D. Whitener, *Dropout Rates in the United States: September 1990* (Washington, D.C.: U.S. Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics).

Linking Reform to Completion and Dropout Rates

On the matter of higher standards and student dropout rates, some educators and researchers have suggested that demanding more of all students is likely to further discourage students who are already doing poorly and to increase the percentage of students who leave high school before graduation. Others have argued to the contrary. Current research provides a wide range of hypotheses concerning the relationship between higher standards and the dropout rate. None, however, have been studied in detail, so they must be viewed as theoretical possibilities. They are not definitive findings.

Grades and Dropping Out

Ralph and Salganik (1988) studied the relationship between achievement, as measured by students' grades, and dropping out. Using data from High School and Beyond (HS&B), they reported that although 40 percent of the students who received grades of mostly "D" or below did drop out, 85 percent of all dropouts actually had an average of low "C" or better, and among these students, 41 percent had an average of low "B" or better. They argued that since so many students who are performing satisfactorily do drop out, higher standards may not significantly affect the dropout rate. Ralph and Salganik also cited research on effective schools indicating that schools with higher expectations of students have lower rates of absenteeism and dropping out and that higher standards might result in greater student engagement and lower dropout rates.

Minimum Competency Exams, Course-Taking Requirements, and Dropping Out

Some who study high school dropouts have expressed concern that reforms such as requiring students to pass minimum competency exams or increasing the number of academic courses that students must pass before graduation will increase the percentage of students who drop out of high school (Hamilton 1987; Kreitzer, Madaus, and Haney 1989; McDill, Natriello, and Pallas 1985, 1986: National Council on Disability 1989). Students who progress through both elementary and secondary school at a slower than average rate—that is, students who have been retained in grade or have failed high school courses—have been found to be more likely to drop out than others (Barro and Kolstad 1987; Hahn 1987; Hamilton 1987; McDill, Natriello, and Pallas 1985; Rumberger 1987; Tidwell 1988). Further, McDill, Natriello, and Pallas (1986) noted that students from economically disadvantaged or racial–ethnic minority backgrounds are more likely to fail minimum competency tests than are other students. They suggested that students at risk of truancy, or with discipline problems, may be more inclined to drop out if they fail competency tests.

Therefore, according to this argument, reforms that increase the likelihood of retention in grade or failure to progress toward completing high school graduation may also increase tendencies to drop out. This may be the case especially among those already at risk for dropping out due to other factors, such as low socioeconomic status, minority status, low achievement, and learning disabilities (Kreitzer et al. 1989; Patterson 1990; U.S. General Accounting Office 1989; Valdivieso 1986).

McDill, Natriello, and Pallas (1985) suggested that requiring all students to take a single pattern of courses (such as the "New Basics" curriculum) "may lead to negative consequences for potential dropouts":

> Implementation of the core curriculum will likely restrict the variation of school experiences for students, limit the number of dimensions of ability deemed legitimate in the school, and curtail student choice in constructing a program of study. Students with limited ability along this one dimension may have to face repeated failure with little opportunity to engage in other activities that might afford them some success. Thus, a major result of the full implementation of the New Basics could be the clarification of the distribution of ability in these basics, leaving some students only the choice of dealing with constant failure or dropping out of school.

Glatthorn (1985) expresses concern that the "New Basics" might shift resources away from programs that are beneficial to disadvantaged students, such as vocational education courses, and would result in at-risk students spending more time in the kind of classroom environments that they find least interesting.

As noted above, none of the propositions described in this section has been the subject of definitive data-based research. They rest, therefore, as theoretical counterpoints to most of the research on higher student standards, and suggest a set of issues that deserve attention as efforts are made to understand how reforms affect student outcomes.

Summary

There is little evidence of direct associations between state school reforms and student outcomes. However, trends in course-taking patterns, student achievement, and school completion and dropout rates may suggest some linkages.

- Students are taking more academic courses. Since many school districts have established requirements exceeding those of the states, we do not know the impact of state initiatives on these trends. However, the states may encourage progressively higher standards. At the same time, there is clear evidence that the "New Basics" philosophy is fundamentally altering course-taking patterns among students of all backgrounds, even those who do not have academic plans beyond high school.

- Mathematics and reading achievement as measured by the National Assessment of Educational Progress (NAEP) show improvement over the past decade among groups that have historically performed poorly, even at basic achievement levels. Substantial decline in the gap between racial and ethnic groups in mathematics and reading proficiency indicates considerable progress for racial–ethnic minorities.

- High school completion rates increased slightly between 1982 and 1990, and several indicators of dropout rates declined. Gaps between blacks and whites narrowed.

These data suggest that it may be possible to look for some indirect associations between measures of student progress and state reform of student standards, but this cannot be assumed to indicate causality. Only carefully constructed case studies and more sophisticated analyses of representative populations, focusing on particular reforms at state and local levels, will help describe linkages such as they exist. Given the great number of intervening variables that must also be considered, efforts to tie changes in student outcomes to state reforms may not produce definitive conclusions of causality. Thus, under any circumstances, caution is essential even after appropriately controlled studies are conducted.

Chapter 4

State Reform and Student Standards: Issues for Further Investigation

This report has provided a description of state reforms of student standards and a discussion of some possible relationships between these reforms and student outcomes, as well as the problems associated with efforts to describe these linkages. Reform strategies and programs "filter down" slowly. It takes time for practice to change and even more time before programs and practice translate into changes in outcomes that can be measured. The rather brief time frame bounding this report—roughly 1983 to 1990—demonstrates how difficult it is to observe the impacts of new policy initiatives over short periods of time. Further, school reform is an uneven process: there are considerable differences in the nature and timing of reforms across states and significant differences across and within school districts. But within this complicated matrix, certain things are clear.

- Many states have actively pursued student standards reform agendas—some for well over a decade, while others are relatively new to the movement. Various initiatives have been taken at different times in different states. While these reforms can be described in general terms, they vary considerably in detail, and only case studies can ascertain real commonalities in objectives, requirements, and processes across the states.

- Not only are some states more actively engaged in the reform process, but also *some kinds of reforms* are more popular than others.

- For any single kind of reform, states vary in the breadth and depth of their mandates and in their commitment to implementation.

- Beyond the legislative mandates, only a little is known about what states have actually achieved. Neither the process of implementing reform nor their outcomes at the state level have been well studied. Some states have successfully integrated reforms into practice. Others have encouraged, but perhaps not provided, the funding or technical assistance necessary for effective implementation at the school district level.

- Very little is known about the direct impact of state reforms themselves upon student outcomes. Many reforms have been adopted on the *assumption* that they would lead to particular outcomes. But the anticipated linkages are often not well articulated, and the implementation of these reforms are less justified on the basis of research than on common sense expectations that certain actions will produce certain results.

- Little is known about the ways in which individual school districts have "translated" or acted upon the state mandates.

- Many school districts have also been very active in the reform movement, independent of the states. Except anecdotally, however, very little is known about what communities have done on their own that may supplant, or exceed, state reform initiatives. This represents a significant gap in knowledge.

To establish linkages between reform initiatives and student outcomes, researchers will have to focus on indirect measures; direct cause and effect relationships will be extremely difficult to document. Murphy (1990, 43), in quoting Colvin, suggests why this is so:

> The state generated reforms of the 1980s have an interactive effect that is comparable to giving dozens of medicines at once. Doctors cannot always predict how a battery of chemicals will affect the body as they become coefficients of change in a complex...equation. The equation for educational remedies...are as complicated.

Even so, Murphy (1990, 45) argues that it is essential to increase efforts to assess the impact of reforms on student outcomes:

> The information base on which the educational reform agenda rests must be strengthened... large amounts of money have been invested in reform measures simply on the basis of beliefs and hunches...the shape of the agenda for the future is being severely compromised by the...[small] amount of money states are spending to assess the effects of their reform initiatives.

Given the importance of the states in the school reform equation, the Chief School Officers (Council of Chief State School Officers 1988, 1989) have reflected on the inadequacy of high-quality, state-by-state comparative data:

> Missing entirely are state-level measures of student outcomes, the ultimate accomplishments of the educational system. Even the most rudimentary accomplishments—succeeding in getting students to school—are plagued by inconsistencies in measuring student attendance. Other outcomes—school completion rates, achievement—are affected by differences in how states define enrollments and dropouts, by differences in state testing programs and by the lack of follow-up data on students after they leave high school.

Much of the data necessary to understand the impact of reform on student standards or student outcomes are unavailable or not comparable across the states. While national outcome data—based on the kinds of indicators described in Chapter 3—represent indirect ways of looking at the overall "direction" of the educational enterprise, including reforms, it will always be difficult to attribute trends to specific reforms. Nevertheless, data at the national level provide the kinds of comparisons over time that suggest how reforms, among other things, are reflected in the educational product.

Defining Standards: Toward a Common Set of Definitions

Just as this report was being completed, the National Council on Education Standards and Testing issued a report entitled *Raising Standards for American Education* (National Council on Education Standards and Testing 1992). This document defined a useful typology that could be applied to future research on reform of school standards. Four kinds of standards were identified:

- *Content Standards:* specifications of the knowledge, skills, and other necessary things that schools should teach in order for all students to attain high levels of competency in a given subject matter.

- *Student Performance Standards:* the degree or quality of student performance in the subject matter set out in the content standards (i.e., professionally defined benchmarks for assessing the quality of a student's performance).

- *School Delivery Standards:* criteria to enable local and state educators and policymakers, parents, and the public to assess the quality of a school's capacity and performance in educating students in the subject matter set out in the content standards (i.e., a metric for determining whether a school delivers the material set forth in the content standards).

- *System Delivery Standards:* criteria for establishing the quality of a school system's capacity and performance in educating all students in the subject matter set forth in the content standards (i.e., a summation of goals at each level of the educational system that is linked to national educational goals).

The reforms discussed in this report generally fall into the first two categories—content standards and student performance standards. Framing state reforms in terms of a common typology such as this one could facilitate assessments of outcomes and provide clearer ways of describing the association between particular reforms and anticipated impacts.

Future Assessments of State Educational Standards Reform

Reform and Student Outcomes at the State and Local Level

One conclusion of this report is especially relevant to plans for future research: to achieve real evidence of causal linkages between state reform of student standards and student outcomes, systematic studies are necessary, and these have not yet been conducted. These studies must take individual reforms and their objectives and apply carefully designed evaluation methodologies that enable researchers to control for other factors that may affect student outcomes. Researchers cannot control, after the fact, for the variety of factors influencing student outcomes.

High-quality research on the impact of state reforms on students requires an evaluation strategy. Ideally, at the least, it is important to find ways of controlling for state reforms individually so that co-linear affects can be minimized; to differentiate between school districts across a state that are "aggressively" reformist in their commitment to implementing an initiative versus districts that are not; and to control for differences among school districts in terms of the backgrounds of students. All of this will help isolate how particular reforms impact students. To date, researchers have been unable to capture the range of conditions and qualifications that assuredly result in reforms differentially affecting various student populations. For instance, proposals to lengthen the school day and year have not yet been widely adopted; however, this may begin to take place over the next few years. Therefore, before widespread changes in school districts take place, it is important to design evaluation strategies that will enable policymakers and researchers to isolate, or at least test for, the specific impacts of additional contact hours between teachers and students. Without this kind of preparation, the problems of causality will continue to impose significant constraints on what can be learned about the linkages between reforms

and student outcomes. To achieve credible evaluations, states will have to consider the issue of how to test for impacts at the time reform initiatives are adopted.

At this point, few states have studied the impact of their reform initiatives. As a result, an important information building block is missing. If research at the state level did provide evidence of linkages between reforms and student outcomes, national trends describing student status on these same outcome measures would become especially useful.

Two research issues at the local level are particularly important to the study of reform of student standards at the state and national level:

- There must be additional research on implementation—the process of translating reform policies into practice. States may have mandated any number of reforms of student standards, but it may not be clear that these initiatives have resulted in actual changes in practice at the school level. Because documenting changes in policy at the state level alone does not provide the evidentiary linkages that are essential to determining their impacts, systematic investigations of what happens once policies are adopted are essential.

- Little is known about how reform of student standards at the local level compares with state mandates (in circumstances where both state and local governments have enacted initiatives); and whether there is "hard" data on pre- and post-reform student outcomes at the local level. The power of reform of student standards rests with the response of, and outcomes resulting from, actions taken by localities. Studies at this level of governance would enable strategic examination of differences in outcomes in "high" and "low" reform settings controlling for conditions before implementation of each policy initiative and for differences in the characteristics of the populations served.

Reform and Student Outcomes at the National Level

Given the increasing role of the states in educational policy, programming, and funding, the relationship between state-level reform and student outcomes represents a significant concern. It follows that national trends in student outcomes will reflect state and local ones; therefore, the need for databases that can characterize trends along appropriate dimensions is clear. The National Education Statistics Agenda Committee of the National Forum on Education Statistics (National Forum on Education Statistics 1990) calls for monitoring "the degree to which recommended changes in education practice are actually being implemented...[with a] regular system of indicators on curriculum, on school environment, and on teaching." This will help to capture the *input* side of the equation. The Agenda Committee report also calls for closer monitoring of *outcomes*, especially achievement and student progression and persistence. National data will sharpen opportunities over time to understand the impact of state-level reforms of student outcomes. Toward this end, a number of NCES projects offer valuable information for individuals concerned with school reform issues.

- *Student performance.* If NCES develops representative state-level data with the National Assessment of Education Progress (as noted in appendix B, 1990 and 1992 state-level trial assessments), NAEP will become a tool that is highly relevant to assessing the impact of state reforms. In addition, the transcript studies provide useful ways of describing changes in course-taking patterns that may be associated with these reforms.

- *Dropout statistics.* In the near future, the Common Core of Data (CCD) will offer opportunities for state-by-state comparisons.

- *School organization and school policies.* The Schools and Staffing Survey (SASS) and the National Education Longitudinal Study of 1988 (NELS:88) offer opportunities to explore and compare policies specifically related to the reform agenda. SASS can be used to describe and compare school district and state-level policy reforms.

- *Reform and the teaching force.* Although this report has focused on student outcomes associated with state-mandated school reform, as noted in chapter 2, initiatives in the 1970s and 1980s have also been directed at the teaching profession. For instance, important changes are occurring in state teacher certification and licensing standards, teacher education programs, continuing education requirements, and compensation programs. Over time, these kinds of reforms may affect the classroom and the quality of instruction. SASS provides a particularly appropriate framework within which to monitor the elaboration of these initiatives among states and across districts. Further, both NAEP and NELS:88 collect data from teachers that may be tied to the characteristics of sampled students and assessment outcomes.

Taken together, these data sets will enhance efforts to describe linkages between the state-level reform of student standards and student outcomes. Ultimately, at the national level, understanding the impact of state reform of student standards requires applying multiple methodologies and research strategies across all levels of governance and each type of reform. Data sets available through NCES offer some important opportunities to describe the changing terrain associated with state school reform, as well as to identify aspects of the reform process that are becoming standard practice across the country and can be compared with aggregated indicators of student progress.

Appendix A

Minimum High School Graduation Requirements for Standard Diplomas: 1980 and 1990

Table A.1—Minimum high school graduation requirements for standard diplomas: 1980 and 1990 (as of July 1990)
(Numbers refer to years of instruction)

State	Year	English/ lang. arts	Social studies	Math	Science	Phys. ed./ health	Electives	Other	Total	Date of enactment	Effective grad. class	Refer to note
AL	1980	4	3	1	1	4	7		20			
	1990	4	3	2	2	1.5	9.5		22	1988	1989	1
AK	1980	1	1	1	1	1	Local board determines		19		1978	
	1990	4	3	2	2	1	9		21			
AZ	1980	3	2	1	1		8.5	.5 free enterprise	16			
	1990	4	2.5	2	2		9	.5 free enterprise	20	1986	1991	
AR	1980	4	1			1	10		16			
	1990	4	3	3	2	1	6.5	.5 fine arts	20	1984	1988	2
CA	1980	State permits local board to set minimum academic standards										
	1990	3	3	2	2	2		1 fine arts or foreign lang.	13	1983	1987	
CO	1980	No information available										
	1990	No information available										3
CT	1980	Local board determines										
	1990	4	3	3	2	1	6	1 arts or voc. ed.	20	1984	1988	
DE	1980	4	3	1	1	1.5	7.5		18			
	1990	4	3	2	2	1.5	6.5		19	1983	1987	
DC	1980	4	1.5	1	1	1.5	7.5		18			
	1990	4	2	2	2	1.5	7	1 foreign lang., 1 life skills	20.5	1984	1985	4
FL	1980	Local board determines										
	1990	4	3	3	3	.5	9	.5 practical/exploratory voc. ed., .5 performing arts or speech & debate, .5 life management skills	24	1987	1989	5
GA	1980	3	1	1	1	2/3	10	3 1/3	20			
	1990	4	3	2	2	1	8	1 computer tech and/or fine arts and/or voc. ed, and/or junior ROTC	21	1987	1988	6
HI	1980	4	4	3	3	1.5	6	.5 guidance	20			
	1990	4	4	2	2	1.5	6	.5 guidance	20	1978	1983	

Table A.1—Minimum high school graduation requirements for standard diplomas: 1980 and 1990 (as of July 1990)—Continued
(Numbers refer to years of instruction)

State	Year	English/ lang. arts	Social studies	Math	Science	Phys. ed./ health	Electives	Other	Total	Date of enactment	Effective grad. class	Refer to note
ID	1980	3.5	2	1	2	1.5	8		18			
	1990	4	2	2	2	1.5	6	3.5 (see note)	21	1988	1989	7
IL	1980	3	1	Local board determines remaining					16			
	1990	3	2	2	1	4.5	2.25	1.25 (see note)	16	1983	1988	8
IN	1980	3	2	1	1	.5	.5	8	16			
	1990	4	2	2	2	1.5	8		19.5	1983	1989	
IA	1980		1.5		1							
	1990				1					1988	1989	
KS	1980	4	2	1	1	1	8		17			
	1990	4	3	2	2	1	9		21	1983	1989	
KY	1980	3	2	2	2	1	8		18			
	1990	4	2	3	2	1	7	1 (see note)	20	1982	1987	9
LA	1980	3	2	2	2	2	8.5	.5	20			
	1990	4	3	3	3	2	7.5	.5 computer literacy	23	1988	1989	
ME	1980	4	Local board determines remaining with American History required									
	1990	4	2	2	2	1.5	3.5	1 fine arts	16	1984	1989	10
MD	1980	4	3	2	2	1	8		20			
	1990	4	3	3	2	1	5	1 fine arts, 1 industrial arts/ technology ed., home ed., voc. ed. or computer studies	20	1985	1989	11
MA	1980	Local board determines										
	1990		1			4						12
MI	1980		.5	Local board determines remaining								
	1990		.5	Local board determines remaining								13
(SBE recommends)		(4)	(3)	(3)	(2)	(1)		(2 foreign lang./fine or performing art or voc. ed., .5 computer ed.)				
MN	1980	3	2 (gr. 10,11,12)			1	Local board determines remaining		15			
	1990	4	3	1	1	1.5	9.5		20	1982	1982	
MS	1980	3	2.5	1	1		8.5		16			
	1990	4	2	2	2		8		18	1985	1989	14

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Table A.1—Minimum high school graduation requirements for standard diplomas: 1980 and 1990 (as of July 1990)—Continued
(Numbers refer to years of instruction)

State	Year	English/ lang. arts	Social studies	Math	Science	Phys. ed./ health	Electives	Other	Total	Date of enactment	Effective grad. class	Refer to note
MO	1980	1	1	1	1	1	11	4	20			
	1990	3	2	2	2	1	10	1 fine, 1 practical arts	22	1984	1988	
MT	1980	4	1.5	2	1	1			16			
	1990	4	1.5	2	1	1	10.5		20	1988	1989	15
NB	1980	Local board determines										
	1990	Local board determines								1984	1991	16
NV	1980	3	2	1	1	2.5	9.5		19			
	1990	4	2	2	2	2.5	8.5	1 arts/hum., .5 computer lit.	22.5	1986	1992	
NH	1980	4	2	1	1		8		16			
	1990	4	2.5	2	2	1.25	4	4 (see note)	19.75	1984	1989	17
NJ	1980	4	2	2	1	4						
	1990	4	3	3	2	4	4	1.5 (see note)	21.5	1987	1990	18
NM	1980	4	2	2	1	1	7	2 practical/1 fine arts	20			
	1990	4	3	3	2	1	9	1 communication skills	23	1986	1990	19
NY	1980	4	3	2	2	.5	6.5		16			
	1990	4	4	2	2	.5	(see note)		18.5	1984	1989	20
NC	1980	4	2	1	2	1	6		16			
	1990	4	2	2	2	1	9		20	1983	1987	21
ND	1980	3	3	1	2	1	7		17			
	1990	4	3	2	2	1	5		17	1983	1984	22
OH	1980	3	2	1	1	1	9		17			
	1990	3	2	2	1	1	9		18	1983	1988	
OK	1980	4	1.5	1	1		10.5					
	1990	4	2	2	2		10		20	1982	1987	23
OR	1980	3	3.5	1	1	2	9	1.5	21			
	1990	3	3.5	2	2	2	8	1.5	22	1984	1988	24
PA	1980	3	2	1	1				13			
	1990	4	3	3	3	1	5	2 art/humanitics	21	1983	1989	25

Table A.1—Minimum high school graduation requirements for standard diplomas: 1980 and 1990 (as of July 1990)—Continued
(Numbers refer to years of instruction)

State	Year	English/ lang. arts	Social studies	Math	Science	Phys. ed./ health	Electives	Other	Total	Date of enactment	Effective grad. class	Refer to note
RI	1980	4	1	1	1		9		16			
	1990	4	2	2	2		6		16	1985	1989	26
SC	1980	4	3	2	1	1	7		18			
	1990	4	3	3	2	1	7		20	1984	1987	27
SD	1980	4	2	1	1		8		16			
	1990	4	3	2	3		7	.5 computer, .5 fine arts	20	1984	1990	28
TN	1980	4	1.5	1	1	1.5	9		18			
	1990	4	1	2	2	1.5	9	.5 economics	20	1988	1989	29
TX	1980	3	2.5	2	2	1.5/.5	6.5		18			
	1990	4	2.5	3	2	1.5/.5	7	.5 economics/free enterprise	21	1984	1988	30
UT	1980	3	2	1	1	1.5/.5	6.5		15			
	1990	3	3	2	2	2	9.5	2.5	24	1986	1988	31
VT	1980	No provision										
	1990	4	4	—5—		1.5	1 arts		14.5	1986	1989	32
VA	1980	4	3	1	1	2	7		18			
	1990	4	3	2	2	2	6	1 additional math or science 1 fine or practical arts	21	1987	1989	33
WA	1980	6	5	3	2	2		3 occupational education				
	1990	3	2.5	2	2	2	5.5	1 occup. ed, 1 fine/visual or performing arts	19	1985	1991	34
WV	1980	4	3	1	1	2	7		19			
	1990	4	3	2	2	2	7	1 (see note)	21	1983	1989	35
WI	1980	Local board determines requirements										
	1990	4	3	2	2	2			13	1984	1989	36
WY	1980		1	Local board determines remaining					18			
	1990		1	Local board determines remaining					18			37

Table A.1—Minimum high school graduation requirements for standard diplomas: 1980 to 1990 (as of July 1990)—Continued

(Numbers refer to years of instruction)

SBE = State Board of Education

NOTES

1 AL--Students must become computer literate through related coursework.
2 AR--Social studies options: 3 units or 2 units social studies and 1 practical arts.
3 CO--Local boards determine requirements. State has constitutional prohibition against state requirements. School accreditation requirements are a total of 30 units, appropriately covering language, social studies, science, math, foreign language, fine/vocational practical arts, health/safety, and physical education.
4 DC--Electives must include life skills seminar or students may pass a test in lieu of the seminar.
5 FL--Two of the science units must be in a lab.
6 GA--"Other" column: 1 fine arts, vocational education, computer technology, or ROTC.
7 ID--"Other" column: .5 each of reading, speech, and consumer education and 1 in humanities. Humanities increases to 2 after 1988. Practical arts may substitute for 1 of the 2 units of humanities; total requirement remains the same with electives decreasing.
8 IL--"Other" column: .25 consumer education, 1 art, foreign language, music or vocational education. One year of math may be computer technology; 1 year of social studies must be U.S. History, or one-half U.S. History and one-half American Government.
9 KY--"Other" column: 1 additional math, science, social studies, or vocational education.
10 ME--American History is required. One of the science units must include lab study.
11 MD--Four credits must be earned after Grade 11.
12 MA--American History is required.
13 MI--The State Board, in January 1984, published graduation requirement guidelines that local districts are urged to incorporate.
14 MS--At least one of the science units must include lab.
15 MT--State Board raised total: 1985 graduates needed 19 units, 1986 graduates needed 20. Effective 7/92, requirements will be changed to 2 units of social studies, 2 units of science, 1 unit of fine arts, and 1 unit of vocational/practical arts.
16 NB--For graduation, 200 credit hours are required, with at least 80 percent in core curriculum courses. The State Board is conducting hearings to define core courses.
17 NH--"Other" column: .5 arts, .5 computer science; 3 from 2 of the following: arts, foreign language, practical arts, vocational education.
18 NJ--"Other" column: 1 fine, practical or performing arts; .5 career exploration. Ninety-two credit hours are required for graduation. State does not use graduating class as the base for changes but uses the terminology of "the students entering ninth grade class." Consequently the increased math requirements become effective for the ninth grade class entering in the 1990-91 academic year.
19 NM--In 6/84 the State Board approved requiring all students to achieve computer literacy prior to graduation.
20 NY--"Other" column: 1 art and/or music for local; 3 to 5 from a sequence of specific courses must be chosen by Regents' diploma students and is an additional requirement for local. The local diploma notes .5 for health only, 2 noncredit units of physical education beyond the total are required.
21 NC--One science class must include lab.
22 ND--One unit of higher level foreign language may be substituted for the 4th unit of English; 1 unit of math may be business math. Although 17 units are required, the local education agencies are urged to establish requirements at a minimum of 20 units.
23 OK--"Other" column: For college preparation diploma, choice of foreign language, computer science, economics, English, geography, government, math, history, sociology, science, speech, and psychology.
24 OR--"Other" column: .5 career development, 1 applied arts, fine arts, or foreign language.
25 PA--In 1985, local boards determined the remaining 5 units. Computer science can be option instead of arts and humanities.
26 RI--College-bound students are required to complete 2 units of foreign language, .5 arts, and .5 computer literacy and have a total unit requirement of 18.
27 SC--If approved by the State Department of Education, students may count 1 unit of computer science for a math requirement. Students who earn 1 unit in science and 6 or more in a specific occupational service area will fulfill the science requirements.
28 SD--Increased total number of requirements was phased in: 16 through 1986; 18 in 1987; 19 in 1988. Beginning in 1990, the requirements were raised to 3 in science and electives dropped to 7.
29 TN--Students may meet the economics requirement by: 1 semester in economics, out-of-school experiences through Junior Achievement, or marketing education.
30 TX--"Other" column: For college preparation: .5 economics/free enterprise, 2 foreign language, 1 computer science, 1 fine arts. 1.5 units of physical education and .5 of health are required for either regular or college preparatory program.
31 UT--"Other" column: 1.5 arts, 1 vocational education.

Table A.1—Minimum high school graduation requirements for standard diplomas: 1980 to 1990 (as of July 1990)—Continued

(Numbers refer to years of instruction)

32 VT--To allow more flexibility for both vocational education students and smaller or more rural districts, the previous math and science requirement of 3 units each was modified to a combination of 5 units that may be 2 of one and 3 of the other.
33 VA--Additional math or science requirement included in the "Other" column may be fulfilled by an appropriate vocational education class or ROTC.
34 WA--45 hours required for graduation beginning in 1980. The 1985 legislature added a credit for students graduating in 1991. This may be in fine, visual, or performing arts or any of the subject areas currently required.
35 WV--"Other" column: 1 of student's electives must be in choice of applied arts, fine or performing arts, or foreign language.
36 WI--Electives are the option of the local school district. The state recommends that districts require a total of 22 units. State recommendations emphasize vocational education, foreign language, and fine arts to make up the difference between the 13 mandated and 22 recommended units.
37 WY--Requirements in effect for a number of years. School accreditation standards indicate 4 units of English/language arts, 3 of social studies, and 2 each of math and science.

SOURCE: Data from Education Commission of the States, *Clearinghouse Notes: Minimum High School Graduation Requirements: Standard Diplomas* (Denver, CO: July 1990).

Appendix B

Researching Reform and Student Outcomes Using Selected Databases

Linking state school reform to student outcomes will require several analytical strategies. Researchers will surely continue to elaborate and test particular hypotheses intended to identify and measure relationships. At the same time, as noted throughout this report, many of these linkages cannot be described directly: they are too closely tied to factors beyond the reforms themselves that are simultaneously affecting student outcomes. Without controlled before-after studies, research on reform will necessarily rely on indirect evidence, including descriptions of general trends in student outcomes. NCES offers a number of databases that should be central to these ongoing efforts.

Education Databases: An Overview

Some NCES databases include *complete high school transcripts* for a sample of students, along with information about family and educational backgrounds. These transcript studies include the High School and Beyond 1980 sophomore cohort (HS&B); the 1987 High School Transcript Study from the National Assessment of Educational Progress (NAEP); and the National Education Longitudinal Study of 1988 (NELS:88) Transcript Study, which will be conducted in 1992. NCES is also conducting a transcript study of 1990 seniors from the National Assessment of Educational Progress (NAEP 1990 Transcript Study).

Some NCES databases contain information about *demographic characteristics and educational outcomes,* such as graduation and achievement, for national samples of students. These include assessments in subject areas of the National Assessment of Educational Progress (NAEP) and cognitive tests in the National Educational Longitudinal Study of 1988 (NELS:88), the High School and Beyond study (HS&B), and the National Longitudinal Study of 1972 (NLS–72).

Trends in graduation rates can be estimated using the Enrollment Supplement to the Current Population Survey (CPS). When the NELS:88 students graduate from high school in 1992, the dropout rate from that cohort can be compared with the dropout rate of the 1980 HS&B sophomore cohort. The NCES Schools and Staffing Survey (SASS), first conducted in 1987, contains information about *schools, teachers, school policies, and graduation requirements of schools* nationally and state by state.

This appendix briefly describes each of these data sets.

National Longitudinal Survey of 1972

The National Longitudinal Survey of 1972 (NLS–72) was the first longitudinal study conducted by NCES. The sample for the base year, NLS–72, included students from public and private schools in the 50 states and the District of Columbia who were enrolled in grade 12 during the 1971–72 school year. NLS–72 oversampled schools in low-income areas and schools with significant minority populations. The NLS–72 series of surveys involved 22,000 high school seniors. Data collected from student surveys include information about their personal and family background, education, and work experience. Students' high school curriculum track (academic, vocational, or general) and standardized test scores were collected from school records. NLS–72 students completed a battery of achievement–ability tests in vocabulary, reading, and mathematics and tests of reasoning and memory. Follow-up surveys were conducted in 1973, 1974, 1976, 1979, and 1986 and contain information about postsecondary education, work experiences, and family formation.

Pertinent to the study of reform efforts, NLS–72 includes

- Information about policies and procedures at the schools attended by the students in the sample;
- Scores on tests in vocabulary, reading, mathematics, reasoning and memory;
- Student-reported grades and grade-point average;
- Student reports of courses taken (such as the number of mathematics credits or the number of English courses) and of credit hours in major courses; and
- Student characteristics, including sex, race–ethnicity, socioeconomic background, parental education, and high school curriculum track.

High School and Beyond Student Surveys

High School and Beyond (HS&B) is a longitudinal study of two cohorts: 1980 high school seniors and 1980 high school sophomores. The database contains information collected in a series of student questionnaires, scores from a battery of achievement tests, and information about the high schools attended by the students. High school transcripts were collected for the 1980 high school sophomore cohort, and postsecondary school transcripts were collected for both cohorts. The high school transcript study for the 1980 sophomore cohort is described in more detail below.

The High School and Beyond 1980 senior cohort contains a nationally representative sample of 28,000 high school seniors in 1980 from 1,015 public and private high schools across the county. The sophomore cohort includes more than 30,000 sophomores enrolled in the same schools in 1980.

The study design provided for a nationally representative sample, oversampling schools with high-minority populations, alternative public schools, and private schools with high-achieving students. Surveys conducted in 1980 recorded information about the students' demographic characteristics, family backgrounds, and educational experience. Follow-ups were conducted in 1982, 1984, and 1986, and another follow-up is planned for 1992. These follow-up surveys contain information on postsecondary education, work experience, and family formation.

Some school information—including length of school year, availability of educational programs (such as remedial and gifted education), availability of student programs (academic, general, and specific vocational programs such as business education), courses offered, and use of minimum competency testing—has been collected for the HS&B sample of schools.

Data on the HS&B 1980 senior cohort include

- Self-reported information about courses and grades in selected subject areas;
- Verbal and quantitative achievement, abstract and nonverbal ability–test scores administered in 12th grade; and
- Student characteristics such as sex, race–ethnicity, socioeconomic background, and high school curriculum track.

Data on the HS&B 1980 sophomore cohort include

- Transcript information about all high school courses and grades for some students, and student-reported information about courses and grades in selected subject areas for all students;
- Verbal and quantitative achievement, science, writing, and civics test scores, administered in the 10th and 12th grades. Improvements between the 10th- and 12th-grade tests can be linked to student characteristics and courses taken between 10th and 12th grades; and
- Student characteristics such as sex, race–ethnicity, socioeconomic background, and high school curriculum track.

1982 High School Transcript Study

The NCES 1982 High School Transcript Study contains complete transcripts for approximately 12,000 members of the 1980 HS&B sophomore cohort. Transcript information for the cohort was collected in 1982 from the 9th- through 12th-grade records (the school years 1978–79 through 1981–82). Because the transcript information is more complete and accurate than the student-reported information about courses and grades, transcript data are particularly useful for analyzing student course taking and grades.

For each course taken by a student in grades 9 through 12, the data files contain a course code, the school year and term that the course was taken, the credits attempted and earned, and the final grade. The course codes describe both the subject and level of the courses. Classification codes like those in other NCES secondary transcript studies are used so that courses taken by students from different transcript studies can be compared. Courses that are part of the special education curricula are identified. In addition, each student record contains information on the student's rank in class, overall grade-point average, number of days absent in each school year, number of suspensions, the date and reason the student left school, and scores for standardized tests.

The 1982 High School Transcript Study, in conjunction with data about the sophomore cohort, provides the following kinds of information:

- Numbers of credits completed by high school graduates in any subject area of interest (such as "New Basics" programs);
- The relationship between courses taken and achievement test scores;
- The relationship between student characteristics and grades or courses taken; and
- Documentation of minimum competency testing programs at the school and course-taking patterns, grades, or dropout rates (10th- through 12th-grade dropouts).

National Assessment of Educational Progress

The National Assessment of Educational Progress (NAEP) monitors knowledge, skills, and school performance of the nation's student population. NAEP began in 1969 and has periodically conducted assessments in different subject areas across a nationally representative sample of students ages 9, 13, and 17. The grades sampled have been changed to 4, 8, and 12 beginning with the 1988 assessments. The assessments were

conducted annually between the 1969 and 1979 school years. Currently, NAEP is conducted every other year in even-numbered years. In the 1988 assessment, data were collected from a national probability sample of about 35,000 students per age–grade group, or a total of about 105,000 students in nearly 1,750 schools.

The subject areas assessed have included reading, writing, mathematics, science, citizenship, U.S. history, geography, social studies, art, music, literature, and career and occupational development. In 1988, NAEP assessed student performance in reading, writing, civics, geography, and U.S. history. In 1990 NAEP assessed reading, writing, science, and mathematics.

NAEP also collects background information from students, teachers, and administrators that can be related to achievement. Student characteristics include sex, race, parental education, region of the country, home environment, and socioeconomic status indicators. School characteristics and policy variables include enrollment, curriculum testing, school administrative practices, school conditions and facilities, and special services and programs. The assessment test scores of students from schools with different characteristics and policies can be compared.

Until 1990, NAEP had been conducted to produce data at the national level. Disaggregation of results to the state level had been prohibited. In the 1990 assessment, representative state-level data were produced for states participating in a trial assessment of eighth-grade mathematics. The trial collected data from 37 states, two territories, and the District of Columbia. In 1992, NAEP will conduct a trial state-level mathematics assessment for the fourth and eighth grades and a trial reading assessment for the fourth grade. Depending on the outcomes of these assessments, Congress may authorize future NAEP studies at the state level.

NAEP studies can be used to

- Analyze achievement trends over time in reading, writing, mathematics, science, and other subjects;
- Compare changes in achievement for students of different sexes and different racial–ethnic backgrounds; and
- Compare achievement of students from schools with different student testing policies.

1987 High School Transcript Study (NAEP)

The 1987 High School Transcript Study sampled 433 public and private high schools that had previously participated in the 1986 National Assessment of Educational Progress (NAEP) study of students enrolled in grade 11 or who were age 17. Transcript data for students from these schools were collected in 1987 so that information about high school graduation would be available. In the participating high schools, copies of transcripts and related information were obtained in the fall of 1987 for 35,100 students, including 6,900 handicapped students. Although the NAEP schools were used as the sample, only about one-half of the students that are part of the 1987 High School Transcript Study also participated in the 1986 NAEP Assessment Testing program.

Student information collected for this survey is limited to sex, grade level, age, graduation status, and race–ethnicity. The study included a Special Education Student Questionnaire (completed by school staff) that identifies the nature and severity of the handicapping condition for all students with handicaps.

The files contain complete high school transcript data for grades 9 through 12. Course information for each student includes course title, grade when the course was taken, grade earned, and credits earned. The courses are categorized using the same classification as the 1982 HS&B Transcript Study, so that researchers can compare the courses taken by seniors from the two years.

In 1987, school administrators from the sampled schools completed a school characteristics and policies questionnaire that asked about course requirements for graduation. The data include total credits needed to graduate with a basic diploma and the credits required in English, math, computer science, social studies and history, science, foreign language, physical education, and other courses. The survey also collected information about other kinds of diplomas offered, grade-point average requirements for graduation, and the existence of competency tests for graduation at each school.

Another transcript study is being conducted for 1990 seniors. The analyses already planned for the new transcript study include descriptions of changes in course-taking patterns from 1982 to 1990 and the relationship between course taking and achievement.

The 1987 High School Transcript Study provides data on the following:

- Handicapped students (sufficient numbers to allow investigation of the unique experiences of that group);
- Student characteristics, including sex, grade level, age, graduation status, and race–ethnicity, which can be used to compare achievement, course-taking patterns, and high school graduation requirements;
- Courses taken and grades achieved in specific subject areas, or in specific courses; and
- Course-taking patterns for students attending schools with different standards (such as different minimum course requirements for graduation and minimum competency testing policies).

National Education Longitudinal Study of 1988 Student Survey and Transcript Study

The National Education Longitudinal Study of 1988 (NELS:88) is a new NCES database that follows students from the time they are enrolled in the eighth grade. The NELS:88 sample, drawn from the cohort of students enrolled in eighth grade in 1988, is representative at the national level. Participants were randomly selected from each of the 1,000 public and private schools sampled for the study. Some 25,000 eighth graders and their parents, teachers, and school principals were surveyed in 1988. Hispanic and Asian–American students were oversampled to create a sufficiently large sample for analysis of language-minority students.

The first follow-up surveyed the same students in 1990, when most were in 10th grade. It includes information on how school policies, teacher practices, and family involvement can be related to student educational outcomes (such as academic achievement and persistence in school). The database contains student background information

including race–ethnicity, sex, and socioeconomic status indicators and identifies handicapped students. Information on school policies and practices, testing and minimum course requirements, activities, and school climate are among the data available from a school administrator questionnaire.

Four cognitive tests were administered in 1988 and 1990. In the latter year, both students and school dropouts from the eighth-grade sample took cognitive tests in reading, science, social science (history and government), and mathematics. The tests will be administered again to the sample during their senior year in high school (1992). The tests were designed to reflect 8th- through 10th-grade coursework and have enough overlapping items with the 8th- and 12th-grade tests to permit measurement of academic growth.

High school transcripts for this sample of students will be collected after the expected graduation date for the cohort in June 1992. These transcripts will include courses taken, credits earned, and grades achieved in all high school classes. After the on-time graduation date for this sample (1992), the following data will be available:

- Complete information about courses taken and grades achieved while in high school;
- Dropout rates for a cohort of 8th graders;
- Achievement test scores in reading, science, social science, and mathematics administered in 8th, 10th, and 12th grades;
- Student characteristics including sex, race–ethnicity, and socioeconomic background;
- School policies, including testing and minimum course requirements for graduation (which can be linked to courses taken, grades, achievement test scores, and dropout rates);
- Test scores from 8th to 12th grade for students with different course-taking patterns; and
- Dropout rates for students with different course-taking patterns, grade-point averages, and achievement test scores, as well as data for students attending schools with different graduation requirements.

Common Core of Data

The Common Core of Data (CCD) is a comprehensive national, statistical database on all public elementary and secondary schools and school districts, which is generally comparable across all states. CCD contains information collected annually from state education agencies, including general descriptive and fiscal information. Basic data collected for CCD include the number of staff, student enrollment by grade, and some demographic information about staff and students. The fiscal data cover revenues and current expenditures.The states and federal participants work together to identify data needs and to develop definitions for those items that can be agreed upon by the states. Most recently, the cooperative system worked together to develop and test definitions and methodology for collecting cross-state comparable data on dropouts. New areas of endeavor include the development of automated student record systems and the development of definitions and measurement methodology for limited-English-proficient students.

Schools and Staffing Survey

The Schools and Staffing Survey (SASS) is a comprehensive public and private school education database that combines and expands on three data sets previously collected by NCES: a survey of teacher demand and shortages, surveys of public and private schools, and a survey of public and private school teachers. In 1987–88, SASS contained a sample of approximately 65,000 teachers, 12,800 schools, and 5,600 school districts. The data from SASS support national estimates of various characteristics of public and private schools and state estimates for public schools. NCES first conducted SASS in 1987–88 and again in 1990–91. It will be administered at 2-year intervals in the future.

SASS contains four questionnaires. The *Teacher Demand and Shortage Questionnaire* surveys schools about demand for teachers and factors affecting the supply of teachers. It also asks about the number of credits students in the graduating classes must complete in order to graduate from school. The *School Questionnaire* surveys programs, policies, and conditions; student characteristics; and staffing patterns. The *School Administrator Questionnaire* surveys principals and school heads about their backgrounds and their perceptions of school climate. The *Teacher Questionnaire* provides information about the demographics and qualifications of teachers, their working conditions, career history, and career plans.

SASS files contain information that is useful for developing descriptions of school policies. These data can be used to track changes over time in school policies and graduation requirements, beginning with the 1987–88 school year, for the entire nation or for the public sector in individual states. Although SASS does not contain information about individual students attending these schools, it includes some information about students, aggregated at the school level, such as race and ethnicity.

Data about school policies available in the SASS are

- Basic descriptions of schools and enrollments;
- Organizational information, such as the decision-making responsibilities of district administrators, principals, and teachers;
- Descriptions of available curriculum and student programs;
- Course credits required for high school graduation;
- Descriptions of staffing and teacher workplace conditions; and
- Information about average student characteristics and school climate.

Education Supplement to the Current Population Survey

Related to, but separate from the NCES databases, the Current Population Survey (CPS) is conducted by the Bureau of the Census on a regular basis. The basic CPS is conducted monthly and collects primarily labor force data for the civilian non-institutionalized population. In addition to the basic CPS questions which are asked every month, in October each year, there are supplementary questions about school enrollment for all eligible household members 3 years old and over. Questions asked every October include enrollment status in regular school (nursery, kindergarten, elementary, high school, college, university, or professional school), grade level, enrollment in school during the previous year, and high school graduation status of the individuals living in the sampled households.

The present CPS sample was selected from the 1980 Decennial Census files covering all 50 states and the District of Columbia. About 56,100 occupied housing units are eligible for interview every month. Since 1981, sample sizes have ranged from about 53,000 to 59,000 households.

CPS generates information on enrollment in school (from preschool to college) and high school dropout rates. The following data are of special interest:

- Proportions of the population below, at, or above modal grade (where modal grade is defined as the typical grade for persons of a specific age at the time of the survey);
- Event dropout rate (the proportion of a group of students who drop out of school in a single year—that is, the proportion of those who were attending school the previous year, who are no longer attending, and who have not completed high school); and
- Status dropout rates (the proportion of all individuals in a specific age group who are not currently attending school and have not completed high school or the equivalent).

Appendix C

Standard Error Tables

Table C.1—Percentage (and standard errors) of students with mathematics proficiency at or above five proficiency levels by race–ethnicity and age: 1978, 1982, 1986, and 1990

Age, race, and year	Simple arithmetic facts	Beginning skills and understanding	Basic operations and beginning problem-solving	Moderately complex procedures and reasoning	Multi-step problem and algebra
			(percent)		
9-year-olds					
Total					
1978	96.7(0.3)*	70.4(0.9)*	19.6(0.7)*	0.8(0.1)	0.0(0.0)
1982	97.1(0.3)*	71.4(1.2)*	18.8(1.0)*	0.6(0.1)	0.0(0.0)
1986	97.9(0.3)*	74.1(1.2)*	20.7(0.9)*	0.6(0.2)	0.0(0.0)
1990	99.1(0.2)	81.5(1.0)	27.7(0.9)	1.2(0.3)	0.0(0.0)
White					
1978	98.3(0.2)*	76.3(1.0)*	22.9(0.9)*	0.9(0.2)	0.0(0.0)
1982	98.5(0.3)*	76.8(1.2)*	21.8(1.1)*	0.6(0.1)	0.0(0.0)
1986	98.8(0.2)*	79.6(1.3)*	24.6(1.0)*	0.8(0.3)	0.0(0.0)
1990	99.6(0.2)	86.9(0.9)	32.7(1.0)	1.5(0.4)	0.0(0.0)
Black					
1978	88.4(1.0)*	42.0(1.4)*	4.1(0.6)*	0.0(0.0)	0.0(0.0)
1982	90.2(1.0)*	46.1(2.4)*	4.4(0.8)*	0.0(0.0)	0.0(0.0)
1986	93.9(1.4)	53.4(2.5)	5.6(0.9)	0.1(0.0)	0.0(0.0)
1990	96.9(0.9)	60.0(2.8)	9.4(1.7)	0.1(0.1)	0.0(0.0)
Hispanic					
1978	93.0(1.2)*	54.2(2.8)*	9.2(2.5)	0.2(0.5)	0.0(0.0)
1982	94.3(1.2)*	55.7(2.3)*	7.8(1.7)	0.0(0.5)	0.0(0.0)
1986	96.4(1.3)	57.6(2.9)	7.3(2.8)	0.1(0.5)	0.0(0.0)
1990	98.0(0.8)	68.4(3.0)	11.3(3.5)	0.2(0.5)	0.0(0.0)
13-year-olds					
Total					
1978	99.8(0.1)*	94.6(0.5)*	64.9(1.2)*	18.0(0.7)	1.0(0.2)*
1982	100.0(0.0)	97.7(0.4)	71.4(1.2)	17.4(0.9)	0.5(0.1)
1986	100.0(0.0)	98.6(0.2)	73.3(1.6)	15.8(1.0)	0.4(0.1)
1990	100.0(0.0)	98.5(0.2)	74.7(1.0)	17.3(1.0)	0.4(0.1)
White					
1978	100.0(0.0)	97.6(0.3)*	72.9(0.9)*	21.4(0.7)	1.2(0.2)
1982	100.0(0.0)	99.1(0.1)	78.3(0.9)*	20.5(1.0)	0.6(0.1)
1986	100.0(0.0)	99.3(0.3)	78.9(1.7)	18.6(1.2)	0.4(0.1)
1990	100.0(0.0)	99.4(0.1)	82.0(1.0)	21.0(1.2)	0.4(0.2)

Table C.1—Percentage (and standard errors) of students with mathematics proficiency at or above five proficiency levels by race–ethnicity and age: 1978, 1982, 1986, and 1990—Continued

Age, race, and year	Simple arithmetic facts	Beginning skills and understanding	Basic operations and beginning problem-solving	Moderately complex procedures and reasoning	Multi-step problem and algebra
13-year-olds—continued					
Black					
1978	98.6(0.4)	79.7(1.5)	28.7(2.1)*	2.3(0.5)	0.0(0.1)
1982	99.8(0.2)	90.2(1.6)	37.9(2.5)	2.9(1.0)	0.0(0.0)
1986	100.0(0.0)	95.4(0.9)	49.0(3.7)	4.0(1.4)	0.1(0.1)
1990	100.0(0.2)	95.4(1.1)	48.7(3.6)	3.9(1.6)	0.1(0.3)
Hispanic					
1978	99.6(0.3)	86.4(0.9)*	36.0(2.9)	4.0(1.0)	0.1(0.1)
1982	99.9(0.1)	95.9(0.9)	52.2(2.5)	6.3(1.0)	0.0(0.1)
1986	100.0(0.3)	96.9(1.4)	56.0(5.0)	5.5(1.1)	0.2(0.4)
1990	99.9(0.3)	96.8(1.1)	56.7(3.3)	6.4(1.7)	0.1(0.1)
17-year-olds					
Total					
1978	100.0(0.0)	99.8(0.1)	92.0(0.5)*	51.5(1.1)*	7.3(0.4)
1982	100.0(0.0)	99.9(0.0)	93.0(0.5)*	48.5(1.3)*	5.5(0.4)
1986	100.0(0.0)	99.9(0.1)	95.6(0.5)	51.7(1.4)	6.5(0.5)
1990	100.0(0.0)	100.0(0.1)	96.0(0.5)	56.1(1.4)	7.2(0.6)
White					
1978	100.0(0.0)	100.0(0.0)	95.6(0.3)*	57.6(1.1)*	8.5(0.5)
1982	100.0(0.0)	100.0(0.0)	96.2(0.3)*	54.7(1.4)*	6.4(0.5)
1986	100.0(0.0)	100.0(0.1)	98.0(0.4)	59.1(1.7)	7.9(0.7)
1990	100.0(0.0)	100.0(0.1)	97.6(0.3)	63.2(1.6)	8.3(0.7)
Black					
1978	100.0(0.0)	98.8(0.3)*	70.7(1.7)*	16.8(1.6)*	0.5(0.2)
1982	100.0(0.0)	99.7(0.2)	76.4(1.5)*	17.1(1.5)*	0.5(0.3)
1986	100.0(0.0)	100.0(0.2)	85.6(2.5)	20.8(2.8)	0.2(0.3)
1990	100.0(0.0)	99.9(0.2)	92.4(2.2)	32.8(4.5)	2.0(1.0)
Hispanic					
1978	100.0(0.0)	99.3(0.4)	78.3(2.3)	23.4(2.7)	1.4(0.6)
1982	100.0(0.0)	99.8(0.3)	81.4(1.9)	21.6(2.2)	0.7(0.4)
1986	100.0(0.0)	99.4(1.2)	89.3(2.5)	26.5(4.5)	1.1(0.8)
1990	100.0(0.0)	99.6(0.7)	85.8(4.2)	30.1(3.1)	1.9(0.8)

*Statistically significant difference from 1990, as determined 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.

SOURCE: I.V.S. Mullis, J. Dossey, M.A. Foertsch, L.R. Jones, and C.A. Gentile, *Trends in Academic Progress, Achievement of American Students in Science, 1970–90, Mathematics, 1973–90, Reading, 1971–90, and Writing, 1984–90.* (Princeton: Educational Testing Service, January 1992).

Table C.2—Percentage (and standard errors) of students with reading proficiency at or above five proficiency levels by race–ethnicity and age: 1975, 1980, 1984, 1988, and 1990

Age, race, and year	Percent able to read at least at level: Simple, discrete reading tasks	Partially developed skills and understanding	Interrelate ideas and make generalizations	Understand complicated problems	Learn from specialized reading materials
	(percent)				
9-year-olds					
Total					
1975	93.1(0.4)*	62.1(0.8)	14.6(0.6)*	0.6(0.1)*	0.0(0.0)
1980	94.6(0.4)*	67.7(1.0)*	17.7(0.8)	0.6(0.1)*	0.0(0.0)
1984	92.3(0.3)	61.5(0.7)	17.2(0.6)	1.0(0.1)	0.0(0.0)
1988	92.7(0.7)	62.6(1.3)	17.5(1.1)	1.4(0.3)	0.0(0.0)
1990	90.1(0.9)	58.9(1.3)	18.4(1.0)	1.7(0.3)	0.0(0.1)
White					
1975	96.0(0.3)	69.0(0.8)	17.4(0.7)*	0.7(0.1)*	0.0(0.0)
1980	97.1(0.2)*	74.2(0.7)*	21.0(0.9)	0.8(0.1)*	0.0(0.0)
1984	95.4(0.3)	68.6(0.8)	20.9(0.7)	1.2(0.2)	0.0(0.0)
1988	95.1(0.7)	68.4(1.6)	20.3(1.5)	1.6(0.3)	0.0(0.0)
1990	93.5(0.9)	66.0(1.4)	22.6(1.2)	2.2(0.4)	0.0(0.1)
Black					
1975	80.7(1.1)	31.6(1.5)	2.0(0.3)	0.0(0.0)	0.0(0.0)
1980	84.9(1.4)	41.3(1.9)	4.1(0.6)	0.0(0.0)	0.0(0.0)
1984	81.3(1.0)	36.6(1.5)	4.5(0.5)	0.1(0.1)	0.0(0.0)
1988	83.2(2.4)	39.4(2.9)	5.6(1.2)	0.2(0.2)	0.0(0.0)
1990	76.9(2.7)	33.9(3.4)	5.2(1.5)	0.3(0.2)	0.0(0.0)
Hispanic					
1975	80.8(2.5)	34.6(3.0)	2.6(0.5)	0.0(0.0)	0.0(0.0)
1980	84.5(1.8)	41.6(2.6)	5.0(1.4)	0.0(0.0)	0.0(0.0)
1984	82.0(2.1)	39.6(2.2)	4.3(0.6)	0.1(0.0)	0.0(0.0)
1988	85.6(3.5)	45.9(3.3)	8.6(2.3)	0.4(0.0)	0.0(0.0)
1990	83.7(1.8)	40.9(2.7)	5.8(2.0)	0.2(0.3)	0.0(0.0)
13-year-olds					
Total					
1975	99.7(0.1)	93.2(0.4)	58.6(1.0)	10.2(0.5)	0.2(0.0)
1980	99.9(0.1)	94.8(0.4)	60.7(1.1)	11.3(0.5)	0.2(0.0)
1984	99.8(0.0)	93.9(0.3)	59.0(0.6)	11.0(0.4)	0.3(0.1)
1988	99.9(0.1)	94.9(0.6)	58.7(1.3)	10.9(0.8)	0.2(0.1)
1990	99.8(0.1)	93.8(0.6)	58.7(1.0)	11.0(0.6)	0.4(0.1)

Table C.2—Percentage (and standard errors) of students with reading proficiency at or above five proficiency levels by race–ethnicity and age: 1975, 1980, 1984, 1988, and 1990—Continued

Age, race, and year	Percent able to read at least at level: Simple, discrete reading tasks	Partially developed skills and understanding	Interrelate ideas and make generalizations	Understand complicated problems	Learn from specialized reading materials
13-year-olds—continued					
White					
1975	99.9(0.0)	96.4(0.2)	65.5(0.9)	12.1(0.5)	0.3(0.1)
1980	100.0(0.0)	97.1(0.2)	67.8(0.8)	13.6(0.6)	0.3(0.1)
1984	99.9(0.0)	96.2(0.3)	65.3(0.7)	13.1(0.5)	0.4(0.1)
1988	99.9(0.1)	96.0(0.6)	63.7(1.5)	12.4(0.9)	0.3(0.1)
1990	99.9(0.1)	96.0(0.6)	64.8(1.2)	13.3(0.9)	0.5(0.2)
Black					
1975	98.4(0.3)	76.9(1.3)*	24.8(1.6)*	1.5(0.3)*	0.0(0.0)
1980	99.3(0.3)	84.1(1.7)	30.1(2.0)*	1.8(0.5)*	0.0(0.0)
1984	99.4(0.2)	85.5(1.0)	34.6(1.2)	2.8(0.5)	0.0(0.0)
1988	99.8(0.3)	91.3(2.2)	40.2(2.3)	4.6(1.2)	0.1(0.3)
1990	99.4(0.5)	87.7(2.3)	41.7(3.5)	4.6(0.8)	0.1(0.3)
Hispanic					
1975	99.6(0.3)	81.3(2.3)	32.0(3.6)	2.2(1.0)	0.0(0.0)
1980	99.7(0.3)	86.8(2.4)	35.4(2.6)	2.3(0.6)	0.0(0.0)
1984	99.5(0.4)	86.7(1.5)	39.0(2.1)	4.1(0.7)	0.1(0.1)
1988	99.2(0.8)	87.4(2.6)	38.0(4.4)	4.4(1.9)	0.0(0.0)
1990	99.1(0.5)	85.8(2.4)	37.2(2.9)	3.9(1.2)	0.1(0.2)
17-year-olds					
Total					
1975	99.7(0.1)	96.4(0.3)*	80.1(0.7)*	38.7(0.8)	6.2(0.3)
1980	99.9(0.1)	97.2(0.3)	80.7(0.9)	37.8(1.1)	5.3(0.4)*
1984	100.0(0.0)	98.3(0.1)	83.1(0.5)	40.3(0.8)	5.7(0.3)
1988	100.0(0.0)	98.9(0.3)	85.7(0.8)	40.9(1.5)	4.6(0.6)*
1990	99.9(0.1)	98.1(0.3)	84.1(1.0)	41.4(1.0)	7.0(0.5)
White					
1975	99.9(0.0)	98.6(0.1)	86.2(0.6)	43.9(0.8)	7.2(0.4)
1980	100.0(0.0)	99.1(0.1)	86.9(0.6)	43.3(1.1)	6.2(0.4)*
1984	100.0(0.0)	99.0(0.1)	88.0(0.5)	46.3(0.9)	6.9(0.4)
1988	100.0(0.0)	99.3(0.3)	88.7(0.9)	45.4(1.6)	5.5(0.7)*
1990	100.0(0.0)	98.8(0.2)	88.3(1.1)	47.5(1.2)	8.7(0.6)

Table C.2—Percentage (and standard errors) of students with reading proficiency at or above five proficiency levels, by race-ethnicity and age: 1975, 1980, 1984, 1988, and 1990—Continued

Age, race, and year	Percent able to read at least at level: Simple, discrete reading tasks	Partially developed skills and under-standing	Interrelate ideas and make generali-zations	Understand complicated problems	Learn from specialized reading materials
17-year-olds—continued					
Black					
1975	97.7(0.8)	82.0(1.8)*	43.0(1.6)*	8.1(0.7)*	0.4(0.3)
1980	99.0(0.3)	85.6(1.7)*	44.0(2.0)*	7.1(0.8)*	0.2(0.2)
1984	99.9(0.1)	95.9(0.5)	65.7(1.2)	16.2(0.9)	0.9(0.3))
1988	100.0(0.0)	98.0(1.0)	75.8(2.4)	24.9(3.1)	1.4(0.7)
1990	99.6(0.8)	95.7(1.3)	69.1(2.8)	19.7(1.8)	1.5(1.0)
Hispanic					
1975	99.3(0.4)	88.7(2.4)	52.9(4.1)*	12.6(2.7)*	1.2(0.6)
1980	99.8(0.3)	93.3(1.8)	62.2(3.1)	16.5(2.1)	1.3(0.4)
1984	99.8(0.2)	95.6(0.7)	68.3(2.1)	21.2(2.3)	2.0(0.4)
1988	99.9(0.0)	96.3(2.4)	71.5(4.8)	23.3(3.7)	1.3(1.2)
1990	99.7(0.0)	95.9(2.1)	75.2(4.7)	27.1(3.3)	2.4(1.4)

*Statistically significant difference from 1990, as determined by an application of the Bonferroni procedure, where alpha equals .05 per set of five comparisons (each year including 1971, not shown, compared with 1990). Thus, alpha equals .01 for each comparison.

SOURCE: I.V.S. Mullis , J. Dossey, M.A. Foertsch, L.R. Jones, and C.A. Gentile, *Trends in Academic Progress, Achievement of American Students in Science, 1970–90, Mathematics, 1973–90, Reading, 1971–90, and Writing, 1984–90*. (Princeton: Educational Testing Service, January 1992).

Table C.3—Standard errors for Figure 3.9: Status dropout rates for persons ages 16–24, by race–ethnicity: October 1973 through October 1990

Year	Total	Race–ethnicity[1]		
		White, non-Hispanic	Black, non-Hispanic	Hispanic
1973	0.27	0.28	0.96	1.71
1974	0.27	0.28	0.95	1.59
1975	0.26	0.27	0.96	1.54
1976	0.26	0.27	0.91	1.53
1977	0.26	0.27	0.89	1.53
1978	0.26	0.27	0.89	1.51
1979	0.26	0.27	0.90	1.50
1980	0.26	0.27	0.87	1.43
1981	0.25	0.27	0.83	1.36
1982	0.28	0.29	0.89	1.47
1983	0.28	0.29	0.88	1.47
1984	0.27	0.29	0.84	1.46
1985	0.27	0.29	0.84	1.34
1986	0.27	0.29	0.82	1.30
1987[2]	0.30	0.32	0.91	1.40
1988[2]	0.31	0.32	0.91	1.47
1989[2]	0.31	0.32	0.90	1.40
1990[2]	0.30	0.32	0.89	1.40

[1]Not shown separately are non-Hispanics who are neither black nor white, but who are included in the total.
[2]Numbers for these years reflect new editing procedures instituted by the Bureau of the Census in 1986 for cases with missing data on school enrollment items.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October (various years), unpublished tabulations.

Table C.4—Standard errors for Figure 3.10: Single-year event dropout rates for grades 10–12, ages 15–24, by race–ethnicity: 1973 through 1990

Year	Total	Race–ethnicity[1]		
		White, non-Hispanic	Black, non-Hispanic	Hispanic
1973	0.34	0.35	1.26	2.07
1974	0.34	0.36	1.29	1.94
1975	0.32	0.33	1.14	1.93
1976	0.32	0.35	1.06	1.58
1977	0.33	0.37	1.08	1.64
1978	0.34	0.36	1.19	2.12
1979	0.34	0.36	1.21	1.86
1980	0.33	0.35	1.10	1.95
1981	0.33	0.34	1.17	1.78
1982	0.35	0.35	1.14	1.84
1983	0.34	0.36	1.10	1.88
1984	0.35	0.38	1.01	1.99
1985	0.35	0.37	1.19	1.79
1986	0.33	0.34	0.99	1.90
1987[2]	0.34	0.37	1.16	1.50
1988[2]	0.37	0.40	1.11	2.02
1989[2]	0.36	0.38	1.28	1.70
1990[2]	0.35	0.38	1.09	1.70

[1]Not shown separately are non-Hispanics who are neither black nor white, but who are included in the total.
[2]Numbers for these years reflect new editing procedures instituted by the Bureau of the Census for cases with missing data on school enrollment items.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October (various years), unpublished tabulations.

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